

Recent Developments on the Regulatory Framework for the Private Sector in Infrastructure

D. Narasimha Rao¹
Subhashish Gupta^{2, 3}

1. INTRODUCTION/BACKGROUND

Independent regulation has emerged in the last two decades as a fourth branch of government. This movement has been propelled by the privatization of state-owned resources worldwide, particularly in infrastructure sectors. Historically, these industries, particularly electricity and telecommunications, have been the primary target of liberalization. Countries have instituted, or contemplated the institution of, 'new-style' independent regulatory authorities (IRA) to guide and oversee their transition toward private sector involvement – either through competition or privatization.⁴ Over 40 countries have set up regulators in the last decade (See Appendix 2).

In the nineties, 45 percent of private investment in infrastructure took place in electricity and telecom alone.⁵ Much of the regulatory activity in India too has centered on infrastructure industries, because they have formed a central component of economic reforms since 1991. Together, these two industries have annual revenues of 150,000 crores. The electricity industry is growing at 6-8 percent, while the telecom industry anticipates growth in excess of 25 percent. Independent regulatory agencies have emerged in the electricity and telecommunications sectors only in the last seven years.⁶ A semi-autonomous tariff regulator was established for ports in 1997. In addition, government has contemplated establishing regulators in petroleum, natural gas, aviation and rail industries. In parallel, India has also established the Competition Commission of India (CCI) under the Competition Act 2002, for regulation of industry in general. The overlap between the central and sectoral regulators is as yet unexplored. Thus, the Indian regulatory landscape is complex and formative.

In these initial years of regulatory experience in India, the general perception is that regulatory agencies have had little positive influence on sectoral growth and development. The causes are complex and sector-dependent, but include, among others, a combination of lack of regulator independence, credibility, enforcement authority and accountability. The objective of this paper is to provide policy recommendations for future regulation of infrastructure sectors in India, both for existing and evolving regulatory frameworks. The paper focuses on infrastructure sectors where private sector participation (PSP) and independent regulation have been encouraged, namely electricity, telecommunications, oil and gas, ports, airports and roads. As the paper shows, regulators across industries suffer common symptoms and challenges. Future economic

¹ Visiting Professor, Indian Institute of Management, Bangalore, email: narasimhar@iimb.ernet.in

² Associate Professor, Indian Institute of Management, Bangalore, email: sgupta@iimb.ernet.in. The authors would like to acknowledge the work of Priyank Gandhi in conducting research.

³ This report was prepared by consultants for the Asian Development Bank. The views expressed in this report are the views of the authors and do not necessarily reflect the views or policies of the Asian Development Bank (ADB), or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequence of their use.

⁴ The key difference between new-style, independent regulation and old-style regulation under government ministries is that the former have quasi-judicial powers, they are constituted and operate with arms-length distance from the rest of government (in theory), and have special expertise.

⁵ PPI, Project database, The World Bank

⁶ The Telecom Regulatory Authority of India was formed in 1997, while the Central and State Electricity regulatory commissions began formation in 1998.

development will depend on improving regulatory efficacy, especially with independent regulators being contemplated in other vital industries. The motivation for this analysis is to supplement the relatively sparse policy and academic analyses of regulatory performance in India.⁷ This lacuna exists partly because of the relative infancy of regulatory institutions in infrastructure – just about 5 – 7 years. Most other analysis focuses largely on industry reform rather than the role of the regulator therein.

This paper reviews two aspects of regulation: institutional efficacy, which includes primarily autonomy, capacity and accountability; and second, the mode of regulation, or the regulator's functional scope. The recommendations for institutional efficacy are concerned with regulatory process – including member/staff selection, rulemaking and appeals; and to some extent in the role of executive and legislative intervention therein. In studying autonomy, the paper also addresses issues of structure – should regulators be independent or tied to ministries, should we have sector-specific or broader, central regulators?

Section 2 discusses the theoretical and historical context for regulation and applies these to the Indian context. It identifies the unique challenges of regulating infrastructure in India and discusses its implications in light of historical and academic precedents. Section 3 summarizes the recent developments in regulation and the salient trends in all infrastructure sectors (petroleum, natural gas, ports, airports, roads), and identifies the key issues and concerns for future regulation. Section 4 analyzes regulatory (institutional) efficacy in India, with a focus on regulatory autonomy, process, and accountability. The analysis focuses on experiences of independent regulation, which occur in electricity and telecommunication industries. Insights are drawn on procedural and institutional requirements for effective regulation in India. Section 5 discusses the appropriate functional role for an independent regulator in electricity and telecom markets, both of which have both competitive and monopoly segments. Section 6 discusses the structure and functional role of regulation in other infrastructure sectors in light of the industry trends and issues discussed in Section 3. Section 7 summarizes the paper findings and synthesizes practical recommendations for regulatory governance.

2. ROLE OF REGULATION

Before analyzing the Indian regulatory framework, it is useful to discuss briefly historical attempts at understanding regulation.⁸ Looking at the Indian sector in a theoretical context provides some clues to the justification (or explanation) of regulation in India, and gives an opportunity to exploit the predictive power of these theories for future action.

2.1 Historical and Theoretical Context

Regulation broadly defines mechanisms of government intervention in industry. Typically, regulation entails intervention in price, entry, market structure, procurement or quality. The study and practice of regulation has always involved the existence, usually exclusively, of private ownership in the regulated industries. Historically, theoreticians focused on understanding why and how regulation evolved, with an implicit assessment of its impacts on equity and economic efficiency. Economic theorists viewed regulation as resulting from a market-driven demand. The analysis dwelled mostly on the demand-side of regulation - namely, the industry and on the price and entry controls that influence market outcomes. Political theorists later filled the lacuna on the role of the supply-side - the politics and institutions - that carried out regulation. The context for study was largely the United States- which has the longest history of regulation and of private industry, since the late 1800s – and later, to a lesser extent, on European countries.

⁷ The recent work on independent regulators in India include, in chronological order: Sankar&Ramachandra 2000, Godbole (2002, 2003, 2004), Prayas (2002-2003), and S L Rao (2004). In telecom, Singh, Soni and Kathuria (2000) , Virmani (2004), India Infrastructure Reports (2002-2004)

⁸ This is not a comprehensive literature review of regulation by any stretch: for more detailed historical reviews, mostly of economic theories, see Posner (2001), Peltzman (1989), Laffont (1993), Duso (2002)

Political and economic theorists have a long history of competing explanations of regulatory evolution, failure and efficiency. Political theorists first propounded the normative public interest view of a benevolent government intervening to correct market failures. These failures reduced economic efficiency, and produced inequitable outcomes, such as monopolistic pricing, social and economic externalities, and wealth concentration.

Economic theorists disputed the explanatory power of the public interest approach (Posner 1974). The public interest approach did not explain heavy regulation in industries that did not have compelling market failures, such as the airlines, trucking, and shipping, where competition subsequently prospered. It also did not adequately explain regulatory failures and behavior, or the support and capture of regulators by regulated entities. Empirical evidence also reveals that government is far from a costless, and therefore preferable, instrument to redress market failure. Supporters have argued that deregulation in industries where natural monopolies were eroded due to disruptive technologies (telecom, electric generation) vindicate the public interest approach. However, it does not explain why some of these deregulated industries retained some form of regulation (for example, for market monitoring).

The private interest view of regulation explains its cause and actions as a product of demand and supply. Government supplies regulation in response to interest group pressures for government intervention. Thus, regulation is 'unavoidable.' Similarly, regulatory actions are shaped by competing interest group influences. Stigler's seminal work explained that regulators consistently yield to producer interests ('producer protection'), due to their higher per capita stake in outcomes and lower transaction costs of collective action (Stigler 1971). Subsequent work generalized this theory to explain consumer-friendly regulation, such as cross-subsidization, by suggesting that regulators do not respond exclusively to dominant interests, because the latter face diminishing gains (Peltzman 1976). Another useful body of literature expands this transaction cost analysis to regulatory institutions (the supply side), using a principal agent theoretic framework (Laffont et al 1993, Spiller 1990). This helps understand the role of information asymmetries and regulatory discretion in influencing regulatory outcomes.

As mentioned, these theories viewed regulation very broadly as government intervention, without dwelling on its form. Equally important as the study of regulatory capture through transaction cost analysis is the study of government institutions and politics. This is particularly relevant for India, where a central question is what institutional form regulation needs to take: independent vs. ministerial; sectoral vs. central. Although the principal agent framework does provide some institutional insights, it cannot fully explain delegation to IRAs (Gilardi 2003).⁹ Literature in new institutionalism partly fills this lacuna. Gilardi, in particular, applies new institutionalism theories specifically to explain IRAs as commitment devices to facilitate privatization.

Each institutional approach offers insights into IRAs. Rational choice approaches posit that IRAs arise to provide credible commitments and insulation from politics to new entrants. Sociological interpretations place importance in the role of diffusion across governments, either within or across countries. Governments learn from others' experiences. Historical institutionalists stress path dependency; where certain reforms commit governments to established paths. A good example would be where the introduction of markets in an industry with a dominant state-owned incumbent necessitates an IRA to reduce government favoritism toward its PSU.

2.2 Applying Theories of Regulation to India

No single theory can claim to explain all regulatory outcomes. Indeed, some outcomes are so complex that can only be explained by application of multiple theories, as is the case for India. At the same time, many of these theories have not considered India's peculiar situation of IRAs

⁹ Such delegation seems contrary to traditional principal agent theory, since it would reduce principal's control and aims to increase agent discretion.

regulating state-owned enterprises. Further analysis along these lines should provide more insights. This paper provides only a flavor of this exploration.

Appendix 1 shows the rationale for independent regulation of infrastructure industries in India, as well as an overview of the existing regulatory landscape. From a public interest perspective, the economic rationale for regulation of infrastructure industries is usually to mitigate monopolistic pricing.¹⁰ The network components of many infrastructure sectors are, and will continue to be, monopolies, such as electricity distribution, and pipelines. In those that have scope for price-based competition – electric generation, telecom, oil and gas commodity and retail – these sectors historically have incumbents with dominant positions. Market abuse is therefore possible, and requires regulation. Since these incumbents are state-owned and have clout in ministries, these regulators need to be independent from the politicians/bureaucracy. Thus, independent regulation in India has an added motivation of the depoliticization of markets. However, several sectors lie in the grey area between monopoly and competition, such as ports, roads and airports. Here, experience shows that such regulation in these sectors is as much driven as by demand from the private sector to seek insulation from politics as it is by government to regulate price.

Thus, regulation, particularly IRAs, have arisen in part due to private interest group pressures, both within and outside India, to encourage PSP. In the aftermath of the fiscal crisis of 1990-1991, infrastructure reforms could be attributed in part to conditionalities associated with World Bank / IMF lending. India's initial regulatory framework was not that of IRAs. Private sector was invited into power, telecom, roads and other sectors through executive policy – tax and duty incentives, special purpose vehicles and MOUs. Only in the late nineties were IRAs established in telecom and electricity and ports, though the TAMP is really a semi-autonomous regulator. IRAs may have been a rational choice by host governments to signal their commitment, as well as insulate private entrants from the interests of state-owned incumbents, who almost always had dominant positions (BSNL, SEBs). On the other hand, IRAs may also have been part of a framework pushed by lending institutions as a necessary component of the resulting reforms in order to protect private investors from the risk of asset expropriation by government through tariff-setting.

Whatever the origin, the regulatory experience has certainly exhibited evidence of 'producer protection.' Looking back at the experience of the nineties, what was often under-emphasized in the design and evaluation of these established regulatory frameworks worldwide was the impact on consumers of the protection granted to private investors. In many putative success stories of privatization/regulation, particularly of distribution utilities (Chile, Brazil, Mexico), substantial price increases followed (Galal 1994). In some cases, price increases fell disproportionately on poorer sections (Ugaz et al), while higher-income groups sometimes benefited from lower prices (Galal 1994).¹¹ Whether these can be explained by capture theory or other political failures is unclear. However, the trend in outcome is clear.

In India too, the Orissa experiment included retail prices increases for nine years, with little benefit to consumers. Subsequent proposed transaction designs (Karnataka) expose consumers to similar risks. Thus, looking forward, with the extent of capture possible (as discussed in the next Section), regulation in India must balance risk allocation between private investors and consumers. Regulators also need to strongly consider distributive impacts of growth on consumers, particularly rural vs. urban. The urban teledensity in India stands at 18 per 100, while the rural teledensity is less than 2. Competition in the sector has led to steep drops in long-distance prices, which accrue to a greater extent to middle- and higher-income consumers. But

¹⁰ Infrastructure construction has to be regulated to ensure fair land acquisition practices and ensure compliance with environmental regulations. Here, we are concerned more with the rationale for 'market' entry, where price setting is the contested parameter for regulation.

¹¹ Telecom privatization often led to increase in access rentals, but decrease in long distance rates. In most countries, higher-income users benefit from the latter, while lower-income users are impacted to a larger extent by the former, as a percentage of their income.

the increase in local rentals may disproportionately affect lower income consumers (as a percentage of income) (Business Line 2003]. Similarly, power supply quality and availability are highly disparate from urban to rural areas.

How theory would suggest consumer interests can be better served depends on what lens is used. From a capture theory perspective, transaction costs of collusion between regulated entities and the regulator would need to be increased. Increasing transparency in regulatory process is one means to achieve this. Similarly, consumers' transaction costs of collective action would need to be reduced. such as through greater information sharing and education by regulators. Alternatively, an agency theoretic perspective would suggest that reducing information asymmetry between the regulator and regulated entities reduces the incentive for and increases the cost of collusive behavior. A political interpretation may suggest that protection of public interest exists in law, but fails to be implemented due to a lack of regulatory accountability. Being non-majoritarian institutions, they are not accountable as the executive is through elections. Thus, alternative mechanisms of accountability need to be strengthened, such as through courts, auditors, etc. Some of these mechanisms are discussed later in this paper. As indicated already, and elaborated later, many reform options – reducing information asymmetry, increasing transparency and formalizing regulatory process – are sensible reform measures that derive from multiple theoretical perspectives.

The role of regulation in India takes on another challenge beyond managing private investment. That is, for the next five to ten years the state-level regulatory system in India will be concerned largely with regulating state-owned utilities.¹² This is because despite growth in PSPs, state-owned incumbents continue to own majority market shares in infrastructure industries. Privatization of incumbents has faced stiff resistance by state ministries. The few number of electric distribution privatizations (Delhi, Orissa) in the last decade and the controversy over the privatizations of oil majors are evidence of this. This poses a unique set of additional challenges for regulatory efficacy, particularly with regards to regulators' independence, which to our knowledge has not been explored in academic literature.

The political structure in an industry with an independent regulator has two principal-agent relationships – between government and the regulator, and between the regulator and regulated entity (as manifested through license enforcement). Researchers (e.g., Laffont 1993) have noted the challenges in the government's ability to monitor regulatory performance, which result in greater opportunities for capture by the regulated entity. However, with the regulation of state-owned entities, the capture of the regulator is facilitated by entities within the principal itself (due to the close link between the relevant ministries and heads of state-owned enterprises, who are bureaucrats).(See Figure 1)

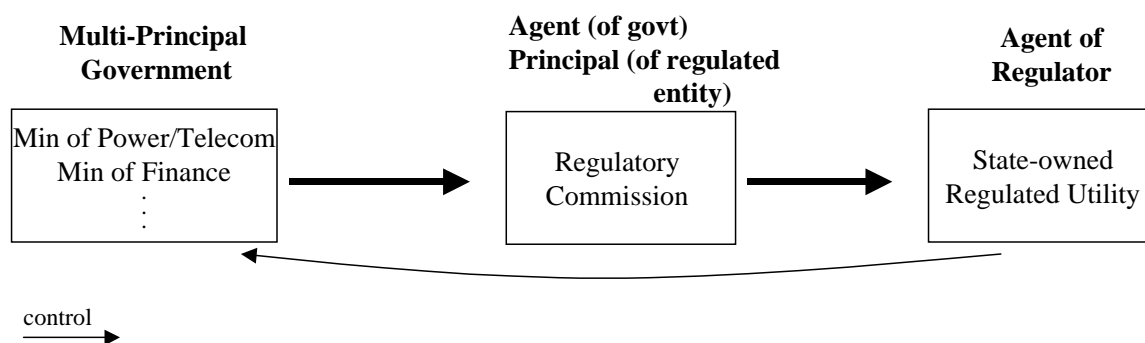
This creates a conflict of interest within the government, because IRAs were set up to force financial discipline on state-owned utilities, among other things. While the government as a whole may seek to institute IRAs, provide commitments to the private sector and relinquish tariff-setting powers to the IRA, the ministry in question (Ministry of Power, DOT, etc.) resists such efforts to protect their turf. This conflict within the principal manifests time and again in all sectors – wherein the law and policy may express an intent, but loopholes introduced by the relevant ministry allow them to be subverted.

There are many implications of this incumbency capture. Because collusive behavior between the government and SEBs is virtually costless, it would be very difficult to avoid. This lends support to the view that privatization is a necessary option. However, as discussed later, the process of privatization too is susceptible to capture and subversion of the public interest. Second, recognizing bureaucratic interference in regulation as a form of capture rather than just as a

¹² Many other countries have regulators regulate public utilities (e.g., US, Hungary, Brazil), but they have a mix of private and public, with the latter dominating the former.

necessary tool of regulatory discipline (to limit regulator discretion) broadens the lens with which one views regulatory inefficiencies from one of institutional, agency-related failures, to one of collusive behavior involving regulated entities. How this has manifested in the last several years, and what the implications are for the future are discussed in the rest of this paper.

Figure 1 – Regulatory Structure in State-dominated Sectors



3. RECENT DEVELOPMENTS IN REGULATION

3.1 Recent Developments in Electricity Regulation

The first electricity regulator was set up in Orissa in 1996, to facilitate the privatization of distribution. Thereafter, the Central Electricity Regulatory Commission (CERC) was set up to regulate inter-state commerce and centrally-owned generation pursuant to the Electricity Regulatory Commissions Act of 1998 (ERC98). Subsequently, states have been slow to set up state electricity regulatory commissions (SERC) to regulate intra-state distribution and supply.

In the established SERCs, commitment to the regulatory function has been limited – as reflected in the large number of vacancies (22 reported in 13 SERCs, more than half for longer than 3 months), limited staff growth (on average, 8-10 posts) and short tenure (average of 2-3 years) (Prayas 2003). About half the members are retired from the civil service or utility, and almost all are from government agencies. Two thirds of staff are from regulated utilities, most of who are hired on a temporary basis. This indicates that the regulators are perceived very much as extensions of bureaucracy.

To varying degrees across states, regulators have made some inroads into improving utility accountability. Given that their main function has been tariff setting, their primary performance benchmark has been technical/commercial distribution system losses. In some states (e.g., Karnataka, Haryana), regulators have forced a reversal in the typical trend of increasing losses. In others, at least the veracity of utility reporting, particularly on system losses, has improved.

However, overall, SERCs' effectiveness has been limited on many fronts, they have not been able to measurably improve sector performance. They have not gained the public's trust in their ability to safeguard their interest. That government and state-owned utilities have not taken regulators seriously has contributed to this mindset. As discussed extensively later, ministries intervene actively in regulatory affairs, often to contradict or invalidate their actions. A recent case brings into question even the judiciary's regard for regulators' independence.¹³

In assessing the current situation, one has to keep in mind that six years is not a very long period to establish new institutions of governance, particularly in such large industries with entrenched

¹³ In West Bengal, a High Court's unprecedented judgment extended into substantive aspects of the WBERC's orders, even questioning the value of involving consumers in the regulatory process. Later, the Supreme Court overturned this judgment.

practices. But building these institutions requires political commitment. The E-Act represents a strong indication of such a commitment. Taking stock of the last few years provides indicators of where such commitment must be directed, and of the potential hurdles.

The Electricity Act has replaced the ERC98 (and all other Acts pertaining to the sector). The formation and the functions of regulatory bodies have largely remained the same from the ERC98 to the E-Act. However, the E-Act has done away with the discretionary delegation of powers from states to regulators. The key functions of the SERCs include tariff-setting, license issuance and enforcement, quality of service monitoring, power purchase and resource planning, performance monitoring, market development and investment regulation.

The E-Act has retained the 'old-style' regulator, the Central Electricity Authority (CEA), with the role of resource planning and technical standard setting and development. In addition, the E-Act also calls for the creation of Advisory Committees to advise the SERCs. These committees are to be constituted from a broad range of stakeholders.

3.2 Recent Development in Telecom Regulation

As in electricity, independent regulation in telecommunications is a recent phenomenon. The Telecom Regulatory Authority of India (TRAI) was set up in 1997 through the Telecom Regulatory Authority of India Act 1997. Since independence the provision of telecommunication services had been the preserve of the Department of Telecommunications (DOT). As a government department, it was the policy maker as well as the service provider, and therefore controlled this sector. Most of the expertise in telecommunications was also concentrated in the DOT. Thus, in the post liberalization phase the challenge for the development of independent regulation has been to get out of the clutches of the DOT.

TRAI's function even by law gives it limited autonomy (e.g., no licensing powers). In practice as well, DOT has directed policy and dismissed TRAI's attempts to influence market developments. For example, the DOT prevented TRAI's attempt to rebalance long distance and local rates for telephony (rediff.com).¹⁴

TRAI's attempt to prevent 'back-door' entry into mobile markets by MTNL and Reliance were also thwarted. TRAI has had its authority challenged in court and its recommendations ignored by the government.

More recent developments in the sector have expanded the focus of regulation from telephony to a broad range of services, including internet, broadband, Voice Over Internet Protocol (VOIP), and others. The government recently instituted unified licensing for all basic telephony, finally undoing the artificial segments of fixed-line basic, Wireless Local Loop (WLL) basic and cellular mobile services. The sector has also witnessed mergers and acquisitions with the number of cellular mobile operators standing at seven countrywide. Industry commentators claim that the final number of telecom operators, fixed and mobile combined would eventually be five. Within each circle, the government has allowed as few as three operators. If this prediction is borne out there will be competition policy concerns, which would have to be considered. The latest development has been the Communication Convergence Bill, which is still awaiting clearance from the Parliament. This would repeal the TRAI Act and the Indian Telecommunications Act, among others. In it, the government proposes a single regulator for communication and broadcasting services (Communication Commission). The government also proposes to give the Commission licensing powers. Currently, the Bill has lapsed, because of concerns related to either unifying or separation regulation of carriage and content.

¹⁴ The government and the DOT faced two problems with tariff rebalancing. First, the increase in local calls and rentals were unpopular among the middle-class urban population, who did not make long-distance or international calls. There were noisy scenes in the parliament, particularly from the politicians on the left. Secondly, the decrease in long-distance and international calls would have strongly affected DOT's revenues.

Aside from future market power issues, the main shortfall in telecom regulation has been the neglect of rural telephony. Thus, the key challenges for regulation moving forward are to harness technological change and opportunities, and ensure the sustainability of competition, but also to extend the reach of technological opportunities and market into rural areas.

3.3 Regulation in Other Infrastructure sectors

The government is mulling the introduction of independent regulators in other sectors. Potential candidates are airports, oil and natural gas. The primary reason for independent style regulation has been mitigation of risk of private producers. It has been argued that it is the lack of assurances and guarantees against government expropriation that inhibits private participation. An independent style regulator may be a partial answer to such risks, but the setting up of proper legal frameworks and building the necessary competence is no mean task. It is worthwhile to explore other feasible institutional structures to achieve the goals of risk mitigation and protection of public interests.

The regulatory developments in these sectors include the setting up of the Tariff Authority for Major Ports (TAMP). An airport regulatory authority has been recommended by the Ministry of Civil Aviation and a Petroleum Regulatory Board by the Petroleum Regulatory Board Bill (2002) to regulate the oil sector and natural gas pipelines. A railway tariff regulator is being discussed. There are no indications yet of independent style regulation in roads or water and sanitation.

Ports

Ports historically have been seen as natural monopolies, with high fixed costs. Presently, the Tariff Authority of Major Ports (TAMP) sets tariff ceilings for major ports, while minor ports are not regulated.

With planned and developing land and rail connectivity, the potential for inter-port competition is growing, albeit slowly. The twelve major ports have seen a decline in their market share over time and it stood at 79% in 2002.¹⁵ The minor ports have been able to compete away the share of major ports partly through aggressive pricing. The more successful minor ports have also gained from the privatization policies of their respective states.

The future role of TAMP under growing competition has come under scrutiny. The government has proposed bringing minor ports under its ambit, on the one hand, while pressures have been mounting to convert TAMP from a price regulator to a dispute resolution body, on the other hand.

The government has introduced an amendment to the Major Port Trusts Act 1963 and the Indian Ports Act 1908 to allow the central government to transfer the undertaking of any major port to a successor company formed under the Companies Act, thus paving the way for corporatization of ports. The government seems to be moving from service ports to that of landlord ports, to facilitate PSP in other services. There is also a need to create mechanisms to facilitate PSP in other port-related services.

Airports

The government has proposed setting up of a Civil Aviation Regulatory Authority to meet regulatory requirements of civil aviation. This is proposed to be an appellate body for tariffs, allotment of space etc (Ministry of Civil Aviation). The regulatory body is being viewed primarily as a tool for dispute resolution. Here too, this role has been driven by the push for greater private ownership of future airports.

The Airports Authority of India owns and manages 92 airports and 28 civil enclaves at defense airfields. So far, the Cochin International Airport is India's first fully private airport, to be followed by the Bangalore International airport. Unfortunately, the Airports Authority of India Act stood in the way of introducing private participation. This hurdle has been removed with the passing of the

¹⁵ Business Line (2002), Plans likely to bring all ports under one regulator, March 30, 2002.

Airports Authority of India (Amendment) Act. Thus the government is poised to lease the two airports of Delhi and Mumbai to a joint venture company for a period of 30 years. The AAI and other public sector companies would hold 26% equity with Indian investors making up another 25%. The amount of Foreign Direct Investment (FDI) allowed would then be 49%. Indian airlines would be allowed a maximum of 10% equity stake. Provisions have been made to ensure that the operator retains all AAI employees for 3 years, after which it will have to ensure employment to 40% of them. Even after the airports are handed over to the private parties for operation AAI would still retain control over air traffic control and airport security.

It is interesting to note that privatization of ownership need not necessarily translate into privatization of services. At Cochin Bharat Petroleum does refueling and ground handling operations are carried out by Air India. Only, Alpha Retail U.K manages the duty free shops. There is a dearth of firms capable of providing services at airports and so private participation and competition in the provision of services may be difficult. Alternatively, if private provision of services is possible privatization of ownership need not be necessary.

Roads

Road development is managed at the center by the Ministry of Surface Transport (MOST) and National Highway Authority of India (NHAI), and at the state level by public works departments. Successful efforts at private investment in road infrastructure have been heretofore confined mostly to smaller projects, mainly road bypasses and toll bridges. Larger BOT projects, particularly toll-based expressways, have come under criticism for excessive costs and controversial land acquisition practices. No single model for concession design has emerged as successful. The annuity model was the most prevalent, but tends to allocate market risk excessively on government. Toll-based projects have consistently overstated market revenues, and relied on real estate revenues to attain viability.

The National Highway Development Project (NHDP), which includes the Golden Quadrilateral (GQ) and North-South, East-West (NS-EW) corridors, which has a total cost of about 54,000 crores has only 4,000 crores of private financing, while most of the funds were raised from a cess on fuel, multilateral lending and domestic market borrowing. The government has successfully attracted private financing on a smaller scale on national highways for small portions of them, such as the Jaipur-Kishangarh portion of NH-8, and the Delhi-Gurgaon expressway.

However, sub-contracting to private entrepreneurs has been commonplace for construction/civil works and consultations for most projects on the NHDP. The Government has also outsourced toll collection to private toll collectors, such as on the 80km stretch of NH8 between Jaipur and Kotputli.

Petroleum and Natural Gas

India has had growth and limited PSP in all elements of the natural gas value chain – in wellhead production of natural gas, in transmission, and city gas distribution (Surat, Delhi, Mumbai). The government recently permitted private sector players to set up pipelines (previously only the state-owned Gas Authority of India Ltd (GAIL) was permitted to do so), on the condition that they allow up to 25 percent of the capacity to be carried by third parties on an open access basis. Reliance has been the prominent private entrant in supply and transmission, arising from its discoveries in the Krishna-Godavari basin. City gas distribution has had a number of joint ventures, but only one with a private partner, British Gas, in Mumbai.

The major development in the petroleum sector is the dismantling of the Administered Pricing Mechanism (APM), through which the government used to control the retail prices of petroleum products. Even though prices in this sector ought to be market driven, since the government owns most of the refining capacity and marketing outlets it still has considerable control over the retail prices. Private participation in this sector is marked by the entry of Reliance in refining and the

entry of a number of private (and international) operators in retailing. However, the share of sales of private operators in other petroleum products is still quite small.

The government has proposed a joint Oil and Gas Regulator in its recent Petroleum Regulatory Board Bill. It seeks to regulate licensing, refining, processing, storage, transportation, distribution, marketing and sale of natural gas and petroleum products. It will regulate common carriers (oil and gas open access), which have some characteristics of a natural monopoly, along with that of marketing and sale of petroleum products, where competition is eminently feasible. The concerns that the Bill addresses regarding the sale of petroleum and petroleum products include ensuring adequate availability, ensuring display of information about the maximum retail prices fixed by the entity for consumers at retail outlets, monitoring prices and taking corrective measures to prevent profiteering by the entities and securing equitable distribution.

However, the regulator would not regulate gas tariffs (which is expected to be a competitive sector), markets, or trading. The regulator has been set up as an independent regulator with rulemaking and dispute resolution authority, and with some useful advantages over other independent regulators, such as independent non-budgetary funding, and investigative powers.

4. CRITIQUE OF REGULATORY EFFICACY

This section discusses in the detail the empirical evidence of regulatory capture in the regulatory experience in electricity and telecom sectors. The agents of capture are both industry, as well as state-owned utilities. This section talks of capture 'from above.' Political/bureaucratic constraints on regulators represent not merely institutional failures in government's attempts to check regulators' discretion, but manifestations of protecting state-owned utilities.

4.1 Regulatory Autonomy and Capture

Given the continued dominance of government in infrastructure, many have questioned whether independent regulators are really workable in India. Even though the enabling legislation (to a greater degree in electricity than telecom), empowers regulators with substantial scope and decision-making authority, several loopholes exist to undermine their authority. First, they are tied to government in their very structure. Second, they face capture in various forms. In addition to the well-recognized political interference for populist motives (e.g., free power to farmers), state ministries' desire to protect and control the incumbent utilities adds a new dimension of capture possibilities.

Regulators' first dependency on government is through their funding. Most electricity regulators are funded through a consolidated budget. Further, a large share of agency staff consists of retired officials from the regulated utilities. This makes them sympathetic to the utility position, either due to past connections, or just from their mindset. This hampers the capacity of the regulator to develop and exert independent expertise and perspectives in rulemaking. Experience suggests that states have been reluctant to offer necessary support for institution building in the power sector (Sankar & Ramachandra 2000).

The state ministries have a strong vested interest in exercising control over management of state-owned utilities. The state-owned utilities provide several benefits to bureaucrats, including pay-offs from large contracts and investments, as well as other favors (SL Rao 2004). This relationship therefore pits the regulator directly against the government in influencing management decisions of the utilities. The last few years have borne out this contest, in which state governments have often encouraged utilities to defy regulator rules (Godbole 2002), and sometimes directly challenged regulatory orders in court (SL Rao 2004). Regulators are often reluctant to penalize state-owned enterprises for non-compliance. Even when they do, their effectiveness is limited, since financial penalties mean little to state-owned utilities. Although state governments in recent years have ostensibly imposed hard budget constraints, more often than not they make good utilities' shortfalls.

Capture with Privatization

A common perception today is that privatization of state-owned utilities is a necessary, and perhaps only, method to distance the regulator from government intervention. The creation of a concession agreement or license to facilitate privatization, and in some cases, legislative action, offers somewhat of a clean slate in defining the relationship between the regulator and the privatized utility.

However, this flexibility is a double-edged sword – to the same extent that fresh rules can be designed to protect investors' property rights (which, as noted earlier, is the primary concern in privatizations worldwide), this flexibility can be exploited to distance the private entity from the *regulator* as well, in recognition of the susceptibility of the regulator to government influence. The role of the regulator is minimized, by specifying in the privatization contract or legislation the terms of private sector operation.

The Delhi transaction was the first case in India where the critical terms of privatization (target levels of loss reduction) were negotiated and agreed upon up front. But in this case, the regulator retained an important ongoing role in tariff-setting and investment approval. Subsequent policy developments indicate that this model may find favor as a template, except with a much-reduced role for the regulator. The Karnataka privatization strategy was one where draft legislative amendments unduly transferred risks from the private operator to consumers, and virtually eliminated the oversight role of the regulator (KERC 2003). The World Bank has also discussed the merits of pre-specification of privatization terms, which it has referred to as 'regulation by contract.' The merits and demerits of this approach aside, if negotiations of the terms of privatization transactions take place behind closed doors, regulators would be vulnerable to capture by *private interests* in the very design of the privatization transaction. This can lead to an imbalance in risk allocation in favor of investors, and against consumers or government.

The second method of capture with privatization is the well-known information asymmetry problem in cost-plus regulation, wherein regulators depend unduly on regulated entities for information in rulemaking. This problem is similar in the regulation of state-owned entities as well, except that capture by private operators may be less likely, to the extent that they may not carry the same clout with the government as do the state-owned entities (though, to date the only two private companies that have taken over state-owned assets in India – Reliance and Tata Power – are no political lightweights).

Capture in Telecom Regulation

In telecommunications the dominance of the government is less but still considerable. In particular, the possession of licensing powers with the government reduces the autonomy of the TRAI. Most private operators complain incessantly about interconnection problems and the TRAI seems powerless to redress these issues. The method of selection of chairpersons and members of the TRAI leaves much to be desired. In one case one of the members of the Telecom Commission, which is a part of the DOT was appointed as a member of the TRAI. One can reasonably wonder about this person's impartiality when it comes to regulating BSNL.

With licensing powers *and* the power to issue policy directives to the TRAI, the DOT is in effect another, more influential, regulator. As such, it is able to pursue policies that favor the incumbents, even if these conflict with TRAI's positions. Looking forward, the Convergence Bill also ensures an avenue for DOT's influence. According to the Bill, the commission would have to follow policy directives of the government.¹⁶

Capture of the regulators by the private sectors has also emerged in recent times. The advent of Reliance Infocomm in the basic services arena is a prime example. In terms of its assets,

¹⁶ "Such directives may include the route and mode in which any services are to be licensed," Communications Convergence Bill 2000

Reliance is a big player, and has the ability to threaten BSNL's dominance. It is also rumoured to have significant clout with the government. Evidence of its ability to get its own way was exhibited by its 'back-door' entry into the mobility market.

Interestingly, the growth in dominance of private players appears to have mitigated DOT's bias toward BSNL. For instance, besides interconnection issues, private players also contest their cross subsidization of BSNL's purported social obligations through the Access Deficit Charge (ADC). However, BSNL has not been able to push through its claim on this subsidy, which was initially over Rs. 10,000 crores. The ADC implemented was 5,000 crores, and has been lowered to 3,000 crores. It is expected that this will be eliminated soon. This may be in part because BSNL's position is becoming increasingly tenuous, as its profits in mobile services increase. However, the actual extent of BSNL's required subsidy is unclear - due to the opacity in BSNL's finances and the difficulty in separating its business units. Hence, the decision is likely to be influenced by lobbying on both sides.

That lobbying interests can balance themselves out is certainly not a justification for lobbying as a basis for rulemaking, since, as mentioned earlier, this only leads to 'producer protection', which can subvert the public interest, to the extent that they conflict. TRAI must determine the ADC based on the numbers, not political pressure. To this end, the same concerns of autonomy, enforceability and information access in the electricity sector apply to TRAI as well.

4.2 Informal Processes

What are the mechanisms of capture, and how are they can be reduced so that the regulator can perform its functions unencumbered? Three categories of mechanisms can be defined: a) exploitation or misuse of policy directives; b) informal, opaque 'behind-the-scene' processes that subvert procedure; and c) flagrant flouting of procedure and law.

Policy directives to guide regulatory function are often necessary, partly to plug loopholes and clarify ambiguities in the law, but also to ensure effective and consistent application of the law across states. Typically, these are justified on the grounds of checking regulatory discretion, or, from an agency perspective, as a means of aligning the regulators' goals with that of the government. For example, the government should provide guidance on subsidy and cross subsidy definition and design. Later, new areas for policy directives related to information management and disclosure are discussed. But the legal provisions for policy guidance in the Indian Electricity Act are discretionary, not specific. Further, these are binding on regulators, and not judicable. The Electricity Act states that Commissions will be guided by government policy (Sections 61, 66, 79, 86). It also accords Government the 'last word' in policy directives in matters that it deems to be of public interest.¹⁷ This gives the ministry wide latitude to override regulatory decisions.

These provisions are often used to issue non-policy directives. This ties the regulators' hands, or restricts their flexibility to effectively implement the law. A regulatory survey conducted in 2003 shows that almost all state policy directives reduced tariffs to agricultural and/or domestic consumers, in violation of regulators' objectives of tariff rationalization. The Ministry of Power (MOP), in its draft National Tariff Policy (NTP), duplicated the scope of the CERC, by issuing detailed terms of tariff (such as debt-equity ratios, ROE, etc), often in contradiction to the CERC's proposal, rather than providing qualitative guidance on tariff principles.

Since policy directives are legally binding, regulators may have to implement policies that contradict their legal mandate. The classic example is that of state governments promising free power, which is in direct contradiction to the regulators' mandate to bring tariffs toward the cost of

¹⁷ Section 107, (108) Electricity Act, "If any question arises as to whether any such direction relates to a matter of policy involving public interest, the decision of the Central (State) Government thereon shall be final," *parentheses added*

supply. This stymies regulatory function, and prevents effective implementation of reforms. No legal recourse currently exists for this loophole.

In some cases such discretionary use is sustained by regulators' avoidance of responsibility. In one state, the regulator's demand forecast was revised upwards based on modifications to key input parameters issued by the central government in order to justify several power purchase agreements (PPAs). Here, regulators have the independence legally to develop and enforce their own guidelines. But they often revert to past practices under central planning, either due to their inexperience or external pressure. Regulators are often reluctant to penalize non-compliant utilities – again, possibly due to similar pressures from state or central ministries.

The second category refers to interactions between regulators and vested interests outside the scope of procedure and law, and hidden from the public domain. Thus, they are difficult to corroborate, or analyze, due to their opacity. These may or may not involve corruption. When this happens, the regulator becomes a vehicle to legitimize, rather than to challenge, interest-group politics. These 'informal' interactions can influence regulators during rulemaking, or influence the implementation of their orders. For instance, it is informally known that ministries often appoint members of their choice. This occurs despite the fact that the law (both the ERC 98 and E-Act) lays out a selection process involving an appointed Selection Committee. It is alleged that states offer these positions to retiring bureaucrats in exchange for taking favorable positions in rulemaking. Informal lobbying is another example of this. The CERC, for example, faces conflicting pressures from private sector to introduce open access and implement trading rules, and contradictory pressure from government to develop these rules to favor incumbent utilities and generators.

The third method of capture is where the government simply flouts regulatory authority and procedure. State governments have often unilaterally altered SEB tariffs, or rolled back regulatory tariff orders, and in some cases enshrining these changes in legislation (Prayas 2003). Similarly, governments have negotiated power purchase agreements (PPAs) with IPPs, undermining the competitive process overseen by regulators.¹⁸ Even government agencies have disregarded their obligations as electricity consumers in UP (Godbole 2002) and Delhi.¹⁹

Telecom suffers from a multiplicity of regulators, as mentioned earlier. The TRAI itself is fairly transparent and since the TDSAT operates as a tribunal, presumably, its records are available to public scrutiny as far as possible. The problem is with the DOT, which retains the power to issue licenses and policy directives. Its operations and procedures are opaque to scrutiny. Quite early in the history of the TRAI, the DOT contested TRAI's tariff setting powers and the government issued a policy directive putting its tariff rebalancing exercise on hold. Later this directive was withdrawn and since then further directives have not been issued. The TRAI has a recommendatory function to the DOT. While its correspondence to the DOT is displayed on its website, DOT's response is not available. An example (Das Gupta S 2003) is the limited mobility issue, where the TRAI chairman M.S. Verma wrote to the Telecom secretary about the possibility of using mobile switching centres (MSC) to provide roaming. The secretary's reply disregarding TRAI's worries is displayed in this article, but is generally not available. One should not have to depend on investigative journalism to find out about decisions regarding policy matters.

These different forms of political and bureaucratic intervention undermine the credibility of the regulator in the public eye, and reduce their efficacy. How can regulators extricate themselves from this web of capture? How does one create a regulatory environment that can be insulated from political and bureaucratic interference and yet be accountable to government and people? These challenges are explored next.

¹⁸ In the Tannir Bhavi naphtha project in Karnataka, the project terms were altered to make the project viable after selection of the winning bidder, indicate sources at KPTCL.

¹⁹ In the Delhi privatization transaction, the Delhi government authorized private operators to disconnect defaulting government agencies. See World Bank Oct 2003.

4.3 Improving Regulatory Efficacy

The above sections have dwelled on the compromise of regulatory powers. Clearly, the way forward is to encourage regulators to act in accordance with their mandate, and to remove the constraints that prevent them from implementing their mandate (this influences both regulators' autonomy and enforceability of their actions). To the extent that collusive behavior is unavoidable, in the least measures must be taken to make such collusion difficult. Improving member selection, altering the scope for policy direction of regulators, and exposing private information about regulatory process and decisions (transparency) are some options for doing this.

Along with possessing autonomy, regulators need to be held accountable. Improving accountability applies to both the regulated and regulating entities. Three broad doctrines to do this exist: fiduciary trusteeship, consumer sovereignty and empowered citizenship (Lodge et al 2001). Fiduciary trusteeship treats oversight as a specialized function to be carried out by expert bodies – such as tribunals, legislative committees, and encourage strict procedure to limit regulatory discretion. In the second, consumers exercise their sovereignty by exercising choice, which is facilitated by competition and rivalry, both among service providers and regulators. The third doctrine emphasizes the consumers' role in scrutiny of regulatory process and service provision by reducing distance between the regulator (and service provider) and consumers, rather than just exercising choice.

In the case of infrastructure industries, consumer choice is an option only in markets, which don't exist for most infrastructure sectors. Therefore, only the benefits and feasibility of expert oversight and public participation to improve accountability are explored here.

Reducing Capture Through Improved Member Selection Processes

First and foremost, regulatory bodies need to distance themselves from ministries. A transparent, more balanced member selection process would be a first step in this direction.²⁰ The Electricity Act requires the constitution of a Selection Committee, which is supposed to provide two nominations for every vacancy. However, bureaucrats dominate the Committee. The membership of the committee should broaden to include representatives from academia and industry, with fewer bureaucrats. This will encourage a broader base of nominees, and force active discussion to build consensus. The selection process should require a recorded, public justification of member recommendations, or rejections.

Too much scrutiny of nominees can also dissuade high-quality candidates from applying. There is also always a chance that the process can be subverted. Ultimately, accountability needs to be built into the regulatory process, rather than just in the member selection process. However, a respectable, but more transparent, selection process would only enhance its credibility and that of selected candidates. This should attract, rather than dissuade, qualified applicants.

In the case of TRAI and the proposed Communications Commission, there is no formal procedure for the selection of the chairman and the members. Given the recent wrangling between the basic telecom operators and mobile operators and the old tussle between the TRAI and DOT it would be useful to have a more participatory method of selection. One method could be along the lines of electricity, namely to appoint a selection committee comprising of members from telecom associations, consumer rights associations and the government.

Alter Scope of Policy Directives

The government's usurping of regulatory space, whether through policy directives or blatant disregard, is more difficult to counter. Since executive decisions are not judicable, and yet binding on regulators, regulators have no legal recourse to contest them. However, they also have equal obligation to follow their statutory mandate, on the basis of which they can and should defy these

²⁰ A good summary of recommendations to this end has already been made by Godbole et al, (Prayas 2003]

directives. If regulators were to assert their authority, the chances of such intervention succeeding may reduce. Even if their orders are challenged in court by the government and overturned in judicial proceedings, these contradictions will gain public scrutiny and put pressure on ministries to respect regulators' mandate.

A longer-term solution is to restrict the scope of policy guidance to macro-level principles in specific areas, such as subsidy administration, rather than permit an all-encompassing discretionary claim to the 'public interest' to issue directives. Further, to the extent that clarification of the law is required, this must be in the legislative domain, through rules, not in the form of non-judicable executive policies. Both these will require legislative amendments, and therefore political will.

Funding

Regulators do not typically have the capacity or the will to confront the ministry, due in part to their 'informal' relationship with them, but also due to their financial dependence on them. Regulatory agencies should not be funded through a consolidated budget. Rather, they should recover costs through a consumer fee. They should finance internal capacity building and training through such a cess (the E-Act permits this; TRAI has also mooted independent funding). Most international regulators recover a majority of their costs from a cess. Such a cost is unlikely to burden the consumer. For example, the KERC budget is currently around 3 crores. A cess of 1 paise per unit (less than 0.5% of average tariff) would raise 16 crores per annum in Karnataka. This would be more than sufficient to cut its umbilical cord to the ministry.

Improve Enforceability of Regulatory Actions

Underlying all these reforms is the regulator's ability to enforce its orders. The SEBs may just choose to ignore regulators and implement policy directives (as they have done in the case of conflicting tariff policy). As mentioned earlier, financial penalties are not always effective with state-owned agencies.

Some have suggested regulators should impose penalties directly on officeholders, rather than on the SEB (Godbole 2004). This merits consideration. It would be a good deterrent, and encourage accountability. However, it may be too unpalatable for the government, and difficult to implement.

It should be noted that regulators have hardly utilized their judicial powers. Acts of non-compliance are judicable, even if these may not be sufficiently punitive. Regulators can assert their authority through summons of utility personnel, proactive searches and seizures in instances of information withholding. These will send a strong signal to regulators of their authority and intentions. Instead, the signal being sent borders on indifference.

Enforceability issues were also faced by TRAI with respect to BSNL and interconnection, and with private operators. For example, private operators have consistently defaulted on rollout obligations, despite financial penalties. Private operators also face no penalties with respect to quality of service. Unless TRAI can enforce its rules, they are ineffective. Either more stringent penalties are required, or alternative incentive-based mechanisms need to be developed. With quality of service, standards need to be enforced and made judicable.

Improving Transparency and Accountability

The informal processes behind regulatory actions are not just sectoral concerns, but a systemic aspect of governance that breeds on opacity and lack of accountability across industries. To suggest methods to root out such governance failures may be ambitious. It has, however, been suggested that placing regulatory commissions within the jurisdiction of the Contempt of Court Act should directly mitigate the incentive for such capture (Godbole 2004). Currently only High Court and Supreme Court proceedings are covered by this Act. This consideration has merit for several reasons: SERCs under the law are quasi-judicial bodies that are deemed to be equivalent

to civil courts; SERCs adjudicate on matters of equal import as those taken up by the highest courts in the land. Whether the political will exists to implement this is questionable.

Since these processes eventually manifest as regulatory action, a more practical approach is to squeeze room for their occurrence by increasing scrutiny of regulators' spurious decisions. This requires transparency and accountability; the former to have the information necessary to identify irregularities, and the latter, to have effective mechanisms to contest and overturn these decisions.

These two aspects of regulatory process to protect public interest have been recognized as integral aspects of 'new-style' (independent) regulation since the nineties (e.g., Tenenbaum 1995), and acknowledged by the OECD and World Bank as a requirement for good governance. As very succinctly said in Bentham's principle for good governance, "the more strictly we are watched, the better we behave."²¹ They have also been discussed on several occasions in the Indian context as well (Prayas 2003, Sankar & Ramachandra 2000, Godbole 2002). However, critiques of the sector's short history of regulatory process from this perspective are few, and suggestions for future action to further these objectives are yet to emerge. The next few sections provide some practical suggestions for moving forward.

4.4 Transparency in Regulatory Process

The integrity of the regulatory process rests on transparency of its decision-making. Especially in India, where opaque decision-making is the norm, regulators can set themselves apart from the bureaucracy and gain credibility through transparency.

In the letter of the law (General Clauses Act 1897), regulators have to undertake several steps to ensure transparency in rulemaking; they have to write orders and place them in the public domain; they must invite public comment and may (without obligation) consider these in their final rule; and decisions can be appealed in court.

In practice, state regulatory commissions have made modest inroads at best (Prayas 2003: 29). Tariff orders are generally available to the public. However, few SERCs have proactively made public material that they rely on for rulemaking, including consultation reports, petitions, or filings. Nor for that matter do they explain their methodology or respond to comments. Many consultations that influence rulemaking occur behind closed doors, and are never recorded. CERC, however, is the only exception that has set a good precedent in conforming closest to its legal requirements.

The TRAI follows a consultative process in rule making. It begins by placing a consultation paper on its website and inviting comments. It also holds open houses to discuss issues. The method it uses, though is quite arbitrary. There is no set procedure as to which issues are important and therefore merit a consultation paper and regulation and how many and where open houses are to be held. Comments made by stakeholders on consultation papers and TRAI's responses are not available. Correspondence from the DOT and the government are available in an ad hoc manner. The TRAI also uses consultants for the purpose of writing papers and reports, but the names and the internal consultant reports are not publicly available. Finally, their web site provides no clue as to the organization structure, qualifications and functions of its employees.

The problem is there are shortcomings both in the law, and in its implementation. This can be seen when compared against the rulemaking process undertaken by US regulatory agencies, which set the highest standard for transparency.²² For example, all comments in response to draft rules are published in the form of a rulemaking record. Any order can be overturned (and the

²¹ Quoted in Lodge 2001. See World Bank, *Governance: The World Bank's Experience* (1994); World Bank, *World Development Report: The State in a Changing World* (1997).

²² Pursuant to the US Administrative Procedures Act, 1946

regulator sued) on the grounds of being 'arbitrary and capricious,' if it is found to be unresponsive to this record. In India, even the CERC does not publish such a record. The CERC does respond to comments, but at its discretion. As another example, CERC typically provides a month or less for public comment, whereas US regulators provide 30 to 120 days, with important rules utilizing a more generous comment period. Indian regulators are also not obliged to hold public hearings as part of their rulemaking process. In the US, ratemaking procedures include extensive hearings that are open to the public.

While the US system may be overly cumbersome and difficult to replicate in India, some aspects of its rulemaking process are worth imbibing, such as publishing a rulemaking record, allowing longer periods for comment, holding public hearings as part of the rulemaking process, and making public all records of consultations and hearings in this process.

State regulators need to emulate the CERC and incorporate these improvements, since they lag far behind. Indeed, they need to go further than CERC to inform and educate the public, since the pool of respondents involve ordinary citizens, with less experience and involvement than respondents to CERC rules. State regulators should publish orders in local languages; hold public hearings and training workshops for consumer representatives, particularly prior to important rule promulgations.

These modifications will improve public trust in the regulator, and likely improve the quality of rulemaking, since transparency is the first step toward accountability.²³

4.5 Accountability of Regulators

Regulators must be made accountable as much as they must operate unencumbered. As discussed in previous sections, greater accountability will not only force more reasoned decision-making, but will also dissuade regulators from yielding to informal lobbying.

Accountability requires scrutiny of decisions, and the ability to contest and overturn them. In the Indian context, where regulators can act on the behest of government, regulator *inaction* also requires scrutiny. For example, regulators may silently pass on to consumers PPAs that may violate their power purchase guidelines. This is particularly relevant to cases of utility non-compliance with tariff orders, performance or quality targets.

Filing annual reports is one mechanism of accountability. These reports have to be placed in front of Parliament or the State legislature. Regulatory orders also face legislative review, subject to modification or annulment. However, legislative review of reports and orders has limited enforceability. Legal options need to be explored to incorporate such penalties into the law. Public exposure of such failures will put some pressure on regulators.

The second mechanism of accountability is the appeals process. Orders can be appealed at the High Court on procedural, legal and substantive grounds in most states, though four states permit appeal only on points of law.²⁴ Commissions themselves entertain appeal petitions usually only on the basis of new information or clear error (Prayas 2003: 25).

Usually, the appeals process should be utilized by affected parties to hold regulators accountable for inaction, if they can be shown to violate their mandate. But these shortcomings rarely been appealed. According to the Prayas survey, most review petitions to the SERCs and to the High Courts have come from industry, with an equal number of the remaining few coming from utilities and other groups. Most of the petitions pertain to generation issues. Thus, despite the fact that regulators' primary task is tariff setting, and that most shortcomings are in this function, there is little scrutiny of this function in the appeals process. This suggests that public and consumer

²³ It is noteworthy that the E-Act states that regulatory commissions should exercise their powers with transparency.

²⁴ Orissa, Karnataka, AP and Delhi

representatives need to participate more actively. This in turn reinforces the need for improving the regulators' information base, and the public's access to it. This is discussed later.

Also crucial to enhancing accountability is incorporating *into rulemaking* due process - procedural checks and balances in the rule-making process. There is strong support in academic literature for rigorous regulatory procedure, as means to reduce capture and limit regulatory discretion (Lodge). This is essential in the Indian context also to reduce reliance on judiciary, which is notorious for delays in judicial procedure (which may be lessened by establishment of tribunals, but the experience of TDSAT shows that this may not be so); the inertia to disrupt, or reverse decisions due to high costs, or just momentum (for e.g., MOUs for power projects that may incur development costs); and lately for capture.

To improve process accountability, procedural rules must incorporate *obligatory* requirements for transparency and explanation of rulemaking. These include maintenance and publishing of a rulemaking record, holding workshops, training programs and public hearings for important rules. These rules should be judicable, and their adherence subject to legislative scrutiny (along with annual reports and orders).

A much-debated suggestion for improving process accountability is incorporating public participation into rulemaking, rather than limiting it to appeals. That is, should the regulators be answerable to the public *during* their rulemaking process? Such participation can take various forms, each with different implications.

4.6 Public Participation in Rulemaking – How and How Much?

The rulemaking process can be participatory, with the US at one extreme, or consultative, as in the UK. In the US, all formal rulemaking (e.g., ratemaking) is participatory, involving hearings and endless scrutiny of regulated utility filings by any interested party. The UK model, on the other hand, is consultative, where full information disclosure of regulators' rulemaking process is not obligatory. However, a statutory consumer organization, EnergyWatch, represents the interests of consumers, and disseminates information on regulatory matters.

India's regulatory process is currently a watered down version of the UK system. Rulemaking is consultative, but in a relatively adhoc manner, and with no formal consumer representation. A few SERCs have consumer divisions, but they handle consumer grievances and education. Independent consumer representatives have made minimal intervention in the regulatory process (Karnataka, Andhra Pradesh, Maharashtra).

The case for increasing public participation is compelling, not just from theory, but also from practical considerations. The task of a state regulator, even just in tariff setting, is daunting. A single state utility has tens of millions of customers, with a geographic expanse equivalent to small European countries, and employs several thousand people. A state regulator with a handful of staff has to scrutinize the operations of such a utility to perform its functions. Needless to say, regulators scrutinize utility filings on narrow grounds, mostly related to ensuring data self-consistency, completeness and glaring mistakes.

This lack of capacity can be surmounted in part by self-representation by impacted stakeholders. In this regard, the US system has merits. Since anybody can intervene based on their particular interests, and utility records are public, the entire public, through representation, effectively becomes an investigative arm of the regulator. In the US, such interventions have disciplined rate filings and made influential policy interventions (G Palast et al 2003). The drawback to this system is that regulatory proceedings are long, costly and cumbersome.

Until the public's capacity to intervene grows, the government must formalized through a statutory mandate both the consumer representation and its participation in the rulemaking process. Mandating public participation will not be sufficient. The efficacy of public intervention rests on

two critical prerequisites: information, and capacity. Although Commissions are required to publish all data that they rely on for rulemaking – including data submitted by utilities, consultation reports, etc. - this is only on paper. Indian SERCs have a long way to go in proactively collecting, and disseminating utility data.

Each of these steps poses specific challenges for the regulator. First, although SEBs are not forthcoming about sharing information, they genuinely lack quality data. This is an ingrained culture in public sector units that have not been required to maintain or disclose detailed record of their operations, except for financial audits. In several states, utilities have repeatedly pleaded for waivers on some of these submission requirements, and SERCs have had no choice but to grant these (Godbole 2002]. This problem extends to the lack of physical infrastructure to collect data, including metering, SCADA systems, and information management systems. The E-Act has provisions for 100 percent metering. To implement and supplement these measures, regulatory pressure is essential.

Second, SERCs play a pivotal role in drawing out information that does exist with SEBs. Here, the fact that SERCs employ staff from utilities can be exploited. Casual conversations with regulatory staff indicate a fair degree of knowledge as to the availability and location of information within the utility. But these data are still not obtained, either because regulatory staff feels constrained in their powers to be proactive, or because their demands are disregarded by utilities. This goes back to the enforceability problem. Regulators need to have punitive control over utilities to effect any cultural change within utilities.

With regard to available information, SERCs need to be much more proactive in releasing such information. The public cannot be expected to know what to ask for. Here, SERCs have to establish user-friendly websites, as well as well-organized libraries, and information management systems.

Finally, even with information access, the typical consumer in India would find the power sector too daunting to tackle. SERCs need to undertake regulator training programs in all areas of the power sector, but particularly with regard to their rulemaking activities. Here, the Pennsylvania-Jersey-Maryland (PJM) system operator offers a good template for emulation. They post on their website detailed information on basic market aspects, regulatory proceedings, and all presentations used in their training programs. They maintain an e-manual for the PJM market and system. Training programs are held on a regular basis for the public. Similarly, all the measures discussed earlier on transparency of rulemaking apply here – regarding publishing all material used in rulemaking, and posting minutes of non-public consultations or meetings.

To summarize, the accountability and efficacy of regulators critically, though indirectly, depends on a transition to an information-based culture in the power sector. This needs to permeate from utility operations up into the regulatory rulemaking process, their reporting procedures, their outreach and training, and into member selection. Procedures for information maintenance and disclosure for each of these functions needs to be codified into judicable procedures. This will have several positive effects. Public participation will improve through information access and training; the transparency brought about will improve accountability of regulators; this in turn will mitigate the influence of regulatory capture.

4.7 Institutional Capacity

The expectations placed on regulators are considerable. The construct of an independent regulator resembles an institutional panacea of sorts, where a single body makes rules, administers them, and adjudicates disputes. It is expected to act in the public interest, actively engage virtually all sector stakeholders in decision-making, and effectively interpret and carry out a mandate that is based on a broad set of principles, while all along remaining unfettered by the influence of lobbyists. That they make these decisions for a politically sensitive sector such as

electricity and often under conditions of imperfect information makes their task all the more testing.

Notwithstanding all the legal, social, and institutional structures built around regulators to make them effective, they need internal expertise and capacity to carry out such a daunting mandate. Policy and procedures adopted in this regard will influence their independence, signal government commitment to them, and determine institute sustainability.

Building and sustaining regulatory institutions requires financial and human resources. The average budget of an SERC is about Rs. 3 crores (Prayas 2003: 17), and that of CERC is Rs. 6 crores. In comparison, the US FERC budget is \$120 million (Rs. 600 crores), the UK OFGEM budget is \$ 50 million (Rs. 250 crores), while that of South Africa's is \$ 8.5 million (Rs. 42 crores). Though such a comparison has limitations (purchasing parity, industry size, agency maturity), the differences are in order of magnitude. Given that the consumer base of a typical SERC is equivalent to that of the UK or S. Africa, this is instructive. Similarly, SERCs typically have 20-30 total staff. In comparison, the US and UK regulators have hundreds of employees. These need to be enhanced through staff growth, training, and information management systems and tools.

SERCs need to attract, motivate, and retain qualified staff. International experience shows that mature regulatory bodies offer salaries that are competitive with industry, staff performance is evaluated and rewarded, and they have staff with various levels of experience and expertise (for e.g., US, UK, S. Africa). SERCs need to imbibe these attributes in human resources. Greater in-house expertise and compensation will make jobs in SERCs more attractive, thereby attracting more permanent and qualified staff. This is particularly true of telecommunications where the technology is changing rapidly. Here it might be difficult to develop all the capacity in-house and it might make sense to co-opt experts periodically into the regulatory process.

Indian SERCs have the same scope (in theory) as these international regulators, and likely handle much larger consumer bases. As constraints on regulatory function are removed, and they gain the autonomy required to function effectively, they will also require a simultaneous growth in their capacity. Such growth cannot occur overnight, and therefore must take place along with other necessary changes in the regulatory framework.

Growth in capacity has many ancillary benefits. Strong internal capacity will reduce SERCs' reliance on consultation. This will enhance their independence and gain the public trust. Internal capacity will also enhance the likelihood of SERCs being forthcoming in meeting standards of transparency and accountability, as well as in asserting their authority vis-à-vis the ministries.

5. REGULATORY SCOPE AND FUNCTION

So far institutional failings and improvements have been discussed. This section looks at the functional role of the regulator in the infrastructure sectors, including their role in tariff regulation, developing markets where appropriate, protecting consumer interests through quality of service standards, contract design and negotiation processes, land acquisition and other functions. The emphasis is not on providing general recommendations for the improvement of the sectors as a whole, though this is unavoidable to an extent, but to focus on the role of the regulator therein.

5.1 Regulation of Competitive Electricity Markets

India is on a transition path toward competitive electricity markets. The movement toward markets is gradual and presently focused on capacity expansion. The market structure is unique, in that retail competition has been deregulated (for large customers), while wholesale market is still regulated. Only a residual wholesale energy market exists, where short-term surpluses and deficits are traded. Fully deregulated wholesale markets would entail significant price risks because of supply scarcity. Also, the bulk of energy transacted today is covered by long-term contracts. Migrating these could create enormous stranded costs. The contemplated market structure for the future is one of a coordinated bilateral market with a regional system operator

that oversees system reliability and security. The most recent proposals contemplate a gradually increasing obligation for new power plants to sell their capacity on a merchant basis (Haldea 2004).

In this evolving market, what is the role of the regulator? Typically, two functions are necessary for any new market to emerge: market design and development; and market power mitigation. The E-Act already has slated market design and development as a task of the Commissions, which they have begun. Appropriately, the CERC has focused on bulk supply market design, while SERCs are tasked with implementing the rules for retail open access. Here again, the E-Act empowers the MOP to provide guidance to the Commission on market development. The usefulness of this is questionable, as discussed earlier (Section 4.2). Electricity market design is a complex and highly technical endeavor that must be conducted with caution and expertise. For instance, the MOP in its draft National Electricity Policy charges states to implement the Unscheduled Interchange (balancing market) as part of the Availability-based Tariff within six months. This is not a policy issue, but a technical aspect of market design, which has important ramifications for system reliability and security. Further, this directive is provided without support.²⁵

The CERC alone must develop the appropriate market structure, including retail market development and implementation. Although states would retain the scope to implement retail access, the *design* of retail markets must be done along with that of bulk supply markets, since they are closely related, and would benefit from consistent and uniform application across the country.

A critical aspect of the market development role is an evaluation of the *pace* of market development. Competitive markets require several supporting institutions, information infrastructure, and industry attributes that have not been evaluated in India. The benefits of competitive markets are also questionable in India's current environment (Wolak 2004).

CERC must undertake a broad-based consultative process to undertake a thorough and rigorous analysis of India's direction toward competition. Consultation papers on markets contain inadequate assessment of the risks, options and prerequisites for market development.²⁶

The Market Power Mitigation Function

Currently, both the CERC and CCI have jurisdiction over regulation of electricity markets. CERC should have sole jurisdiction. This overlap should be legally clarified. Centralized commissions have historically proceeded against violators on ex post basis. The set up of the CCI is similar, in that it has minimal market rules, and relies on the appeals process and judicial review for addressing market power. It is unlikely that the CCI will be able to manage electricity markets where proactive ex ante action is essential. Prolonged litigation may result in enormous transfer of wealth from consumers to producers before remedial action can be affected. After the fact wealth transfers can be extremely difficult to undo by regulatory action (Wolak 2004 (2)).

Several international experiences support this finding. The most prominent example is offered by the California energy crises. Due to the absence of a formal mechanism to analyze and police market power abuse, California customers fought numerous, largely unsuccessful battles to obtain refunds after the crisis. FERC has since established the Office of Market Oversight and Investigation (OMOI) to monitor electricity pools. In New Zealand, the government appointed a seven-member regulator to monitor the markets after two incidents of significant electricity price increases and the failure of the New Zealand Market Surveillance Company (NZMSC) to successfully investigate charges of market manipulation (Wolak 2004 (2)).

²⁵ The MOP did set up the N K Singh Task Force to advise the development of these National Policies. However, the report of this task force does not contain an analysis that supports this finding.

²⁶ The CERC has published a single consultation paper on competitive markets, which places more emphasis on finding constitutional and legal justifications for competition, rather than on evaluating options and attendant risks.

Although these examples apply to more sophisticated markets than what India can envision in the near-term, the principles apply – market manipulation is hard to predict, and requires constant monitoring. This is a challenge and may require institutional commitment toward a market-monitoring function.

The CERC should anticipate market power as it develops competitive markets, even if such a market is restricted to ‘managed competition’ for new capacity. This includes determining what constitutes market power abuse, whether and how it should be monitored, and what mitigation and remedial measures should be adopted. For example, the CERC needs to take an integrated view of vertical market power across natural gas and electricity markets. Vertical integration can create opportunities for predatory pricing in areas with limited fuel options.

5.2 Regulation of Telecommunication Markets

In a nascent market, primary concern in telecom market development is the dominant position of the incumbent. In the last five years, BSNL’s monopoly over most of the India’s customer base required significant regulatory intervention into interconnection issues, as well as subsidies. Today, the picture has changed. The wireless consumer base has exceeded BSNL’s 45 million fixed line connections in 2005, with a continued growth of up to 50 percent a year.

Nevertheless, the behavior of the incumbent BSNL in providing interconnection still lingers in small towns and rural areas. Private operators claim that the BSNL is not fully complying with its order to provide points of interconnection despite repeated complaints. Because most operators are already building their own competing networks, there is not much to be done, even though the resulting network redundancy is inefficient.

One major impending concern is falling prices, and the risk of bankruptcy. Not surprisingly, a wave of consolidation has taken place in the last year. The regulator needs to ensure market players do not overcompensate and gain market power. As discussed below, it would be best if market power issues were left to the TRAI. We have previously argued that the DOT is likely to be more prone to capture.

Similarly, the authority in charge of market development ought to have the authority to award licenses. Historically, the TRAI has had a recommendatory role while the government is in charge of market development. At the same time, one of TRAI’s mandates is to “facilitate competition and promote efficiency in the operation of telecommunication services so as to facilitate growth in such services.”²⁷ It would be much better to let the TRAI have licensing powers to achieve a degree of consistency in the sector. This will also ensure that market developments are deliberated and promulgated through the transparent regulatory process.

The Communications Convergence Bill does provide the new regulator with licensing powers and directs it to regulate market dominance. However, dispute resolution still rests with a tribunal and the government refuses to fully abdicate its licensing powers. Further, there is a new body, the spectrum management committee, for spectrum management. Thus, the issue of multiple regulators for telecom is set to continue into the future.

Dispute Resolution

The TDSAT was set up following the Telecom Regulatory Authority (Amendment) Ordinance in January 2000. The TRAI, with whom dispute resolution powers originally rested, had been drawn into litigation all too often. The government felt that a tribunal, with a judicial person as chairman, would have sufficient stature and authority to resolve disputes. After its inception the TDSAT has adjudicated a number of disputes. In some cases it did take a long time to pass judgments, notably in the limited mobility issue. In terms of providing an alternative to the judicial system

²⁷ Telecom Regulatory Authority of India Act 1997

there are two points to note. First, the TDSAT is set up as a specialized court, rather than a forum for negotiation and Alternative Dispute Resolution (ADR). Secondly, disputes have been appealed to the Supreme Court even after adjudication by the TDSAT. Sometimes, as in the recent case of Reliance routing international calls as domestic, TDSAT has not been involved at all. Such instances call into question the importance of the TDSAT.

The use of a tribunal to settle disputes in telecommunications is unusual, even though there are a few instances of it internationally. Recently, there has been a growing literature on ADR (Bruce and Marriott 2002, Bruce et. al. 2004). ADRs are seen as a cost effective and relatively quick method of dispute resolution when compared to the formal court system. TDSAT and the proposed communications tribunal, therefore, ought to also facilitate ADR between parties.

The Market Power Mitigation Function

Just as with electricity, the CCI and TRAI appear to have overlapping roles, with no guidance on jurisdiction. Specifically, the most likely area of overlap lies in evaluating mergers and acquisitions. This is the only aspect of market power specified in the Competition Act, wherein the CCI may review M&As above a certain size, measured in gross revenues. On the other hand, TRAI's guidelines allow intra-circle mergers as long as every circle has a minimum of three operators. These can be in conflict if mergers pass only of the two tests. These need to be clarified, preferably in favor of TRAI.

As has been argued before, telecommunications is a specialized area and rapid technological change makes it particularly turbulent. It makes sense for the agency responsible for market design and development to design and implement market monitoring mechanisms. It is extremely unlikely that the CCI will have the expertise to carry out the necessary functions and it would also likely to be costly to build up a telecom specific capacity within it.

Monitoring market power will become important in telecommunications with the advent of convergence between communication technologies. Market players might attempt to use their dominance in tied products and services. In March 2005, providers accused Reliance of predatory pricing by providing unlimited long distance talk time within its network. Although this is predictable behavior (exploit network externalities), it has been construed as discriminatory practice, since Reliance doesn't offer the same privileges service to competitive long distance providers. These issues are better studied by TRAI, who is better equipped to research, interpret and apply international practices. The telecom industry, being a networked industry with multiple services and technological complexity, is far too specialized to apply generic competition policy.

5.3 Regulation of Electricity Distribution Monopolies

Three areas merit discussion. First, the trend toward privatization was pointed out earlier. There also appears to be a trend toward mitigating regulatory risk by enshrining the terms of privatization in legislative and contractual commitments. This in effect reduces the oversight role of the regulator. Is this the right approach for India, and what are the risks of its implementation? The second pertains to utility performance tariff-setting. The current trend, which has been expressed in the E-Act and national policies, is to encourage multi-year, performance-based tariffs. What has been the experience so far, and what are the challenges? The third relates to quality of service. This is a neglected, but important facet of regulation.

Seeking Balanced Risk Allocation

The risks associated with regulation by contract/legislation are evident in the Delhi model and the proposed Karnataka design. Measures designed to safeguard investor returns and shield them from associated risks creates moral hazard problems, wherein investors have incentives to overcapitalize or increase operating costs. The reduction, or absence, of regulator scrutiny increases the likelihood of this. In Delhi, investments do need regulatory approval, but the incentives are structured such that increased operating costs increase their subsidy (World Bank

2003). In the Karnataka proposal, regulatory oversight is virtually absent, so there is a strong likelihood of overcapitalization.

Until such time that tariff setting is freed from the unpredictability of government intervention, market risk mitigation through assured returns or price would need to continue. However, at the same time privatization design needs to build in better safeguards for cost discipline, and performance improvement. For this, regulatory approval of capital expenditure and operating costs is essential. Second, the efficacy of such oversight will improve only with a reduction in information asymmetry, which goes back to the institutional efficacy issues and the fundamental need for a greater information flow in the regulatory process.

Also, as discussed earlier, the risk sharing between investors, consumers and government depends on the contract negotiation process, where representative interests may not be balanced. To date, the concerned state government has full control on the buyer side. This process needs to be more transparent, and involve the regulator, as well as other stakeholders – particularly consumer representatives. This is because the regulator can emphasize its supervisory role and balance representation by speaking for the consumer. Consultation reports, which most often drive the transaction design, need to be publicized and opened for comment prior to its finalization. Such a process would create more buy-in for the process, and result in less internal conflict and delay.

Multi-year Tariffs and Utility Performance

Most reform related to performance improvement and tariff setting has focused on technical loss reduction and utility financial performance. The proposed National Electricity Policy suggests implementing some form of multi-year tariff principles, along with performance-based price regulation.

The challenges of performance-based regulations are in implementation. Their efficacy rests on two factors: the quality of performance targets and their enforceability. A good performance target is one that encourages utilities to invest in system improvement, but is realistic enough that it can be implemented. Enforceability implies utilities need to take these targets seriously. This requires not only effective monitoring of utilities' performance, but also realistic penalties associated with failure.

The key metrics for performance include loss reduction, utility financial performance (these are linked, but are useful to decouple in order to emphasize and monitor losses separate from management and other costs). The experience of Delhi in target-setting and enforcement is instructive. Data and information shortfalls have hindered regulators' ability to independently verify utilities' AT&C reduction.²⁸ This goes back to the importance of instilling an information culture and greater accountability to share and provide information.

In order to develop appropriate (quality) performance targets, regulators should consider the development and use of benchmarks. For this, benchmarking efforts in other public utilities (natural gas, electricity, telecom) can be useful (See Berg and Holt 2002). Regulators have begun to see realistic trends of loss reduction since ERC98, which can be a starting point for developing loss reduction trajectories. A critical prerequisite will be a transparent subsidy scheme. Unless and until utilities financials can be separated from subsidies in a clear manner, efforts to force operating efficiency improvements will be handicapped.

Quality of Service

The third important challenge is providing safeguards for quality of service (QOS). Across all infrastructure sectors, with some exceptions in telecom, both private and state-owned entities have little incentive to improve quality of service. Indeed, reduction in quality of service may be

²⁸ AT&C: Aggregate technical and commercial loss – this is a product of billing efficiency and collection efficiency.

desirable (to improve returns, in the case of private entities, and to reduce workload, with SEBs). Theory suggests there are two main incentives for quality provision: competition, and reputation. Further, greater levels of information asymmetry between producer and consumer will lead to quality deterioration. In monopoly industries, there is no threat of competition. With regard to reputation, most state-owned entities have little accountability, so they care little for reputation. For this reason, quality of service must be regulated. Reasonable standards, effective monitoring and enforceable penalties are the critical requirements to force utilities to improve QOS. In electricity, the CEA is probably the best entity to develop QOS standards, given its mandate under the E-Act to develop other types of technical standards for grid operation and equipment. TRAI already performs this function in telecom, but mostly as reporting. In competitive markets, public exposure of QOS metrics for all competitors can significantly reduce information asymmetry, and increase pressures on competitors for quality.

In other monopoly sectors, effective monitoring mechanisms and penalties need to be developed and enforced. As discussed earlier, it may be difficult to rely on the regulator to develop the capacity to monitor QOS in its entire service territory. Instead, regulators can set up dedicated cells as part of their consumer grievance division, and rely on self-monitoring by public groups. There have been instances already where consumers have successfully sought damages from the utility for negligence in power supply (KERF). However, the regulator in this case should be credited for being committed and proactive. More detailed rules on QOS need to be codified and enforced. Formal rules on adherence to standards would be judicable, thereby further strengthen accountability for QOS.

5.2. Regulatory Scope and Function in Other Infrastructure Sectors

In the utility sectors in which competitive markets have been developing, and where the risk of dominance by incumbent utilities will continue, such independent-style regulation is necessary. That is why electricity, telecom, oil, and natural gas should continue with independent regulation. Further, sectors with strong interdependencies (electricity, gas and oil) must have formal mechanisms of collaboration. Ports, airports, and roads all have elements of monopolies. Given that a large share of these sectors' slow development can be attributed to bureaucratic influences, there is a need to distance these processes from the sector ministries. However, instituting independent-style regulators in each sector may be impractical and/or premature. The experiences of independent regulation in electricity and telecom have shown that attaining true autonomy and the developing the institutional capacity has been a challenge.

Supra-Regulator for Infrastructure Projects

In monopoly sectors wherein regulation is typically by contract (roads, airports and port services), the burden of establishing effective independent regulators in each sector may outweigh the benefits. A compromise solution would entail setting up a single 'supra-regulator' for all infrastructure projects to oversee common functions, such as land acquisition, contract design and implementation, quality standards, etc. Such a supra-regulator would have representatives from all concerned sectors and other stakeholders who would collectively regulate, thereby reducing the potential for manipulation by any individual ministry. The functional scope of such a regulator should be limited and well-defined to include broad guidelines and standard processes, but need not include judicial powers. It would also develop a common template for service contracts, which would apply to airport-related services, port services and potentially tolling agreements for road projects.

This regulator would then oversee land acquisition for greenfield road, airport and ports projects. It is common knowledge that many infrastructure projects stall, or fail, in the land acquisition stage, often due to resistance from local landowners and farmers. There is a fair degree of opacity in this process, with corruption and coercion also being commonplace. This process needs significant improvement, not least in transparency and better adherence to law. These are necessary not just to streamline process to comfort private investors, but also to respect the rights and claims of those from whom land is acquired. Issues have been raised as to whether the

government's use of eminent domain has permitted subsidization of unviable projects, as well as allowed below-market compensation to evicted landowners and farmers. Real estate is increasingly seen as a useful source of revenues to subsidize projects – this is seen, for example with the Bangalore Mysore Infrastructure Project (BMIC) and several IT parks around the country. This is, of course, a complex subject that requires in-depth analysis. But the government must commit to making transparent land acquisition processes if infrastructure development is to accelerate with the infusion of private sector funds.

Finally, it could also serve as a procedural check on compliance with other environmental regulations, which are often subverted to accelerate projects.

Sectoral 'old-style' regulators may then undertake sector-specific oversight. The division of this responsibility and the need for sector-specific regulators are discussed next.

Ports

As mentioned earlier, the degree of inter-port competition is proscribed by the lack of connectivity between ports. However, a lot of different activities are conducted inside ports. These include services to vessels such as piloting, mooring and utilities and services to cargo such as stevedoring and storage. It is possible to introduce a degree of competition in some services; for instance, two or more agencies providing piloting. If that is not possible there could be competition for the market, where agencies bid for exclusive provision of services. There is a high degree of complementarity between these services and running a port successfully and efficiently requires coordination. Thus port regulation is complex and the required expertise is likely to be in short supply and found only in port trusts. Further, dockworkers are politicized and there are a number of agencies regulating shipping, making independent-style regulation even more complex. To encourage competition in these services, and introduce standardized procedures for contracting, the sector should have a regulator with a mandate to regulate such service agreements. As discussed above, this function should be subsumed into the proposed 'supra-regulator', since this expertise and function are applicable in other infrastructure sectors (e.g., airport terminal services).

Price regulation should continue under TAMP. It would be premature to abandon price regulation at this stage, since competition among ports is restricted. Ports are hampered by low productivity, high costs and other inefficiencies. Instead, TAMP could adopt performance-based pricing methods, such as yardstick competition (benchmarking), or other incentives, to discipline costs. As and when inter-port competition and price deregulation become viable, TAMP can then transition to an appellate role.

Institutionally, TAMP today is semi-autonomous, meaning it is still closely tied to the ministries. To encourage private participation in port-related services, it may be prudent to grant TAMP independent-style status. However, with so many vested ministries controlling the sector, achieving autonomy in practice may be impossible. The situation would be like the one that TRAI found with BSNL, only compounded, since there would be twelve such bodies. As the TAMP gains expertise and PSP increases, this transition can be made at a later stage.

Airports

Airports share quite a few characteristics with ports. They are expensive to set up with high sunk costs and airport operations encompass a number of activities. These can be classified into aeronautical and non-aeronautical (Betancor and Rendeiro). Aeronautical activities can be further subdivided into operational services such as air-traffic control, security and runway maintenance and handling services such as baggage handling and fuelling. Non-aeronautical services include duty free shops, restaurants and banks. Obviously, as in ports, one can contemplate competition in the provision of some of these services such as baggage handling and shops. For others such as refueling one could contemplate franchising. For several reasons, government should encourage competition and private participation in these services, regardless of ownership

structure. Handling services are known to lack efficiency, and could benefit from competitive sourcing; commercial services can yield significant revenues (airports in the US earn up to 70 percent of revenues from such commercial activities); and third, dealing with congestion and space/passenger handling can use an infusion of innovative ideas for pricing (e.g., landing and parking fees) and management, which would be encouraged by competitive outsourcing. However, the benefits of private take-over of operational services such as air-traffic control and safety are less compelling. These already conform to international guidelines, and only require strict monitoring and enforcement. The role of the proposed regulator would be to oversee these services, ensure adherence to safety and quality standards, conduct dispute resolution and enforce contract provisions.

The institutional structure of the proposed Civil Aviation Regulatory Authority is unclear. It appears to have a focus on dispute resolution. If so, some degree of autonomy from the ministry is desirable, since the AAI could be a likely party to the disputes.

As discussed earlier, future airport restructuring and greenfield development should be conducted under the auspices of the 'supra-regulator', which would oversee multiple infrastructure projects, and provide templates for contract design and negotiation, as well as review land acquisition.

Petroleum and Natural Gas

The institution of an Oil and Gas regulator is progressive, and well-timed. Institutionally, the regulator has been given fair degree of autonomy (though the selection of the regulator should follow procedure recommended elsewhere in this paper), and enforcement authority. Functionally, its scope must be expanded to include oversight over both wellhead production markets and gas distribution. However, the scope of regulation in downstream petroleum sectors of refining, retailing and marketing seems unnecessary.

Gas distribution is a natural monopoly, and therefore requires price regulation. Like other monopolies discussed in this paper, gas regulation is also critical to establish service standards for quality. Currently, the existing city suppliers are regulated through concession contracts. However, once these spread (as they expected to with the growth of gas pipeline business), there is merit in centralizing and standardizing regulation of the distribution sector.

Gas (wellhead) production is assumed to be a competitive sector, which can be disciplined by internal competition, and other substitutes, such as domestic fuels and fuel imports. This is an appropriate long-term goal, but the ground reality today is different. Inter-fuel competition may come from coal, both domestic and imported, and Liquefied Natural Gas (LNG). For power plants, which are the main driver of the gas market, LNG is unlikely to be competitive with domestic gas. From recent experience, no LNG-based bid has been offered for less than \$4/MMBtu. While, a recent bid by Reliance for supply to NTPC was just under \$3/MMBtu. Private entities are averse to using domestic coal, due to its reliance on two legacy state sectors of coal and railways. This leaves only imported coal, which is likely to be competitive only for coastal power projects. Thus, the regulator needs to monitor markets for anti-competitive behavior, and aggressively promote competition in wellhead production, both to expand the sector and to discipline prices.

The concerns that the Bill addresses regarding the sale of petroleum and petroleum products include ensuring adequate availability, ensuring display of information about the maximum retail prices fixed by the entity for consumers at retail outlets, monitoring prices and taking corrective measures to prevent profiteering by the entities and securing equitable distribution. All of these concerns can be adequately addressed either by consumer courts or by the competition commission.

Further, given the close linkage of gas and power, there must be close interaction, if not formal institutional mechanisms, for interaction between electricity and gas regulators. Internationally, joint regulatory commissions responsible for gas and electricity is typical (See Appendix 2). This

coordination poses a difficult institutional challenge, because power purchase contracts are regulated at the state level. The government must create formal mechanisms and responsibility on the part of the oil/gas regulator for information sharing and coordination with state electricity regulators.

Roads

The opacity and politicization of most road projects leads to poor construction contracts with little incentives for long-term quality. MOST has developed contract templates that include some performance guarantees – but these are not adhered to. One way to bring accountability to this process is to separate construction and management funds, so that the heavy reliance on the latter is revealed. Another is to have a quasi-independent regulator develop and enforce standards for contracting and develop ex-post monitoring processes to ensure contract adherence. Internationally, there are hardly any instances of independent style regulation for roads, though there are those for regulating safety and road transport. There are also instances of regulators for multiple transport sectors, such as Australian provinces and Canada (See Appendix 2). Along these lines, as mentioned above, land acquisition and contract design and enforcement functions could be subsumed within a supra-regulator for infrastructure projects. This regulator could also serve as an additional procedural check on the compliance with environmental regulations, which are also often subjects of controversy and process subversion. But such a body must have rulemaking and enforcement authority, and an enforceable set of processes that all road development projects must go through.

6. SUMMARY AND CONCLUSIONS

Infrastructure industries in India are dominated by state-owned entities. They have been undergoing transformation, despite the continued dominance of incumbents, through increased PSP and market development. Regulation has been and will continue to be essential to bring credibility, certainty and sound rationale to the terms and conditions of private sector involvement and market development, while also insulating them from government interference. On this front, recent experience reveals a strong degree of bureaucratic interference in regulation to protect incumbents. This has stymied the reform process, and reduced regulator autonomy. Where privatization and private investment takes place, the contract negotiation process is often politicized and opaque. As predicted by theory, and experienced in other countries, regulation has leaned heavily toward private sector promotion and protection, often without much success, and at the expense of consumer interests. There are insufficient checks and balances in the current regulatory framework (even though lip service to that effect exists in various applicable laws) to protect consumer interests. Regulatory procedure needs to be better formalizing into a more transparent and accountable process of governance, both in old-style government regulation (in roads, airports, ports) and with independent regulators (electricity, telecom, gas).

Evolution in independent regulation has been confined to electricity and telecommunication industries, and has been slow. Some successes have been achieved with regard to bringing some transparency in reporting and accounting in service providers, as well as forcing some performance improvements (such as loss reduction in electricity). Regulatory experience has varied across states, with some states setting high standards for transparency and proactive action (MA, AP and KA), and others not having as yet set up functions regulatory commissions. In telecom, TRAI has been proactive in rulemaking, but its efficacy has been hampered by serious limitations in its mandate.

Specific lessons and practical recommendations for regulatory frameworks are summarized below.

6.1 Recommendations on Institutional Issues

The establishment of independent regulatory institutions requires significant political commitment, in terms of ceding authority to these institutions from incumbent ministries, ensuring that they can function with autonomy, and providing resources necessary to equip them.

Regulatory Autonomy and Credibility

- The incentives for regulatory capture in the initial stages of regulation will be strong due to the reluctance of ministries to cede control. Particularly in electricity, regulators are plagued by capture from above (policy directives, legal mandate), within (member selection, staffing) and from below (non-compliance, information asymmetry). This must be countered up front by building the credibility of regulators and granting them autonomy:
 - o Limit the discretionary scope of policy intervention in regulatory function that is embedded in sector law (Electricity Act, Convergence Bill). Policy direction must be targeted. Clarifications and elaboration of laws must be done through judicable rules rather than non-judicable policies.
 - o Mandate and following transparent processes for member selection
 - o Set in place greater procedural rigor toward a transparent and consultative process of rulemaking (details follow)
 - o Discourage state-owned entities' disrespect/disregard of regulatory decisions and orders, either by stronger punitive measures (such as direct penalties on officeholders, rather than on organizations)
 - o In privatization transactions, ensure that regulatory oversight over utility operations is not unduly restricted, and that regulators are involved in the contract negotiation process
- Regulatory bodies need to develop internal capacity. For this, the government should encourage the following (with the recognition that these cannot happen overnight):
 - o Implement self-funding of regulators through a cess, license fees, and remove all dependence on budgetary support
 - o Build institutional capacity by hiring experienced staff, with relevant expertise, from industry as well as government.
 - o Offer attractive competitive compensation packages, and performance incentives.
 - o Support the procurement of information management, financial and accounting tools.
 - o Consider developing formal training programs for regulators, including formalizing experience sharing between regulators, such as with the Forum of Indian Regulators (FOIR)
- The delineation of jurisdiction between the Competition Act and sector regulation must be established immediately so as to preempt confusion and disputes in the market. Preferably, judicable rules should be codified to delegate sectoral issues to sectoral regulators, where relevant. With electricity and telecom, the CERC and TRAI must retain final authority on market monitoring and regulation.

Regulatory Accountability and Process

The efficacy of independent regulation depends on transparency. This will make capture more difficult, and increase accountability of regulators. This in turn critically requires the infusion of an information culture in the regulated industry and the regulator. This will require:

- o Extensive information assimilation and maintenance by the regulated entities, and full disclosure thereof to the regulator. To enforce this, regulators must be more proactive in utility investigations, search and seizures to obtain information in support of tariff filings
- o Proactive information dissemination by the regulator to the public of utility records and their own rulemaking. So far, regulators are measured by their willingness to share data. This is not sufficient. Regulators must be mandated to make public a rulemaking record, submit detailed reports to Parliamentary committees. This culture will have to be formalized through enforceable rules, and implemented with commitment. The General Clauses Act is not outdated in this regard. The

government should encode more detailed administrative procedures and guidelines, or the government can provide a detailed template of the same for the Conduct of Business Regulations of each regulator.

- Public participation is crucial for accountability, not only in appeals (status quo), but also in the rulemaking process through formalized consultation. Industrial interests predictably dominate public participation. General consumer participation is minimal, due to information asymmetry, lack of expertise and funds for collective action. For this:
 - o Public participation in rulemaking should be mandatory
 - o Information disclosure should be complete, and mandatory for all regulatory proceedings. Legal provisions can be developed to hold regulators accountable to this procedure.
- To improve regulator accountability and reduce capture, the government should consider extending the jurisdiction of the Contempt of Court Act to regulatory institutions with judicial powers

6.2 Recommendations on Regulatory Scope and Function

In general, the regulatory function has been focused on tariff-setting, and the policy inclination in designing regulatory frameworks has been to facilitate private sector participation. This needs to broaden to put more emphasis in protecting the consumer interest, in practice. Specifically, across all infrastructure industries, but particularly in services such as electricity, telecom and gas, quality standards have to be developed, monitored and enforced. Policy statements to this effect are insufficient, since they are not judicable.

Electricity

- State-owned utilities comfortably flout regulatory orders. Financial penalties imposed on them are inadequate incentives for compliance. State governments need to demonstrate a commitment to enforcing hard budget constraints on state-owned enterprises. More stringent penalties should also be considered, such as penalties on officeholders.
- The CERC should have jurisdiction over all electricity-related issues. The Competition Commission must delegate any appeals or petitions in this regard to the CERC.
- The CERC should consider setting up a market-monitoring unit with dedicated staff in order to participate in market design activities, anticipate market power issues, and monitor markets continuously for dominant power abuse.
- The CERC needs to work with the gas ministry, and any future gas regulator closely to establish broader principles of market design and market power across both industries
- In electricity distribution, state regulators should research and develop benchmarks for performance indicators as they implement multi-year tariffs with performance targets.
- State privatization transactions that are negotiated by government behind closed doors run the risk of allocating risk excessively onto consumers or government, and to create moral hazard concerns of overcapitalization and operating inefficiency. Privatization negotiations should be conducted with consultation, and public exposure, and build in safeguards against overcapitalization and balance risks fairly between consumers, investors and government.

Telecommunications

The telecommunications sector shows great promise and is sometimes held up to showcase liberalization in India and the dynamism of its economy. However, the sector will face challenges from technological change, from market dynamics and rural expansion needs. The right regulatory structure will be essential for increased investment, and sustainability of the industry. The government should:

- Strengthen TRAI by providing it with licensing powers, or implement the Convergence Bill (Communications Commission would have licensing powers)
- Build capacity by increased and independent budgets, proper hiring and training. Make selection of chairmen and members through committees that are representative of the industry, government and civil society.
- Extend TDSAT mandate to include ADR mechanisms

- Build expertise within TRAI in telecommunications engineering, economics and accounting. This includes exposure and education to develop an appreciation for the social dimensions of telecommunications. This also includes keeping up with technological developments.
- Improve outreach by public education programmes and papers.
- Improve data collection for research and decision making. (For example, price indices, consumer preference data)

Other Infrastructure Sectors

Infrastructure projects (roads, airports, ports) have been found to consistently face delays, resistance and had limited success in attracting private participation. The areas of improvement lie largely in the project development and formulation process, which is politicized and opaque. Policy efforts to expedite them (e.g., special purpose vehicles, political endorsement) have often put political pressure to subvert process, with regard to land acquisition and environmental regulation. Contracts, similarly, have often under-emphasized long-term performance targets over project completion.

In order to make the project development process transparent and effective, a supra-regulator should be established with a broad, enforceable mandate to oversee the project development process for multiple infrastructure sectors. Such a regulator must also evolve some kind of project justification method, through a social cost-benefit, for example. This body can serve as a check on the compliance of projects with environmental and land-related regulations. This will also encourage a standardized method for tendering, contract terms, and distance decision-making from the vested interests in each ministry. The details of such a regulator's design and scope must be further investigated. In addition:

- In airports and ports, government should encourage outsourcing of non-critical services through competition, even in public-owned facilities.
- The sectoral regulator should limit its scope to specialized operational functions, such as tariff-setting in ports, aeronautical services in airports, while the 'supra-regulator' should oversee broader project development activity and contract negotiation
- The proposed Oil and Gas regulator should broaden its mandate to include regulation of city gas distribution, and market monitoring and regulation in gas production.

APPENDIX 1

Independent Regulators in Infrastructure in India – Overview and Rationale

Sector	Independent Regulators	Dispute Resolution Body	Policy maker (Executive)	Umbrella Legislation	Basis/Scope of Independent Regulation*
Electricity	CERC, SERCs	Appellate Tribunal in the future, presently, none	Ministry of Power	Electricity Act 2003	Price, quality and entry (license) regulation of electric distribution (natural monopoly), market design and market power mitigation for wholesale markets
Telecom	TRAI	TDSAT	DOT	TRAI Act 1997, Convergence Bill pending	Price regulation of interconnection (incumbent dominant position), market development, mitigation of dominant power abuse, QOS regulation
Ports	TAMP (semi-autonomous)	none	Ministry of Shipping	Port Laws (amendment) Act, 1997	Price regulation. Future need questionable, with growth in inter-port competition. Dispute resolution body.
Roads	NHAI (not autonomous)	none	Ministry of Surface Transport	NHAI Act 1988	Depoliticization and standardization of entry (license/contract design for private investors)
Oil and Gas	Proposed		Ministry of Petroleum and Natural Gas	Petroleum Regulatory Board Bill	Price and entry (license) regulation of pipelines and distribution (natural monopoly), design and regulation of commodity markets
Airports	Proposed	none	Ministry of Civil Aviation		Depoliticization and standardization of entry (license/contract design for private investors)

APPENDIX 2

INTERNATIONAL INFRASTRUCTURE REGULATORS - SUMMARY

Sector Regulated	Autonomous	Semi Autonomous
Electricity	17	1
Telecommunications	59	6
Roads	1	2
Railways	3	0
Aviation	4	1
Ports	6	4
Transport	3	2
Gas	1	1
Electricity & Gas	24	3
Super Regulators	9	2
General Competition Commissions	5	0
Water and Sewage	6	2

Source: World Bank Database on International Directory of Utility Regulatory Institutions (1999), with verification/assimilation by authors

Notes:

- 1 Transport (General) includes all countries where a single regulator has been established to regulate 2 or more of the following sectors: Roads, Rail, Aviation, Ports, Public transport
- 2 Super Regulators includes all countries where a single regulator has been established to regulate 2 or more of the following sectors: Electricity & Gas, Telecommunications, Roads, Railways, Aviation, Ports, Water and Sewage
- 3 Super Regulators in some cases also includes countries where a general competition commission has also been entrusted with regulation and there are no sector specific regulators at the National Level
- 4 In all cases only federal or national level regulators have been considered and provincial and state level regulators have not been considered
- 5 In a few cases a particular sector is regulated by more than one regulator. These cases have been mentioned below:

References

- Agarwal, M., Alexander, I., Tenenbaum, B.; 2003; *The Delhi Discom Privatizations: Some observations and recommendations for future privatizations in India and elsewhere*; The South Asia Energy and Infrastructure Unit; The Energy and Mining Board; The International Bank for Reconstruction and Development / The World Bank
- Bagchi S., 2000; *Telecommunications Reform and the State in India*; CASI Occasional Paper No. 13, University of Pennsylvania
- Berg, S., Blake, M., S.; 1998; *Overview of the UK regulatory process*; Public Utilities Research Center; http://bear.cba.ufl.edu/centers/purc/publications/case_studies.htm
- Berg,S, Holt, L; 2002; *Scorecard for Utilities and Regulators*, Public Utilities Research Center; http://bear.cba.ufl.edu/centers/purc/publications/case_studies.htm
- Betancor O., Rendeiro R.; *Regulating Privatized Infrastructures and Airport Services*; University of Las Palmas, Spain;
- Bruce, R., Marriott, A.; 2002, *The Use of Alternative Dispute Resolution Techniques in the Telecom Sector*, International Telecommunication Union, Telecommunication Development Bureau, Document 12
- Bruce, R., Macmillan, R, St. J. Ellam, T., Intven, H., Miedema, T.; 2004, *Dispute Resolution in the Telecommunication Sector, Current Practices and Future Directions*, ITU and World Bank
- Business Line; 2003; The Hindu; *Wronged*; Editorial, Jan 29, 2003.
- Das Gupta, Surajeet; 2003; Business Standard, ICEWorld, March 12 issue
- Dokeniya 1999; *Re-forming the state: telecom liberalization in India*; Telecommunications Policy 23 (1999) 105-128
- Galal, A., Jones, L., Tandon, P., Vogelsang, I.; 1994; *Welfare consequences of selling public enterprises: An empirical analysis*; Oxford University Press, The World Bank
- Gilardi, Fabrizio, 2003; *Institutional Change in Regulatory Policies: Regulation through Independent Agencies and the Three New Institutionalisms*, Université de Lausanne, Chapter for Jacint Jordana and David Levi-Faur (eds), *The Politics of Regulation: Examining Regulatory Institutions and Instruments in the Age of Governance*
- Godbole, M.; 2002; *Electricity Regulatory Commissions: The Jury is Still Out*, EPW Commentary, June 8, Economic and Political Weekly
- Godbole, M.; 2004; *Power Sector Reforms: No takers*; EPW Perspectives, Sept 11, Economic and Political Weekly
- Haldea, G.; 2004; *Introducing Competition in the generation of electricity*; Consultation paper of CERC; <http://www.cercind.org/pub.htm>
- Hausman, J. A.; 1997; *Valuing the effect of regulation on new services in telecommunications*; Brookings papers, Microeconomics; Pgs 1 - 38
- Karnataka Electricity Regulatory Commission; 2003; *KERC's Comments On The Proposed Amendments To KERC ACT For Introduction of Multiyear Tariff*, Karnataka Electricity Regulatory Commission; www.kerc.org
- Laffont, J.-J. and Tirole, J. 1993; *A theory of incentives in procurement and regulation*, MIT Press, Cambridge Massachusetts, USA
- Lodge Martin, Lindsay Stirton 2001; *Transparency Mechanisms: Building Publicness into Public Services*, Journal of Law and Society, Volume 28, Number 4
- Morris, Sebastian; 1999; *GEB (Gujarat State Electricity Board) Reforms: A Note on Regulatory Strategy and an Approach to Privatisation*, WP No. 99-11-04, Indian Institute of Management, Ahmedabad
- Morris, Sebastian, ed; 2002, 2003, 2004; *India Infrastructure Report(s)*, Oxford University Press, New Delhi
- Newbery, D., M.; 2004; *Regulation and competition policy: longer-term boundaries*; Utilities Policy Volume 12 (2004); Pgs 93 – 95;
- Palast, G., Oppenheim, J., MacGregor, T.; 2003; *Democracy and Regulation: How the public can govern essential services*; Pluto Press. London, Sterling, Virginia
- Peltzman, S. 1976; *Toward a more general theory of regulation*, The Journal of Law and Economics, 19: 211-240
- Posner, R. 1974; *Theories of economic regulation*, Bell Journal of Economics and Management Science, 5: 335-358
- Prayas, 2003; *A good beginning but challenges galore; A survey based study of resources, transparency, and public participation in Electricity Regulatory Commissions in India*; Prayas, Energy Group, Pune
- Ramchandra, U., Sankar, T., L.; 2000; *Regulation of the Indian power sector*, ASCI Journal of Management 29 (2); Pgs 47 – 63
- Rao, D.N; 2003; *An exclusive WLL agency merits attention*, The Hindu, August 18, 2003
- Rao, D. N; 2003; *Focus: Telecommunications: Is Rural India Being Served?*, Interface: Initiatives for a Changing India, Issue 13, ICICI Bank, December 2003.
- Rao, S. L.; 2004; *Governing Power: A new Institution of Governance: The experience with independent regulation of electricity*; TERI, New Delhi
- Singh et al; 2000; *Telecom Policy Reform In India*, World Bank
- Spiller, P. 1990; *Politicians, Interest groups, and regulators: A multi-principals agency theory of regulation*, Journal of Law and Economics 33:65-101
- Sridharan R.; 2003; *Regulating the Regulator*, Brainstorming Workshop on Power Sector Reforms, Indian Institute of Management Bangalore, April 2003
- Stigler, G. 1971; *The theory of economic regulation*, Bell Journal of Economics and Management Science, 2: 3-21.
- Tenenbaum, B.; 1995; *The real world of power sector regulation*; Note Number 50, Public Policy for the Power Sector, The World Bank
- Ugaz, C., Price, C., W.; 2003; *Utility Privatization and Regulation: A fair deal for consumers*; Edward Elgar, Cheltenham, UK; Northampton, MA, USA
- Virmani, A; 2004; *Telecommunications Reforms in India*, Indian Council for Research on International Economic Relations, 2004
- Wolak, F.A.; 2004; *Reforming the Indian Electricity Supply Industry*, Department of Economics, Stanford University; <http://www.stanford.edu/wolak>

Wolak, F.A.; 2004; *Lessons from International Experience with Electricity Market Monitoring*; Department of Economics, Stanford University; <http://www.stanford.edu/wolak>
World Bank; 2000; *India: Country Framework Report for Private Participation in Infrastructure*, Public-Private Infrastructure Advisory Facility, World Bank