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Efficiency as a Discovery Process: Why Enhanced Incentives Outperform Regulatory Mandates

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HIGHLIGHT: Opponents of incentive regulation claim explicit rewards are unnecessary because utilities already operate under a "statutory obligation" to be efficient. But that view ignores that incentives are generally superior to mandates for eliciting performance gains, and that a firm cannot knowingly disavow and strategically withhold efficiencies it has yet to discover.

I. Introduction

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There has been a pervasive adoption of incentive regulation worldwide in both the electric power industry and the telecommunications industry. <n1> In the U.S., at least 28 electric utility companies in 16 states operated under some form of broad-based incentive regulation in 2000-01. <n2> Of the 28 identified electric utilities, 13 operate under some form of rate moratorium and 14 operate under price caps. Of the 28 incentive regulation plans, 21 contain earnings sharing provisions or simple dead bands. <n3>

n1 Incentive regulation can be defined as the implementation of rules that provide a regulated firm with strong incentives to achieve desired goals while granting significant, but not unlimited, discretion to the firm. In some sense, all types of regulation--including some forms of cost-of-service regulation--can constitute a form of incentive regulation. The common practice has been to limit the definition of incentive regulation to alternative forms of regulation that satisfy the above definition. These include price cap regulation, rate moratoria or rate freezes (which are also a form of price cap regulation), and various combinations that include earnings sharing. See David E.M. Sappington and Dennis L. Weisman, *Designing Incentive Regulation for the Telecommunications Industry* (Cambridge, MA: MIT Press, 1996), at 2. See also note 13 below.

n2 David E.M. Sappington, Johannes P. Pfeifenberger, Philip Hanser and Gregory N. Basheda, Status and Trends of Performance-Based Regulation in the U.S. Electric Utility Industry, *Elec. J.*, Oct. 2001, at 71-79.

n3 A dead-band is a range of earnings within which no action is taken by the regulator--either to modify rates or to appropriate earnings.

The adoption of incentive regulation in the telecommunications industry is even more dramatic. In the course of just over 15 years, at least 48 U.S. states have changed the method of regulating dominant local exchange telephone companies from traditional, cost-of-service regulation to some form of incentive regulation (price caps, rate moratoria, or earnings sharing). Similar changes in regulatory regime have occurred in Australia, Europe, and South America. Moreover, the trend in the U.S. has been clearly in the direction of pure price cap regulation--price cap plans without earnings sharing. In 1995, dominant local exchange carriers in the U.S. were subject to some form of earnings-based regulation (cost-of-service regulation or earnings-sharing regulation) in 35 states and pure price cap regulation in 9 states. In 2000, the corresponding values were 8 and 39, respectively. <n4>

n4 See David E.M. Sappington, Price Regulation, in Martin Cave, Sumit Majumdar, and Ingo Vogelsang (eds.), *Handbook of Telecommunications Economist* (Amsterdam: North-Holland, 2002), Table 2, Chap. 7, at 225-293.

The speed with which incentive regulation has been adopted can be explained principally by the fact that it offers the prospect of superior performance gains that can benefit all key interest groups. Consumers can benefit from lower rates or slower rate increases; the regulated firm can benefit through enhanced profitability and pricing flexibility; the regulatory process can be streamlined; and competitors can enjoy more favorable terms of entry. In other words, incentive regulation represents a "win-win" proposition. <n5>

n5 The empirical evidence to date appears to support this claim. See, for example, Jaison R. Abel, *The Performance of the State Telecommunications Industry under Price-Cap Regulation: An Assessment of the Empirical Evidence*, NRRI 00-14, National Regulatory Research Institute, Sept. 2000; and Chunrong Ai and David Sappington, *The Impact of State Incentive Regulation on the U.S. Telecommunications Industry*, *J. Regul. Econ.*, forthcoming. Note, however, that the overall benefits of incentive regulation are perhaps less controversial than the distribution of those benefits between consumers and regulated firms. The regulated firm under incentive regulation typically bears greater risk in exchange for the prospect of a higher return. The realization of this higher return depends upon the regulated firm's ability to improve efficiency. In contrast, the gains to consumers, which include rate reductions or freezes, bill credits and infrastructure upgrades, are typically guaranteed up-front and thus independent of the actual performance of the regulated firm. This is an important distinction because there may be a temptation by some parties to point to the greater profitability of the regulated firm under incentive regulation as evidence of an inequitable distribution of the gains from incentive regulation. What this perspective fails to realize is that in a different state of the world in which the regulated firm did not perform well, consumers are shielded under incentive regulation from the rate increases that may attend earnings deficiencies under the traditional regulatory model. In other words, incentive regulation provides a type of "insurance" for consumers that derives from a less direct linkage between the regulated firm's rates and its actual costs.

Despite the widespread adoption of incentive regulation and increasing recognition of its attendant benefits, it is not uncommon in regulatory proceedings to encounter opposition to incentive regulation on grounds that utilities already have a "statutory obligation" to be efficient and, therefore, should not require additional rewards through incentive plans. At the crux of this argument are two key misconceptions. The first misconception is that a "mandate" to be efficient will produce the same long-term benefits as properly structured "incentives" to be efficient. The second misconception is the belief that regulated firms may knowingly and strategically disavow opportunities to increase operating efficiency under traditional regulation in order to profit from such innovation under incentive regulation.

The purpose of this article is to examine the basis for these misconceptions. There are two primary responses. First, motivating increased performance through incentives is generally superior to mandating desired performance levels. Second, the realization that efficiency is a "discovery process" necessarily implies that a regulated firm cannot knowingly disavow and strategically withhold what it has yet to discover. These two points--largely self-evident for those predisposed to favor incentive regulation--explain the important role that enhanced incentives play in generating dynamic efficiency gains and in enhancing the performance of regulated firms.

II. The Important Role of Incentives

The prominent role of incentives in a market economy is (i) to allocate scarce resources to their highest valued use; (ii) to elicit cost minimization and innovation; and (iii) to encourage firms to supply the products and services that consumers demand. Professor James Bonbright, a leading authority in the field of public utility regulation, explains the important role of market forces in fostering incentives to pursue such efficiency and overall performance:

Under unregulated competition, the price system is supposed to function in two ways with respect to the relationship between the price of the product and the cost of production. In the first place, the rate of output of any commodity will so adjust itself to the demand that the market price will tend to come into accord with production costs. But in the second place, competition will impel rival producers to strive to reduce their own production costs in order to maximize profits and even in order to survive in the struggle for markets. This latter, dynamic effect of competition has been regarded by modern economists as far more important and far more beneficent than any tendency of "atomistic" forms of competition to bring costs and prices into close alignment at any given point of time. <n6>

n6 James C. Bonbright, *Principles of Public Utility Rates* (New York: Columbia University Press, 1961), at 107.

These performance incentives fostered by competitive markets derive from the profit motive. The quest for such profits ultimately benefits society as producers strive to supply the goods and services that consumers want at the lowest possible cost. In other words, the pursuit of enlightened self-interest by economic agents serves to benefit society in the aggregate as if their actions were guided by an "invisible hand." <n7>

n7 Adam Smith, *The Wealth of Nations* (New York: Modern Library, 1937) (originally published in 1776), at 423.

The collapse of many centrally planned economies vividly demonstrates that market economies and their strong reliance on incentives are superior to mandates for fostering innovation, efficiency, and overall performance. For example, in recounting the fundamental flaws in the Soviet economic system, Yergin and Stanislaw observe that:

Already by the early 1970s, a fatal weakness was becoming clear in the system: It could not, for the most part, innovate. There was no reward, no reason to do anything new. In fact, there was a strong predisposition to avoid change of any kind, for change caused enormous bureaucratic headaches. The best thing was to keep doing what had been done before. In more advanced economies, innovation was essential to the promotion of economic growth. But in the Soviet system innovation was characterized mainly by its absence. And that applied to everything--whether it was small changes to make processes work better or the introduction of new products. <n8>

n8 Daniel Yergin and Joseph Stanislaw, *Commanding Heights* (New York: Simon & Schuster, 1998), at 273.

While it is prudent to err on the side of caution in drawing wholesale comparisons between market economies and incentive regulation, there are clearly some noteworthy parallels. Prominent among these are the inability of government or regulatory agencies to mandate efficient outcomes, even with the most detailed planning and supervision, and the importance of tangible rewards for motivating superior long-term performance through enhanced efficiency and innovation. The "five-year plans" in the former Soviet Union were notorious for both their level of detail and their inability to elicit performance. These plans were characterized by a virtually complete absence of meaningful incentives and rewards as the government attempted, unsuccessfully, to mandate rather than motivate performance.

It is generally accepted that a primary objective of economic regulation is to emulate a competitive market outcome. Professor Alfred Kahn, for example, observes that "the single most widely accepted rule for the governance of the regulated industries is regulate them in such a way as to produce the same results as would be produced by effective competition, if it were feasible." <n9>

n9 Alfred E. Kahn, *The Economics of Regulation: Principles and Institutions*, vol. I (New York: John Wiley &

Sons, 1970), at 17. See also, Bonbright, *supra* note 6, at 107.

The relevant model of competition to inform regulatory policy is not one of atomistic or perfect competition, <n10> but rather one that evaluates and rewards the performance of regulated entities. While the task of evaluating the performance of the utility is inherently difficult in the absence of actual competition, the basic principle is straightforward: the utility's performance is measured and rewarded or penalized based on predetermined, broad-based performance targets, such as the timely provision of quality service at capped prices. The roots of these ideas trace back almost a half a century and form the essence of the modern theory of incentive regulation as commonly practiced today. <n11>

n10 As Professor Joseph Schumpeter observed: In this respect, perfect competition is not only impossible, but inferior, and has no title to being set up as a model of ideal efficiency. It is hence a mistake to base the theory of government regulation of industry on the principle that big business should be made to work as the respective industry would work in perfect competition. See Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper & Row, 1942), at 106.

n11 See, for example, Sappington and Weisman, *supra* note 1, Chap. 5.

A voluminous amount of theoretical and empirical research concludes that incentive regulation is generally superior to strict cost-of-service regulation in emulating such a competitive market outcome. <n12> This superior performance derives from the fact that incentive regulation, given the greater emphasis on prices rather than earnings, operates more like a fixed price contract in the sense that the regulated firm is limited in its ability to pass cost increases on to consumers in the form of higher rates. This contrasts with strict cost-of-service regulation that operates like a cost-plus contract. The result is that incentive regulation (including some forms of modified cost-of-service regulation) <n13> provides stronger incentives that lead to superior performance gains in numerous dimensions, including (i) use of least-cost technologies; (ii) efficient level of cost-reducing innovations; (iii) incentives to invest and operate efficiently; and (iv) efficient diversification into new markets.

n12 See, for example, Sappington, *supra* note 4.

n13 Cost-of-service regulation that explicitly rewards superior performance or that specifically allows for extended regulatory lags can also provide strong performance incentives. Such modified cost-of-service regulation, for example, may also employ lengthened regulatory lags similar to rate moratoria. Also note that the traditional regulatory model is not inconsistent with providing rewards for superior performance. Regulatory agencies generally have some flexibility to consider superior company performance or management efficiency as a "non-cost factor" in determining whether a utility's rates are within a just and reasonable range. The Federal Energy Regulatory Commission, for example, stated in its Order 414-A (July 29, 1998) that "the Commission will not lower a pipeline's ROE if its lower risk is the result of the pipeline's own efficiency ... The record in this case makes it clear that Transco's positive market position is largely the result of the pipeline's relatively low rates in its market area ... These are characteristics of a healthy company whose efficiency has enabled it to compete successfully in the market place and satisfy its customers." (slip op., at 34-35).

The manner in which enhanced incentives lead to cost control and superior performance is illustrated by the following statement of a utility's chief financial officer concerning the merits of incentive regulation:

There are a couple items I think are very critical to the issue at hand. The most important has been the use of this [earnings sharing plan] in helping to change the culture of the Company ... [I]t's my job to beat on people about cost ... [But employees] said, every time we reduce costs, the Commission comes and takes it away. [T]hat's the way the cost-of-service model rate base regulation works, ... that's a disincentive. And when we got this plan in place, I made speech after speech ... Here's your opportunity, folks. This is as close to competition I can get you right now, but you make a dollar and we get to keep half of it. It goes to the bottom line. And again, regardless of whether I'm talking to a vice president or a pipefitter in one of our power plants, that's had an effect, and I've seen that effect ... It's good for the

shareholders and it's good for customers. I know that sounds trite, but that rings a bell when it comes to employees.
<n14>

n14 Testimony of Donald E. Brandt before the Missouri Public Service Commission, Transcript of Proceeding, Case No. EO-96-14, June 2, 1999, at 266-267.

This discussion of performance incentives should not be construed to imply that there is not an important role for mandates and obligations. To the contrary, in virtually every society and economic model it is necessary to impose certain mandates and obligations--be it contract laws, safety regulations, and other basic legal and regulatory constraints. In fact, some of these mandates and obligations, such as patent laws and other intellectual property rights, are specifically designed to create strong incentives and rewards for innovation and superior performance. <n15> In general, the role of such mandates and obligations takes the form of setting minimum standards for what is acceptable behavior rather than as a means to solicit superior performance. While such mandates and obligations can help ensure that certain minimum standards are met, robust incentives are required to elicit superior performance. This is the case simply because there is generally a wide "gap" between superior performance and performance that is considered merely acceptable.

n15 It is interesting to note that intellectual property laws may give temporary monopolies (e.g., patent rights) to firms in competitive markets in order to provide "incentives and rewards" to encourage innovation, efficiency gains, and superior performance. Yet some argue that "incentives and rewards" to encourage innovation, efficiency gains, and superior performance for regulated monopolies are unnecessary because regulated firms already have the "obligation" to be efficient.

The important role of incentives in eliciting performance gains has been validated in numerous venues covering many aspects of human interactions not only in how firms and consumers interact in a market economy or how firms compensate their employees, but also how government can exact performance gains from its individual agencies and employees, <n16> or even how sporting events motivate participating athletes. <n17> This broad experience confirms that it is not the mandates or obligations, but the incentives created by the prospect of meaningful rewards and recognition, that are most effective in eliciting enhanced performance.

n16 The importance of performance-based compensation within government agencies is broadly recognized. For example, the U.S. General Accounting Office (GAO) notes that "[i]f federal agencies hope to maximize their performance, ensure accountability, and achieve their strategic goals and objectives, they must, among other things, make effective use of incentives--whether monetary or nonmonetary--to motivate and reward their workforce ..." (Human Capital: Using Incentives to Motivate and Reward High Performance. Statement of Michael Brostek, GAO/T-GGD-00-118, May 2, 2000, at 11-12). The importance of incentives is also recognized with respect to government agencies as a whole. For example, a recent report of the Missouri Energy Policy Task Force "recognizes that state agencies may be reluctant to become more efficient if those efficiencies result in a dollar-for-dollar reduction in their budgets." (Final Report of the Missouri Energy Policy Task Force Presented to Governor Bob Holden. Northwest Missouri State University, Maryville, Missouri, Oct. 16, 2001, at 19). The Task Force recommended that these agencies be given efficiency incentives in the form of a shared savings program.

n17 For example, studies found that: the performance of race car drivers increases with the absolute spread of prizes (Brian E. Becker and Mark A. Huselid, *The Incentive Effects of Tournament Compensation Systems*, *Admin. Sci. Q.*, 1992, 37, at 336-350); golfers' performance increases with higher prizes (Ronald G. Ehrenberg and Michael L. Bognanno, *The Incentive Effects of Tournaments Revisited: Evidence from the European PGA Tour*, *Ind'l & Labor Relations Rev.*, 1990, 43, at 74-89); and an incentive pay scheme that shares part of the prize money in horse races with jockeys elicits much improved performance over giving jockeys a flat fee for riding (Sue Femie and David Metcalf, *It's Not What You Pay, It's the Way You Pay It: Jockey's Pay and Performance*, *CentrePiece Magazine*, June 1996, 2).

III. Efficiency as a Discovery Process

The opposition to incentive regulation is not typically based on a lack of recognition that incentives can elicit superior performance and dynamic efficiency gains. Rather, opposition to incentive regulation often focuses on whether such incentives are needed. Not surprisingly, this opposition is seemingly strongest when the earnings that the regulated firm reports under incentive regulation exceed the level of earnings that would normally be expected under cost-of-service regulation. ⁿ¹⁸ The frequently voiced concern is that these higher profits necessarily come at the cost of higher prices to consumers. ⁿ¹⁹ And yet, the broad appeal of incentive regulation is precisely that the realized efficiency gains can benefit regulated firms and consumers alike. In other words, because incentive regulation is not a zero-sum game, higher profits and lower prices need not be mutually exclusive.

ⁿ¹⁸ Such a perception of "excess earnings" can make it very difficult for regulators to maintain the commitment to the terms of the incentive plan. However, as Professor David Sappington observes, the credibility of a regulator's commitment is critical to the performance of incentive plans: Absent credible rewards for superior performance and/or credible penalties for poor performance, the regulated firm will have little incentive to incur the effort costs that increase the likelihood of good performance. See David E.M. Sappington, *Designing Incentive Regulation*, Rev. Ind'l Org., 1994, 9, at 262-263.

ⁿ¹⁹ A related concern is that regulators may face adverse political pressures should the regulated firm report higher earnings under incentive regulation. In other words, how does the regulator explain to part of his constituency that he is doing a "good job" as a regulator when the regulated firm reports a significant increase in earnings? See, for example, Dennis L. Weisman, *Superior Regulatory Regimes in Theory and Practice*, J. Regul. Econ., Dec. 1993, 5 (4), at 364-365.

In spite of the fact that incentive regulation can be a "win-win" proposition, some parties view incentive regulation as little more than a "scheme" used by utilities to increase their profits and earn windfall gains. These added profits may even be viewed as "bribes" to get utilities to do what they should be doing already. A common refrain is that because utilities have a "statutory obligation" to be efficient, any additional rewards for achieving efficient behavior through incentive regulation are unnecessary--and serve only to foster an inequitable distribution of efficiency gains between regulated firms and consumers. This line of argument would seem to suggest that any efficiencies realized by the regulated firm following the adoption of incentive regulation must imply that, under cost-of-service regulation, regulated entities either deliberately engaged in inefficient behavior or were able to "conceal" more efficient operating practices from regulators through their superior knowledge of operating conditions. ⁿ²⁰

ⁿ²⁰ The formal economics literature may, in part, have contributed to this perception through its modeling of principal-agent relationships in which the "agent" has superior information to that of the "principal." The inability of the principal to observe this information directly allows the agent to earn "information rents." In other words, the agent must be "bribed" to reveal this information. However, it is unclear whether this structure is merely a convenient modeling technique or actually reflects institutional reality. The discussion herein emphasizes discovery rather than concealment by the agent, though they need not be mutually exclusive.

While the possibility of such behavior cannot be ruled out a priori, this claim is incorrect as a general proposition. This is because the achievement of performance gains is first and foremost a "discovery process" in which more efficient operating practices and superior use of technology are learned over time. ⁿ²¹ It is the recognition of this discovery process that leads to the conclusion that the efficiency gains realized under incentive regulation need not imply that the firm was knowingly inefficient under cost-of-service regulation. To the contrary, it is quite plausible that the firm under cost-of-service regulation was as efficient as it knew how to be.

ⁿ²¹ Incentive regulation can also facilitate implementation of known efficiency measures because implementation of such measures can be associated with significant direct and indirect costs that are difficult to recover under traditional regulation. Such cost recovery can be difficult under traditional regulation because the regulated entity often bears the full costs of the efficiency measure but may have only limited ability to benefit from the measures as efficiencies are appropriated quickly through the regulatory process. In addition, the regulatory process generally does not consider

indirect costs, such as the risks of using new technologies or the significant institutional strains associated with certain measures such as staff reductions.

To understand the manner in which enhanced incentives can stimulate this discovery process, it is instructive to examine what innovation is and precisely how it comes about. Although the mechanics of innovation are complex and not well-understood, innovation is usually thought of as the creation of a better product or process. If there is a consensus of thought on the innovation process it is that innovation requires highly motivated individuals willing to go beyond doing what has been tried previously, beyond following standard operating procedures, beyond using time-tested methods and technology. Innovation and discovery of new ways of doing things, new technologies, or new applications based on existing technologies requires companies and individuals to question the status quo, to be creative, and to be willing to bear the significant risks associated with exploring new methods. <n22> Of course, enhanced incentives in the form of meaningful rewards for successful discoveries are required to elicit such effort and risk-bearing.

n22 As the great inventor Charles Franklin Kettering observed, the key to successful innovation is intelligent failure--failing in a manner that brings the innovator one step closer to the actual solution. For Kettering, failure was an indispensable part of the innovation process. See, for example, Mark Bernstein, Charles Kettering: Automotive Genius, Smithsonian, July 1988.

In market economies, substantial rewards are provided for successful discoveries in the form of competitive advantage and the protection of intellectual property. For example, it is estimated that the overall rate of return for some 17 successful innovations in the 1970s averaged 56 percent. <n23> In comparison, the average return on investment for all of American business over the last 30 years has been on the order of 16 percent. Despite these high rewards for innovators, however, there should be little doubt that innovation benefits the economy as a whole. In fact, today America enjoys more than half of its economic growth from industries that barely existed a decade ago. <n24> This is consistent with recent findings of the White House Office of Science and Technology Policy estimating that more than half of U.S. economic growth since World War II was the result of innovation. <n25>

n23 Industry Gets Religion, Economist, Feb. 20, 1999 (Special Supplement on Innovation in Industry).

n24 Id

n25 Richard M. Russell of the White House Office of Science and Technology Policy estimates that 52 percent of the nation's growth since World War II had come through inventions. His statement that "unless we can protect intellectual property, we will not have invention" serves to highlight the importance of incentives in achieving such performance. See Warren E. Leary, The Inquiring Minds Behind 200 Years of Inventions, N.Y. Times, Oct. 22, 2002, at D4.

These facts about the economic role of innovation clearly reinforce the aforementioned observations of Professor Bonbright, that economists generally view dynamic efficiency as being "far more important" to consumer welfare than static or allocative efficiency. Such dynamic efficiency is achieved through incentives that reward the perpetual discovery of new, innovative methods that increase efficiency and increase overall performance. Clearly, innovation does not happen because market forces "bribe" companies or individuals to "reveal" what they know already. Rather, it is strong incentives that motivate innovators to exert significant efforts, question the status quo, and assume the risks it takes to discover and implement more efficient procedures, applications, and technologies.

In traditionally rate-regulated industries, however, incentives for such innovation are truncated, if not absent altogether. In fact, the traditional regulatory model provides, at best, weak incentives to discover new efficiencies by: (1) discouraging risk-taking and the application of new technologies through the potential disallowance of costs and investments associated with unsuccessful attempts to innovate; and (2) providing only very limited rewards, if any, for even highly successful innovations. The benefits of new, cost-reducing operating practices simply decrease a utility's

"cost-of-service" and, as a result, often are appropriated quickly and passed on to customers in the form of lower rates. Moreover, the traditional regulatory model commonly disallows the recovery of the performance incentive payments that regulated firms use in an attempt to motivate their employees.

With very limited potential rewards but significant disallowance risks, the traditional regulatory model strongly encourages the prudent use of tried-and-true operating practices and technologies. It thus provides very limited incentives, if not explicit disincentives, to look beyond the status quo to discover and employ new, innovative operating practices and technologies. This is why the provision of enhanced incentives can stimulate a discovery process that enables regulated firms to become more efficient than they previously knew how to be. In the long term, this process can lead to dynamic efficiency gains and significant benefits for firms and their customers alike.

IV. Conclusions

Incentive regulation has supplanted traditional cost-of-service regulation in the telecommunications industry and the regulation of electric utilities appears to be following a similar trend. Despite these significant changes in the nature of regulatory regimes, a frequent claim from parties opposed to the adoption of incentive regulation is that the regulated firm should not be rewarded for efficient performance because it is already subject to the statutory obligation to operate efficiently. This view of the world implicitly rests on the premise that the regulated firm knowingly disavows superior methods by which to enhance efficiency. What this view fails to recognize, however, is that (1) the incentives requisite to the discovery of superior methods by which to augment efficiency are not sufficiently pronounced under cost-of-service regulation; and (2) the regulated firm cannot knowingly disavow what it has yet to discover.

It is the recognition of efficiencies as a "discovery process" that largely explains the long-term benefits that incentive regulation offers over traditional cost-of-service regulation. Indeed, the transition to restructured, more competitive markets now underway in many traditionally regulated industries will require a different mindset for all parties involved in the regulatory process--one that recognizes the importance of enhanced incentives in promoting efficiency and long-term investment in what are arguably some of the most critical of infrastructure industries. It is in this context that incentive regulation is poised to bridge the gap between fully integrated, regulated monopolies and a restructured, more competitive marketplace.

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