

Policy and Regulatory Environment for Private Investment in the Power Sector

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Abstract

Private investors respond to risk return tradeoffs. The policy environment and regulatory framework significantly influence risk as well as return in the power sector. Power sector reform and policy initiatives for enhanced private participation have been undertaken in a number of developing countries. The economic crisis faced by India in the early 90s led to opening up of the power sector for private investment there. Major policy initiatives were undertaken to encourage private and foreign investment. The investment climate was further strengthened by gradual restructuring of state electricity boards (SEBs) and regulatory reforms. More recently, the Electricity Act 2003 has enabled competition in the sector and improved the policy environment for private investment. Abolition of the single buyer model and phased access to consumers has opened substantial potential for private investment in the sector. The scale of private investment in the Indian power sector is not as encouraging as in the case of some reforming countries in Latin America and Asia. This paper undertakes a comparative analysis of the policy and regulatory environment in the power sector in Argentina, Brazil, People's Republic of China, India, Mexico and Thailand. We find that the scope, pace and sequencing of the reform process has significant influence on private and foreign investment. Policy clarity and independent regulatory institutions reduce risk perception of investors as well as lenders.

1. Introduction

Long-run economic growth is influenced by availability of infrastructure services, including electricity. Power sector has long been under public ownership on the basis of natural monopoly and

public good arguments. However, inadequate public investment and increasing demand has necessitated private participation in developing countries. IEA (2003) projects the cumulative power sector investment requirement for 2000-30 to top USD 9.84 trillion, more than half (USD 5.1 trillion) of which would be required for developing countries.

Governments are increasingly facing competing resource requirements from social sectors like health and primary education. Given the limited budgetary support due to enhanced fiscal discipline, enhanced private sector participation is inevitable. Inefficiency, financial stress, and poor and inadequate provision of electricity under public ownership also lends support for enhanced private participation in the sector. India initiated power sector reform in the early 90s to allow private and foreign investment in the sector. However, investment from private investors has not been so encouraging. National Electricity Plan of India aims to achieve access to electricity by all households by 2010 and to meet all shortages by 2012. This would require an investment of Rs.9000 billion (approximately USD 200 billion) at 2002-03 prices to finance generation, transmission, distribution and rural electrification projects (GOI, 2005). IEA (2003) estimates the total investment requirement in the Indian power sector for the period 2000-30 to be USD 665 billion. Given the foreseeable economic growth in the years to come, such investment requirements could not be an underestimate. Investment with private participation in the electricity sector in developing countries is estimated to be only USD 12.1 billion in 2004. Against the backdrop of peak investment of USD 43.3 billion (in 1997) in the electricity sector in developing countries (Izaguirre, 2005), investment requirements in the Indian power sector alone, pose a serious challenge for policy makers.

The scale of private investment in the Indian power sector is not as encouraging as in the case of some reforming countries in Latin America. Argentina and Brazil were recipients of a significant proportion of private investment in the power sector in developing countries. Various developing countries have undertaken reforms of varying scope, pace and sequence. There is also increasing evidence of effectiveness of independent regulatory institutions in promoting private and foreign investment in the infrastructure sector, including the electricity sector (Sirtaine *et al.*, 2005; Stern and Cubbin, 2005; Sader, 1999). Politicization of the sector, especially in terms of tariffs, has not provided adequate returns to investors and has resulted in a decline in investment in private infrastructure projects in developing countries (World Bank, 2005).

This paper undertakes a comparative analysis of the policy and regulatory environment for private investment in the Indian power sector with that in Argentina, Brazil, People's Republic of China (PRC), Mexico and Thailand to understand the impact of scope, pace and sequencing of the reforms process on private investment. This study is timely as a number of developing countries in Asia and Africa have initiated or are in the process of initiating reforms in the power sector. This would also help design policy and regulatory reform in developing countries.

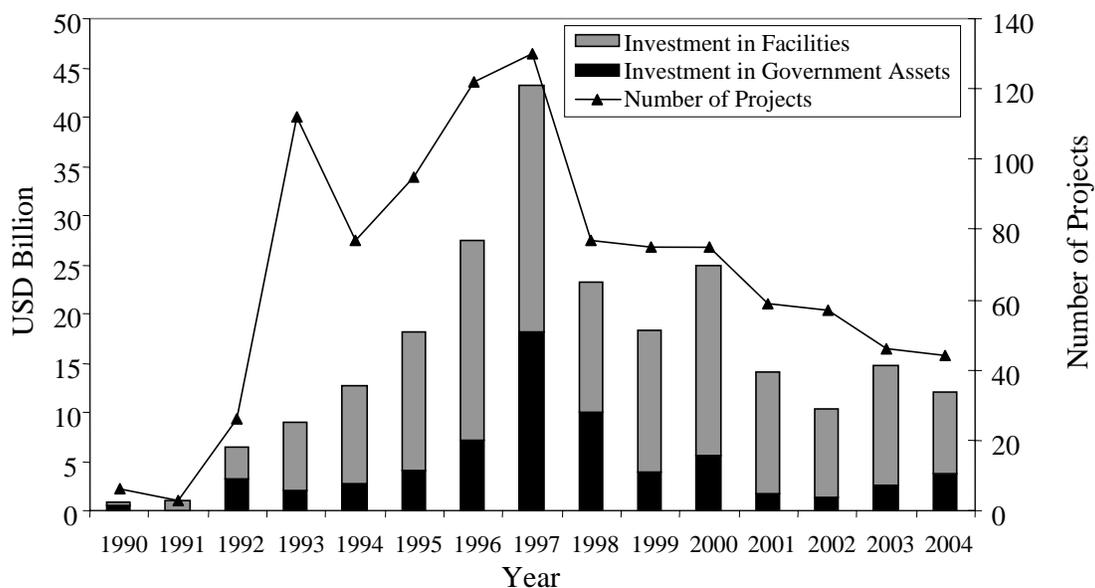
The next section provides an overview of private investment in the power sector in developing countries. Sections 3 and 4 respectively briefly review the power sector scenario in India, and the policy reforms and regulatory developments since the early 90s. Section 5 provides a review of literature on factors influencing private investment in developing countries. A comparative analysis of the policy and regulatory environment for private investment in the power sector across the selected countries is presented in Section 6.

Section 7 concludes the paper with key findings and recommendations.

2. Private Participation in the Power Sector in Developing Countries

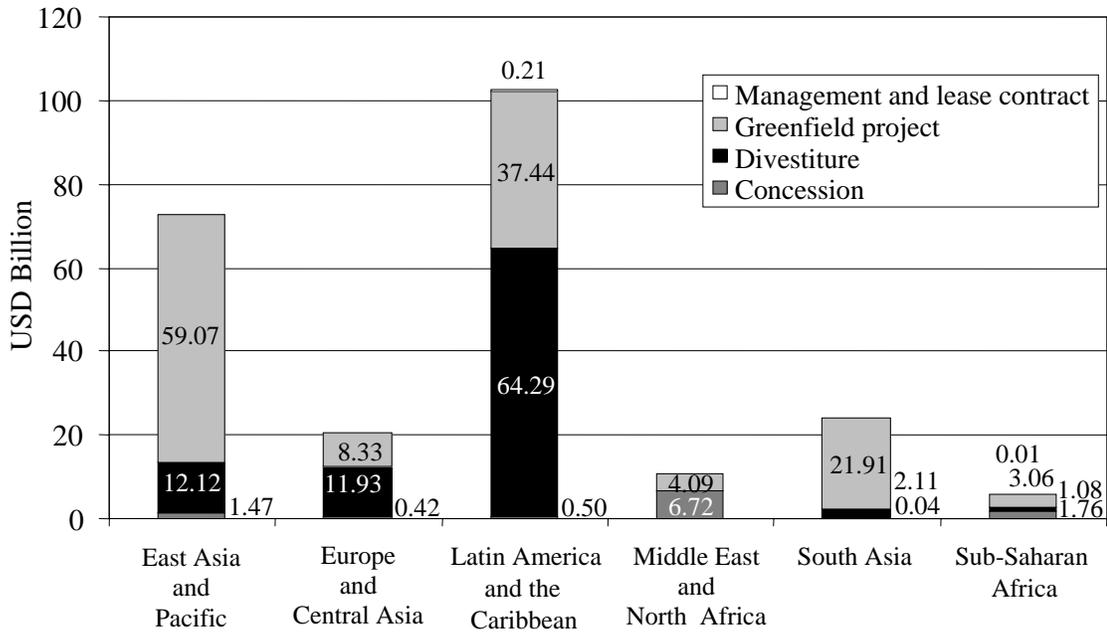
The decade of 1990s witnessed fervent activity in terms of private investment in the power sector in developing countries. Reforms in the power sector, and unshackling of the sector from public ownership and investment control, saw annual private investment reaching a peak of USD 43.3 billion in 1997 (Figure 1). Latin American and East Asian countries were prime destinations for investment (Figure 2). The East Asian financial crisis in 1997 had put a number of IPPs at risk, primarily in Indonesia. Subsequently, the financial crisis in Latin America - an erstwhile abode for private investors – further dampened investors’ interest in the sector.

Figure 1: Private Investment in Low and Middle Income Countries in the Power Sector



Source: World Bank PPI Database

Figure 2: Investment in Power Sector by Form of Private Participation (1990-2004)



Source: World Bank PPI Database

The slow down of private and foreign investment in developing countries has been a cause of concern for policy makers as well as for multilateral institutions. Crisis in California's electricity sector dampened drive for reform in the power sector. Some developing countries, like India, are regaining momentum to induce private investment in the power sector. As the shadow of the East Asian crisis is fading, India is facing increasing policy competition to remain an attractive destination for foreign investment.

3. Indian Power Sector: An Overview

Decades of economic planning since independence in India placed significant emphasis on development of the power sector. Electricity generation capacity has grown from 1362 MW in 1947 to over 124,287 MW by March 2006. However, per capita electricity

consumption remains much below the world average and even lower than in some developing Asian economies (Table 1).

Table 1: Per Capital Electricity Consumption (2003)

S. No.	Country	Per Capital Electricity Consumption (kWh)
1.	Argentina	2185
2.	Brazil	1883
3.	PRC	1379
4.	India (2004-05)	613
5.	Japan	7818
6.	Mexico	1801
7.	Thailand	1752
8.	USA	13078
9.	World	2456

Source: World Bank (2006) and CEA (2006)

Weak financial status, skewed tariff structure and poor operational efficiency of state utilities are imposing a heavy burden on the economic resources of the respective state governments (Singh, 2006). Investment in the sector has not been able to improve access and keep pace with growing demand for electricity in the country. Recent population census (2001) revealed that 44.2% of the households do not have access to electricity. Even those consumers who are already connected to the grid face severe power shortages. Energy and peak shortages were estimated to be 7.4% and 10.5% in 2004-05 respectively (CEA, 2006). Policy reforms in the power sector were aimed at attracting private investment to ease power shortages.

4. Policy Developments for Private Investment in the Indian Power Sector

The economic crisis faced by India in 1990-91 provided an opportunity for unshackling the economy by de-licensing a number of sectors. This led to opening up of infrastructure sectors like power and telecommunication for enhanced private participation. The earliest phase of power sector reform, which began in the early 90s was aimed at improving the policy climate for private investment. Such policy initiatives generated overwhelming initial interest from local as well as international private investors. Insolvency of the sole buyers, the SEBs, and delays in project development frustrated efforts of private investors.

Regulatory reforms have led to setting up independent regulatory commissions. State Electricity Regulatory Commissions (SERCs) are in place in 24 states and the Central Electricity Regulatory Commission has been set up at the federal level. The Electricity Act 2003 has deepened the process of reform by enabling competition in bulk electricity supply, through license-free thermal generation and open access in transmission. It aims to do away with regulatory uncertainty through introduction of multi-year tariff principles. An amendment to the Act stipulates open access to all customers requiring maximum power above 1 MW by 27th January 2009. This opens a market for direct sale by IPPs bypassing the distribution licensees. A cross-subsidy surcharge imposed on such sales provides some comfort to state utilities for a few years only as this surcharge will be phased out.

The Indian power sector has not been able to attract substantial private investment due to an inadequate legal and commercial framework, and delays in obtaining regulatory approvals (IEA, 2003). The private sector, including IPPs, currently owns around 10% of the

total generating capacity in the country. Apart from pre-existing private licensees in urban areas, distribution zones in Orissa and Delhi have been privatized. Foreign investment remains low. Actual FDI in the Indian power sector between 2000-05 is recorded to be Rs.49416.2 million (approx. USD 1.1 billion), accounting for 5.77% of total FDI inflows to the country.

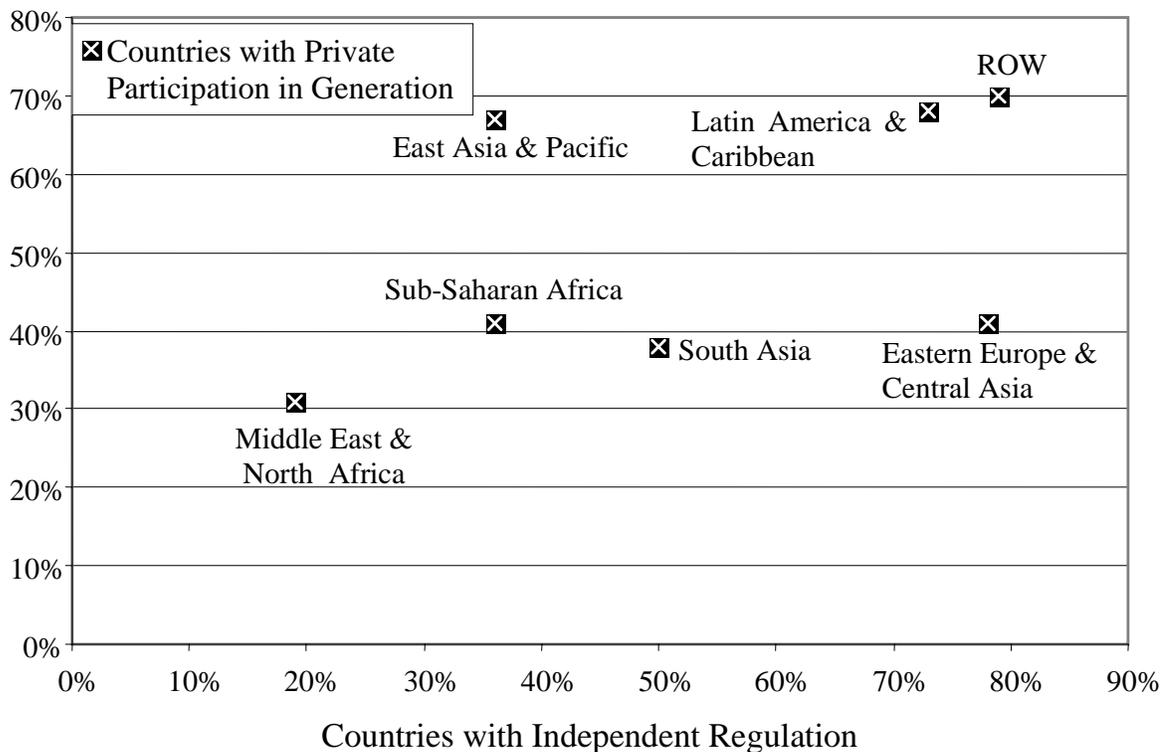
5. Role of Policy Environment and Regulatory Reforms in Private Investment in the Power Sector

Creation of regulatory institutions along with legislated private sector participation in the sector aimed at mitigating risks associated with long-term investment in the sector. With the replacement of public monopolies by private monopolies, the role of independent regulation was envisioned to provide justifiable rates of return to investors while protecting consumers' interest.

Investors in the power sector attach priority to the legal framework defining investors' rights and contractual obligations (Woodhouse, 2005; Stern & Cubbin, 2005; Lamech & Saeed, 2003; Pargal, 2003). Foreign investment in the infrastructure sector in developing countries responds positively to the presence of an effective regulatory framework, thus providing regulatory credibility to the private investors (Kirkpatrick *et al.*, 2004). Shortcomings on these aspects are often addressed through incentives for investment and sovereign guarantees. Many developing electricity markets provide some sort of guarantee to private investors. Sovereign guarantees are not substitutes for effective policy and regulatory environment. Transparent and predictable government policies can obviate the need for sovereign guarantees (Klein, 1997).

Using regional data from a study by Estache & Goicoechea (2005), Figures 3 & 4 depict the complementarity¹ between regulatory institutions and private participation, in generation and distribution segments, respectively. A country with independent regulatory institutions is more likely to have private investment in generation and more specifically in the distribution segment.

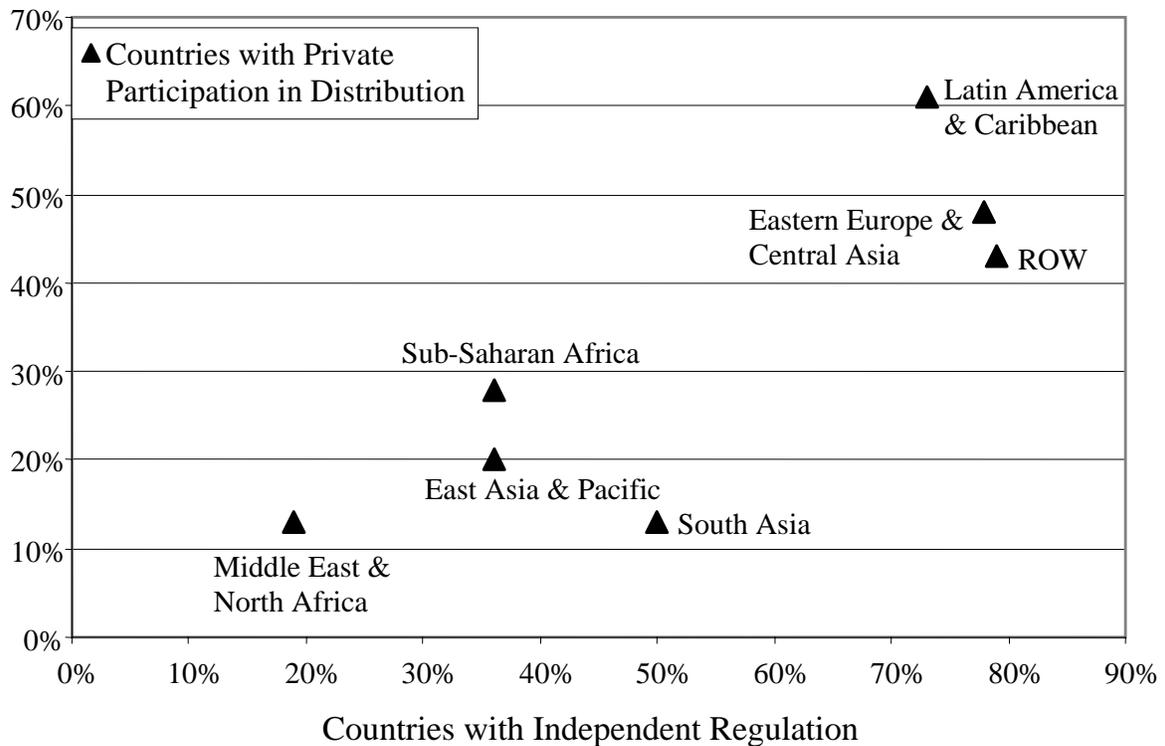
Figure 3: Independent Regulation and Private Investment in Power Generation



Source: Estache & Goicoechea (2005)

¹ It is not possible to ascertain if independent regulation was an outcome of ‘design’ (i.e. before inviting private participation) or ‘necessity’ (i.e. after private participation took place). This could be a potential area for further research.

Figure 4: Independent Regulation and Private Investment in Power Distribution



Source: Estache & Goicoechea (2005)

Further analysis using country-specific data further strengthens the argument for the above mentioned complementarity (Table 2). The relationship is more pronounced in the case of the distribution segment.

Table 2: Independent Regulation and Private Investment in Generation and Distribution (Country Specific Data)

	Number of countries with independent regulatory institution		
	Yes	No	NA
Private Investment in Generation	Yes	No	NA
Yes	59	18	7
No	27	49	4
NA	9	3	31
Private Investment in Distribution	Yes	No	NA
Yes	51	5	3
No	36	60	4
NA	8	5	38

Note: Analysis of the data from Estache & Goicoechea (2005)

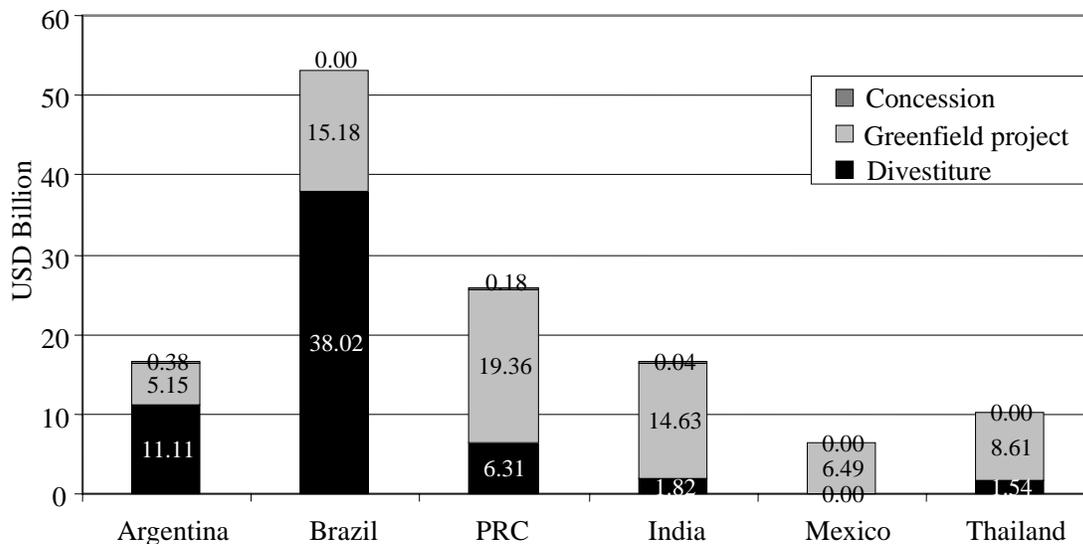
In 2004, 51% of the countries in a sample of 136 countries had independent regulators. This proportion was 79% in the case of the sample of 29 developed countries (Estache & Goicoechea, 2005). Regulation matters in aligning the cost of capital and rate of return, and hence influences profitability of investment (Sirtaine *et al.*, 2005). There is a clear trend towards more effective regulatory governance in the electricity sector in India. However, it is difficult to ascertain convergence of regulatory regime to the best practice, which itself is difficult to define (NERA, 1998).

The efficacy of a transparent policy environment and independent regulatory framework in attracting private investment in developing countries can not be undermined. The transition path and sustainability of reforms provide a long-term policy stability thereby reducing investor risk. The reform program in developing countries is aimed at inducing private and foreign investment. However, the design of the reforms program, its pace and scope vary across countries, as discussed in the following section.

6. Comparative Policy Analysis with Argentina, Brazil, PRC, Mexico and Thailand

In spite of being an early bird, Indian power sector did not succeed much in attracting private investment as compared to some Latin American countries, like Argentina and Brazil. A comparative policy analysis further investigates the role of policy and the regulatory environment in this context. This highlights the relative strengths and weaknesses of the power sector reform and investment climate for private investors in India. The sample includes Argentina, Brazil, PRC, Thailand and Mexico. The first two countries have attracted significant private investment in the power sector. PRC is included on account of its overall attractiveness for foreign investment. Thailand and Mexico have been considered as these are at an initial phase of reforms. From the initial phase of reforms, the two countries have also been described as “best practices” for the IPP model (Woodhouse, 2005).

**Figure 5: Private Investment in the Power Sector (1991-2004)
A Cross-country Comparison**



Source: World Bank PPI Database

Power sector reforms and policies to encourage private investment have progressed at different paces and sequencing across the sample of countries under examination (Table 3). In the context of regulatory and policy environment, such differences arise from:

- (i) Policy Environment for Private Participation
- (ii) Independence of Regulatory Institutions
- (iii) Approach to Power Sector Reform and Regulation

Table 3: Comparative Analysis of Policy and Regulatory Environment

	Argentina	Brazil
POLICY ENVIRONMENT FOR PRIVATE PARTICIPATION		
Year when Private Investment allowed	1992	1995
Year of Privatization	1992	1995 (D), 1998 (G)
Year of Unbundling of Core Utility	1992	1996
Year of wholesale power market	1992	1998
Sectors Open for Private Investment	G, T, D	D, G
Subsidies	Y – Prov. & Fed. Govt.	?
Cross-subsidies	N	Y
Electricity Market Context: IPPs developed in	Privatized electricity market, selling in competitive contract & spot markets.	Partially private electricity market, selling to distribution companies and large users.
INDEPENDENCE OF REGULATORY INSTITUTIONS		
Year when Regulator was setup	1992	1996
Source of financing of Regulatory Institution	Companies/ License fees levies	Fees and Govt. Treasury
Who appoints head/commission	President	Govt
Parliamentary approval for appointment	Y	Y
APPROACH TO POWER SECTOR REFORM AND REGULATION		
Reform Philosophy	Unbundling, Regulator, Wholesale Market --> Privatization of Gen. --> Privatization of Discoms --> Retail Competition	(Unbundled) --> Privatization of Discoms --> Privatization of Gen. --> Wholesale Market --> Retail Competition
Type of Regulation	Price Cap with 5 year review (Distribution)	Cost of Service till 1996, then Price Cap

	PRC	India
POLICY ENVIRONMENT FOR PRIVATE PARTICIPATION		
Year when Private Investment allowed	1994	1991
Year of Privatization	NA	1999
Year of Unbundling of Core Utility	2003	1998
Year of wholesale power market	Process undergoing	No (Bilateral Trading Existing)
Sectors Open for Private Investment	G	G, T, D
Subsidies	?	Y – State govt.
Cross-subsidies	?	Y- phased reduction
Electricity Market Context: IPPs developed in	Selling to provincial power authorities; Reforming electricity market.	Initially, SEBs were sole buyers; Reformed electricity market allows competition in bulk supply & phased customer access.
INDEPENDENCE OF REGULATORY INSTITUTIONS		
Year when Regulator was setup	2003	1995 (Orissa), 1998 (CERC)
Source of financing of Regulatory Institution	?	Govt. Budget
Who appoints head/commission	?	Selection Committee Appointed by Govt.
Parliamentary approval for appointment	?	No
APPROACH TO POWER SECTOR REFORM AND REGULATION		
Reform Philosophy	Private Participation in Gen. --> Partial unbundling --> Regulatory Reforms	Unbundling --> Regulatory Setup --> Part Privatization of Discoms --> Enabled Competitive Bulk and Retail Power Market
Type of Regulation	No Tariff Related Powers to Regulator	Cost of Service with Performance Standards

	Mexico	Thailand
POLICY ENVIRONMENT FOR PRIVATE PARTICIPATION		
Year when Private Investment allowed	1992	1994
Year of Privatization	No	1995
Year of Unbundling of Core Utility	No	---
Year of wholesale power market	No	NA
Sectors Open for Private Investment	G	G
Subsidies	Y	N
Cross-subsidies	Y	N
Electricity Market Context: IPPs developed in	Unreformed electricity market, selling to vertically integrated national utility.	Unreformed electricity market, selling to national generation and transmission utility.
INDEPENDENCE OF REGULATORY INSTITUTIONS		
Year when Regulator was setup	1995	No Regulator
Source of financing of Regulatory Institution	Gov. Budget	---
Who appoints head/commission	President	---
Parliamentary approval for appointment	Y	---
APPROACH TO POWER SECTOR REFORM AND REGULATION		
Reform Philosophy	Unbundling --> Wholesale Market --> Privatization	Unbundled sector; no regulator; a proposal competitive power pooling was dropped in 2003
Type of Regulation	Proposed competitive wholesale market, and 5-year price cap regulation for T & D	None (No Regulator)

Source: Compiled by Author from various sources

6.1 Policy Environment for Private Participation

India liberalized private investment in 1991, a year before such an initiative was launched in Argentina and Brazil. While unbundling of the sector and privatization of distribution companies commenced almost simultaneously in the case of both Argentina and Brazil, the lag in the Indian case was 8 years. Similarly, power market reform

leading to development of a wholesale power market materialized almost 12 years after the reform process was initiated in India. Argentina's initial reform process included setting up the wholesale power market, whereas Brazil undertook such initiatives with a lag of a few years. Divestiture of majority holding of a generating company followed the year after the sector was opened for private investment in Thailand. In the absence of restructuring / unbundling / privatization and independent regulatory institutions, PRC's attractiveness followed from a "Can't Afford not to be there" syndrome (Crow, 2001). However, foreign investors had to face repeated tariff reductions and unenforceable contracts. It has been termed an example of an obsolescing bargain, signifying shifting negotiating leverage between the host country and the investors during the project life cycle (Woodhouse, 2005). The newly setup State Electricity Regulatory Commission in PRC has introduced annually renewable PPAs for IPPs. The fate of earlier negotiated PPAs remains doubtful in the emerging scenario (Woo, 2005a). Such an uncertain environment would reduce investors' interest in committing long-term investments like those in the power sector.

A roadmap to regulatory and market reforms provides policy clarity and comfort to investors. This helped successful accomplishment of the privatization process in Argentina without any government guarantees. Transition from initiation of sectoral reforms to the point when rules of the game for private investors are clear, is a fundamental constraint to private investment in the power sector (Rosenzweig *et al.*, 2001). Policy reforms in the Indian power sector kept alive the uncertainty about the reform path for a long time, and this seem to have influenced private investment in the sector. At the current stage of reform, Mexico and Thailand need to address policy uncertainty to reap the full potential of investor response.

Subsidies remain an integral part of electricity pricing in most developing countries. In India, industrial and commercial consumers continue to cross-subsidize domestic and agricultural consumers. Argentina prohibits cross-subsidies by law, whereas in the case of Brazil and Thailand industrial tariffs are subsidized by residential customers. The presence of significant cross-subsidies at the beginning of the reforms program in India has made the job of regulators more challenging and distasteful for politically sensitive consumers.

6.2 Independence of Regulatory Institutions

The efficacy of regulatory institutions in reforming electricity sectors with greater private participation is influenced by independence of such institutions. Effective regulation—supported by law; financial autonomy and decision autonomy—should be a key priority to protect both consumers as well as investors interests (Sirtaine *et al.*, 2005). Regulatory independence is derived from financial independence, administrative / operational independence and reduced government influence on regulatory appointments. Regulatory institutions developed in India continue to live under political influence due to influence over appointment of regulators and financial dependence on government. This problem is more serious in the case of state level regulatory institutions. Both Argentina and Brazil provide some semblance of independence due to required approval of regulators' appointments by the legislature and greater financial autonomy. Regulation matters in aligning cost of capital and rate of return, and hence influences profitability of investment. At the same time it also protects consumers from overexploitation, giving credibility to the reform process and its sustainability. National Electricity Policy issued in 2005 by the government of India also

recognizes efficacy of independence of regulatory institutions. It notes that lack of transparency in selection procedure, delayed, inconsistent and deficient orders, and lack of accountability on part of regulators is hampering its ability to meet the intended objectives of regulatory reforms.

6.3 Approach to Power Sector Reform and Regulation

The success of power sector reform, measured in terms of improvement in performance of utilities and reduction in consumer tariffs can not be expected if public monopolies are replaced by private monopolies. Policy measures and regulatory institutions need to provide appropriate incentives for performance improvement and encourage sharing of such benefits through enhanced competition in the market. Failure to bring competition in the wholesale market and, later, unavailability of retail choice would leave the process of reform incomplete and subject to criticism. Argentina and Brazil introduced competition at an early stage, thereby providing investors with a choice to sell power without long-term contracts to a certain extent. Timing and sequencing of privatization is critical to the success of privatization itself and the reform program (Rosenzweig & Voll, 1997). The reform strategy followed by the Latin American countries realized the benefit of distribution reforms coupled with privatization. The strategy seems to have paid well for attracting private investment in the sector.

Investors in the power sector expect to earn returns over a long investment horizon, which may last up to 20-30 years for greenfield generation investment. Uncertainties on account of lack of a roadmap to reform are disliked by investors and more so by lenders, who perceive policy risk to be significant unless covered by government guarantees. Argentina and Brazil are almost textbook examples of

reforming the power sector. The uncertainties associated with the emerging policy and regulatory environment in the sector were minimal in both cases as critical reform steps were undertaken almost simultaneously. India, PRC, Mexico and Thailand continue to be riddled with reform hiccups. PRC reforms have been the most unpredictable for investors and have often resulted in adverse outcomes for investors, prompting their exit from the market.

Regulatory institutions also bring with them a new kind of risk called 'regulatory risk' that arises due to unpredictable regulator, behavior, especially in setting rate of return and performance standards. Such fears were reduced in Argentina and Brazil through adoption of price cap regulation with a five-year period of regulatory review. Mexico proposes to adopt a similar approach. In contrast to this, the Indian power sector chose to adopt cost of service regulation. This was the appropriate choice at the time due to lack of reliable data and the sector's lack of preparedness for incentive regulation. CERC, the federal regulator, has adopted a four-year tariff framework under rate of return regulation with performance standards. The Electricity Act 2003 stipulates adoption of multi-year tariff principles by regulators. As per the National Electricity Policy, choice of regulatory principles remains with the regulatory institutions, which are free to adopt incentive regulation as deemed fit.

7. Conclusions

The power sector has remained under public monopoly and riddled with inefficiency in most developing countries. Increasing demand and inadequate public investment has prompted enhanced private investment. The initial phase of power sector reform in India invited private investors in an environment characterized by policy uncertainty and lack of independent regulatory institutions. Latin

American countries provided more policy clarity and predictable regulation. These were able to attract significant private investment even in the absence of sovereign guarantees.

Response of private investors to the initial phase of policy initiatives in India has not been encouraging and capacity shortages loom large. The Electricity Act 2003 and a number of regulatory initiatives hold promise for enhanced private participation in the sector. Lack of a roadmap to the process of reform raises risk perceptions for investors and lenders alike. Experience in Argentina and Brazil suggest that investors' risk perception is best addressed through a roadmap to the process of reform and policy certainty. Independence of regulatory institutions provide credibility to the regulatory process which provides comfort to investors while protecting consumers' interest. An approach for encouraging private investment in the power sector should focus on reducing risk itself rather than allocating it (Malhotra, 1997). This would increase the number of bankable projects, which are rather lacking in developing countries like India.

Policy reforms undertaken in India, especially the recent enactment of the Electricity Act 2003, provide a guiding tool for reforming developing countries. However, the delay in undertaking such initiatives from opening up of the sector for private investment should be minimised to get maximum leverage from the reforms program. Independent regulation complements private investment in generation and, more specifically, in distribution business. Developing countries embarking on policy reforms should chalk out a reform road map as per the prevailing conditions and introduce independent regulation for inducing greater private investment in the power sector while protecting consumer interest.

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