Lessons in Electricity Market Reform: Regulatory Processes and Performance

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ABSTRACT

Electricity firms looking for markets in which capital and managerial skills can be applied, consider how the regulatory regime will shape and constrain decisions related to prices, returns, and other variables. Successful agencies promote credibility with investors, are perceived as legitimate and fair in the eyes of the public, and deliver greater efficiency for the economy as a whole. Independence and transparency are not established by "announcing" their presence, but in the actual decision-making process and public acceptance of agency decisions. Thus, the introduction of new functions has increased the demand for professional training for utility regulators.

A slightly shorter version of this article was published in *The Electricity Journal*, June 1998. It draws upon key points developed for the *PURC/World Bank International Training Program in Utility Regulation and Strategy*. Many individuals have contributed to the ideas presented here, including Mark Jamison, Klaus Tilmes, Daniel Fessler, Warrick Smith, David Sappington, and Tracy Lewis. None should be blamed for errors of omission or commission found here.

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Electric power developers considering global investment opportunities and risks must consider how a regulatory regime will shape and constrain decisions related to prices, returns, and other variables. Successful regulators will seek to promote credibility with investors and a sense of fairness in the eyes of the public, while delivering greater efficiency for the economy as a whole.

Global experience is shedding light on the complex interactions among regulatory regimes, industry structures, and infrastructure performance. In a recent article in this journal, Bernard Tenenbaum observed that power sector reform involves not only sector reform (via privatization and/or restructuring), but also regulatory reform. After outlining nine basic design questions for regulatory commissions, he focused on *independence* and *transparency* as requirements for sustainable regulatory regimes. He noted that the issue of independence creates much controversy, since some political power is essentially delegated to a new agency, which reduces the role of the energy minister in determining prices and investment.

Tenenbaum cites Sally Hunt's dictum: "…the Prime Minister is agreeing to give up political power in order to get electric power." However, the Ministry still develops policy (as reflected in the laws of the land). The highly choreographed hearing process of the United States is not held out as a good model for reforming countries. Still, Tenenbaum notes that open processes allow stakeholders to provide input into decisions, and that written explanations of decisions establish a record that sets a foundation for consistent implementation of the law. Managers, investors, and customers need to have a clear understanding of how principles were translated into practice in specific instances.

While examples are drawn from electricity, the principles apply to an agency regulating any infrastructure industry.

The Regulatory Process and Industry Performance

The purpose of this article is to focus on two other basic regulatory design questions*:*

(1) What activities or parameters should be regulated?

(2) How are regulatory rules created and enforced?

Independence and transparency are not established by "announcing" their presence, but in the actual decision-making process and rulings that emerge. External evaluations of a regulatory commission's stability and credibility will take form on the basis of evidence. Does the commission emphasize quantitative information in making a decision? Does it engage in micro-management that blunts managerial incentives by creating excessive constraints? Thus, what variables are regulated and how the rules are determined have a significant impact on how market participants and external observers view the situation.

Partially in response to these types of questions, the Private Participation in Infrastructure Group at the World Bank funded the Public Utility Research Center (PURC) at the University of Florida to develop a two-week *International Training Program on Utility Regulation and Strategy*. After the first delivery in January 1997, PURC became responsible for organizing additional programs (June 1997, January 1998, June 1998, and beyond). So far, over two hundred and forty participants from sixty-three countries have attended the first three courses. Now that the two-week course is going into its fourth offering in two years, we are in a position to reflect on what lessons might be drawn from recent experience regarding regulatory instruments and agency procedures. Once they understand key principles, decision-makers are better able to develop policies that promote *credibility* for investors, *legitimacy* for consumers, and *efficiency* in the economy.

The predictability and consistency of regulation are important for investors, consumers, firm managers, and government ministries. Can regulators commit to a long run policy - avoiding opportunistic decisions once investors have sunk their capital in fixed investments? Rational planning by both utilities and their customers requires a stable and predictable regulatory process. Keeping regulatory commitments is a key factor affecting the risks borne by investors, so procedures and instruments must be designed so as to limit opportunistic behavior by regulators.

Figure 1 depicts how regulatory policy affects industry performance (See Berg, 1997). Regulatory policy instruments include financial accounting, incentive regulation, non-price standards, competition policy, and rate design. The task of assessing the merits of specific policies is complicated by the intricate relationship among key variables. The four boxes to the far-left in Figure 1 represent some of the many factors that influence a government's choice of regulatory policy instruments. *Industry conditions* include factors that affect industry demand (e.g., population, income, and education) and those that affect industry supply (e.g., production technologies, operating practices, and factor prices). *General economic conditions* include a nation's employment, savings, and inflation rates, as well as the strength, stability, and diversity of its economy, its balance of trade, and the strength and stability of its capital markets.

The *Experience* box in Figure 1 refers to local, national, and international experience with regulatory policies. Industry performance under past regulatory regimes (both in absolute terms and relative to the corresponding performance in other jurisdictions) often influences the choice of future policy. The *Institutional Conditions* box in Figure 1 incorporates factors like the strength and independence of a countries' judicial system, the nature and stability of its political system, the autonomy of regulatory officials, the resources at their disposal, and the nature and historic enforcement of property rights and laws that pertain to regulatory policy. These factors affect the ability of regulators to make credible long-term commitments to private investors and to pursue independent policies.[1]

I. Market Structure Reform and Regulation of Network Industries

1. Levy and Spiller (1994, 1996) document the importance of these and other institutional differences among countries. The authors also provide useful guidance on how to measure these differences. Bergara, Henisz and Spiller (1998) show, in a quantative study based on 87 countries, that "well defined and credible political institutions are significantly correlated with national electricity capacity." (Page 24).

Market reform is relevant for three determinants of regulatory policy: industry conditions, general economic conditions, and experience. Electricity restructuring involves all three areas. Markets are experiencing changes in the basic conditions which characterize them--technological changes and low natural gas prices are altering the configuration of suppliers. Industry observers are concluding that the natural monopoly features of the industry appear to be mainly in transmission and distribution. Generation is going to be competitive. To encourage competition at other stages of production, some countries are promoting retail customer choice. General economic conditions also promote reform, as lack of electricity infrastructure begins to become a bottleneck to development. Also, because of experiences with market reform initiatives in the UK, Chile, Argentina, and some U.S. states, there have been changes in public attitudes towards government involvement in the economy (Lalor and Garcia, 1996 a,b). These economic forces for market reform are powerful, inevitable, and highly disruptive.

Energy regulators face significant challenges because the perceptions of key stakeholder groups are seldom congruent. Often, government ownership characterized the sector in the past - so price structures were usually designed to subsidize particular customer groups. Thus, favored costumers have become accustomed to low prices. When costs exceeded revenues, vertically integrated public agency utilities sought needed capital from the government. Fiscal pressures often limited transfers of funds to electric utilities, leading to declines in service quality (due to inadequate maintenance), low capacity investments and low penetration rates. Nevertheless, Ministries of Energy exercised political clout, determining which groups continued to be favored. Incumbent (monopoly) suppliers were comfortable when wages and salaries were not tied to performance.

In response to this situation, private participation in the provision of infrastructure services has increased dramatically, as developing countries restructure public enterprises. Corporatization separates utility enterprises from government agencies, putting them on a commercial basis. In addition, many entities have been or are in the process of being privatized. In either case, some government oversight responsibilities remain for monopoly services.

Sequence of Reform. The objectives of reform are to increase efficiency through better investment decisions, better use of existing plant, better management, and better choices for customers. Although often violated in practice, the structure of the industry should be determined prior to privatization, since valuation of the assets depends on entry conditions, pricing rules, and how cost containment is to be rewarded. If there is uncertainty regarding the regulatory process and policies, higher discount rates will be utilized in estimating the present value of the net cash flows stemming from the investment.

Establishing Precedents. Decisions on regulatory schemes must be made with an eye to how the scheme might be changed when circumstances change. Regulatory policies create stakeholders who might attempt to block policy revisions that harm their special interest. Even though market structure matters, the key issue for customers is market conduct (price, availability, and quality). Regulators must assess options for competition, decide on entry rules, rule on pricing flexibility, monitor outcomes, and deal with compensation issues (stranded assets). Early decisions are especially important, since they anchor the expectations of investors, consumers, managers, and workers. Different electricity "models" can be adopted, depending on the degree of competition and extent of vertical integration desired. Each model has advantage and disadvantages, so the policy choice depends on the characteristics of each country. Next, let us turn to five general categories of regulatory policy instruments.

II. Financial Analysis for Utility Regulation

Avoidance of Arbitrary Decisions. Capital markets determine the terms and conditions under which funds are made available for infrastructure investments. Regulatory policy, including the credibility of regulatory commitments, has a significant impact on a firm's cost of capital and, therefore, on a firm's choice of input mix and the cost of production. If the regulatory process is not perceived as being fair to all parties (procedural transparency, lack of arbitrary decision-making, balancing the needs of stakeholders), external observers will question the procedures used to reach decisions. Lack of regulatory predictability will raise the cost of capital.

Avoidance of Micro-management. Before data are requested from a company, the availability of current, readily available information should be examined and used to the extent possible to reduce regulatory costs and burdens that may be passed on to the ultimate ratepayer. The data requested from a company should be important to the goals of the regulatory body. Regulators need to distinguish between natural monopoly markets and potentially contestable/non-regulated activities of a utility. To prevent cross-subsidization, regulators should ring fence each of the natural monopoly activities and monitor all transactions that cross the ring-fence.

Avoidance of One-Sided Decisions. If a firm is unduly favored in the regulatory process, owners probably should not rejoice, as the sustainability of the regime may thereby be diminished, raising the likelihood that there will be changes in the rules of the game. Balance is preferable to bias when it comes to decisions.

III. Principles and Application of Incentive Regulation

"Incentive Regulation" - a Redundancy. Any type of regulation establishes incentives by the performance goals that are set, and by the penalty/reward systems that are employed. Incentive regulation is a response to information problems wherein the regulator is unable to monitor the utility's behavior, or to know the utility's capability to perform. Leading forms of regulation include cost-based Rate of Return (ROR), Price Cap Regulation (PCR), Yardstick comparisons (including Performance-Based Regulation --PBR), and hybrid systems (including sharing arrangements). Each provides different types of incentives. Price setting needs to incorporate rewards and penalties in order to promote efficiency and effectiveness.

Pure Price Cap Regulation. PCR severs completely the link between realized earnings and allowed prices, provides strong incentives for cost reduction and technological innovation. Price cap regulation should be applied only to essential services that are supplied on a non-competitive basis. In practice, many price-setting methodologies are ultimately based on the net present value of cash flows. Thus, the cost of capital (which depends on regulatory regime itself) is a key variable determining price levels.

Additional Restrictions and Earnings Sharing. Plans often incorporate additional restrictions on the prices charged for key services. Earnings sharing under price cap regulation can prevent extremely high and extremely low levels of earnings for regulated suppliers, but at the expense of limiting the incentives of incumbent suppliers to reduce operating costs and to excel in the marketplace.

IV. Non-Price Aspects of Regulation

Monitoring Performance. The regulatory framework for quality of service should focus upon those dimensions of service quality which are: important to consumers, controllable by firms, and measurable by regulators. In addition, quality standards (such as reliability) should be set with reference to the balance between the associated costs and benefits.

Rewarding Good Performance. Regulators can implement guaranteed standards, compensation payments to customers (e. g., for repair no-shows), and general price reductions in the event of widespread performance failure.

V. Managing the Introduction of Competition in and for the Market

Promoting Competition vs. Protecting Competitors. Competition policy must honestly distinguish competitive conduct from exclusionary conduct. Both will hurt rival firms, but only the latter is objectionable. The objective is to achieve competitive outcomes, not the protection of specific competitors.

Transitional Regulation. Managing the transition to a competitive energy market is a major regulatory challenge. It requires the unbundling of services as a prerequisite to competition and establishing clear, precise, and fair rules for the functioning of the competitive market. Two articles by Lalor and Garcia (1996a, 1996b) show that implementing competitive policies, while not easy, has positive impacts on performance.

VI. Rate Structure

Instruments and Objectives. Whether a particular rate structure is good or bad, efficient or inefficient, depends upon how well it achieves regulatory objectives. The types of tariffs needed are a function of the industry structure and who is buying what from whom. As a general principle, if there is sufficient competition, market prices will develop and regulated tariffs will not be needed.

Pricing Flexibility. Since firms have much more information on demand patterns, incremental costs, and opportunities for altering both variables, they should be given some pricing discretion. Ways of providing companies with price flexibility include price caps, price bands, price floors and contract pricing.

Universal Service Obligations. USOs are outcomes that the government requires, and that would not occur in a fully competitive, non-regulated market. Funding USOs is an issue because many states and countries have poorly targeted USOs, internal funding is inconsistent with competition and new technologies, and stranded costs complicate the adjustment. Stranded costs include costs that the company has incurred for historic USOs and that the company does not have a reasonable opportunity to recover given the introduction of competition.

Targeted Subsidies. In some countries, targeted consumption subsidies have been used as an alternative to cross subsidies. They have the benefit of targeting those most in need; however, they may distort consumption decisions, and may also be costly to administer.

VII. Managing the Regulatory Process

Figure 2 depicts some features of the regulatory process. Regulation with a "light hand" must still

address issues of due process, transparency, and information asymmetries.

Appointments and Staffing. Countries signal their intentions to stakeholders when regulators are appointed and agency staff recruited. Capital markets are looking for clues as to how initial decisions might be made, so the professional reputations of key regulators are the best indicators of how rules are likely to be developed and implemented.

Budgetary Oversight. While sources of agency funding must be established, budgets will still need to be scrutinized by appropriate legislative committees, promoting agency accountability. Effective use of agency resources can be reviewed by independent auditors or other public watchdog groups.

Balancing Flexibility and Certainty. Effective utility regulation requires much more than just competent economic and financial analysis. Regulatory *discretion* lies at the heart of the regulatory process. While discretion gives regulators the flexibility to achieve more efficient outcomes, it also involves uncertainty for firms and stakeholders, as well as the potential for misuse. Regulatory systems -- rules, institutions and processes -- need to be designed in a way that strikes a balance between competing policy considerations. Each nation must find a way to insulate regulators from short-term political pressures, while ensuring that the process is sustainable (Warrick Smith, 1997-c and 1997-d).

Participation of Stakeholders and Advisory Bodies. To meet their mandates, regulators must manage complex interactions with regulated firms, consumers, politicians, officials, courts, the media, and a range of other interests. How the regulator manages these processes will be critical to his or her success. The involvement of stakeholders is an important source of legitimacy and public acceptability for regulatory agencies and their decision-making procedures. Some regulators (like the UK's Ofwat) have utilized Consumer Councils to provide input into the process. Also providing input are other government agencies, such as environmental agencies with some oversight responsibility for facilities siting and compliance with pollution control regulations.

Clear Time Frame and Information Deadlines. Due to the massive volumes of data and information that must be evaluated and analyzed, managing information flows is essential. To reduce compliance costs, limited information requests are recommended. Unnecessary delays have potentially adverse impacts on firms and/or customers; and stakeholders must be aware of the schedule for processing the case and provided an opportunity for participation.

Technical Studies. Consultants and/or agency staff should prepare (and publish) studies addressing issues under discussion. The regulatory policy instruments described earlier need to be carefully analyzed in terms of their impacts on various regulatory objectives. Other stakeholders need to be in a position to respond to agency studies. In many cases, company studies will form the basis for evaluating alternative regulatory rules.

Professionalism and Avoiding Conflicts of Interest. A regulatory body *must* avoid the appearance of a chaotic and arbitrary system. Professional development of staff is essential, as are procedures for limiting potential conflicts of interest. In general, one of two actions (or their combination) establishes agency legitimacy: completing tasks and upholding responsibilities set forth by statutory mandate.

Rationales for Decisions. Transparency demands that decisions be published, including the

reasoning and factual basis for the decision. Potential appeals (based on errors of fact, the misapplication of law, or procedural mistakes) can provide a check on the process.

Follow-ups. Implementation requires procedures for ensuring compliance, as well as post-decision reviews so that the process can be improved in the future.

Regulatory Performance and Industry Performance

This survey of policy instruments and indicators of regulatory process underscores the difficult tasks facing new regulatory agencies. Warrick Smith (1997a) has identified at least nine potential roles for regulators: technician, political analyst/strategist, advocate, detective, prosecutor, judge, negotiator, educator, and manager. Not all of these roles can be performed simultaneously, but the listing illustrates the multi-faceted nature of regulation. Not only must new institutions reconcile independence with accountability, but the design of regulatory processes requires a careful balance between certainty (rigidity) and flexibility (See Lock, 1996). The former promotes predictability in decision-making and supports keeping commitments. The latter (the exercise of discretion) can facilitate adaptation to changing economic conditions.

The PURC/World Bank Training Course represents one vehicle for sharing of experience and expertise in the creation of agencies that constrain monopoly power and promote competition where it is feasible. Theses sectors are important for economic development. The new regulatory agencies are important to both consumers and investors, as decisions are somewhat insulated from politicians whose time horizons only extend to the next election. No one has all the answers. What is important is that independent agencies begin asking the right questions and developing the conceptual frameworks, regulatory processes, and instruments required for addressing critical issues.

How does one evaluate the performance of regulatory commissions? First, we need to identify the inputs and outputs of regulation. The former is difficult to quantify, and some measures of the latter are often irrelevant. The inputs include the national constitution and legal framework, the size and talent of the agency staff, past decisions (if precedents are relevant), investigations, and financial audits. I would submit that the output is NOT hearings, internal reports, or consultant studies. *Ultimately, the performance of the industry itself is the best indicator of the performance of regulation* -- since regulation is ostensibly designed to improve performance relative to what would occur in an unregulated environment. If regulation leads to poorer industry performance (in terms of reduced efficiency, innovation, reliability, and/or access) then the case for intervention disappears.

Nations will continue to move forward in the creation of legal and regulatory frameworks conducive to capital formation. As an academic involved in that learning process, I would urge that governments and private organizations expand the dialogues initiated over the past decade. Those with consulting expertise, corporate operating experience, and financial know-how will continue to be key players in the transformation of global energy markets. Educational institutions can also play a role in providing forums for sharing experience and exploring new ideas.

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