

# Power Sector Reform in Latin America: Accomplishments, Failures and Challenges

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Jaime Millán was principal energy economist in the Infrastructure and Financial Markets Division of the Sustainable Development Department. He retired from the Bank in November 2005. An earlier version of this paper, coauthored with Eduardo Lora and Alejandro Micco appeared as a chapter in the IDB's *Economic and Social Progress in Latin America and the Caribbean 2000* (IDB, 2001). Their contributions to the earlier paper are gratefully acknowledged, as well as their permission to borrow freely from it.

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# Foreword

It has recently become fashionable in political circles to question the success of the power sector reform efforts initiated 15 years ago by the countries of Latin America and the Caribbean. This is part of a more widespread movement against the Washington Consensus, the set of policy reforms undertaken during the nineties. While the motivation and rationale of these critiques are diverse, it is critical for an institution like the Inter-American Development Bank, which has supported and encouraged the reform efforts through its policies and strategies as well as in its lending, to ascertain the truth of these claims.

The Bank's Energy Strategy (which was approved in 2000) encouraged Bank management to perform evaluations and appraisals of progress in implementing the reforms. Since the first comprehensive study published in *Economic and Social Progress in Latin America 2000* (IPES), Bank staff have undertaken several studies of the energy sector. Some were published as books, such as *Keeping the Lights On: Power Sector Reform in Latin America*, some as part of related publications covering the infrastructure sector, and others as independent papers. Despite these earlier efforts, the dynamic nature of the subject demands revisiting the effectiveness of policies in order to guide staff action.

In this paper, Jaime Millán, a leading energy expert who was Principal Energy Economist at the Infrastructure and Financial Markets Division of the Bank, provides a well-timed update of the IPES review of the electricity sector. The paper incorporates the latest developments and provides additional descriptions and analysis of specific features that have proven to be difficult to deal with. The paper is an abridged version of a chapter in a forthcoming book that presents the sum of Jaime's 35 years of experience in the field. The forthcoming book (which will be published in Spanish) will provide food for thought on a subject of capital importance to the electricity sector in the region.

Pietro Masci  
Chief  
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# Contents

<b>Introduction</b>	<b>1</b>
<b>Accomplishments and Challenges</b>	<b>2</b>
<b>The Role of the State and Regulatory Performance</b>	<b>5</b>
<b>The Sequence of Reform</b>	<b>8</b>
The Textbook Reform Sequence	
Taking Advantage of Windows of Opportunity	
May Require Cutting Some Corners	
The Cost of Compromise and Emergency Solutions	
<b>Achieving Competition While Keeping the Lights On</b>	<b>11</b>
Wholesale Market Designs	
Market Performance	
Flaws in Market Design	
<b>The Regulation of Noncompetitive Segments, Cost Recovery and the Needs of the Poor</b>	<b>18</b>
<b>Conclusions</b>	<b>21</b>
<b>Bibliography</b>	<b>24</b>

# Introduction

Power sector reform has been widespread throughout Latin America and the Caribbean. It began with Chile's pioneering efforts in the 1980s to introduce comprehensive reforms aimed at opening the sector to private participation and competition.

Reform efforts must be viewed against the background of the failures of the old regime. With only a few exceptions, lack of efficiency incentives and tariffs that did not reflect actual costs led to the poor performance of state-owned enterprises (SOEs), which accumulated huge financial deficits. To a large extent, inadequate incentives were related to the lack of separation of the government's role, which facilitated the political abuse of utilities. Rent-seeking groups were allowed to capture the sector and distort its objectives. The consequences included generalized and poorly targeted subsidies, inefficient and insufficient expansion of distribution, and a sector that acted as an employment agency and was subject to corruption.

Thus, while reforms were similar to those undertaken in more developed countries, the underlying motivation was different. Reforms introduced in OECD countries typically have been attempts to deregulate or restructure the electricity industry in order to facilitate competition, which is seen as a means to greater efficiency. While the need for efficiency was also a major issue, reforms of the electricity sector in Latin America and the Caribbean have been largely motivated by the need to relieve the government of the heavy burden of SOEs and avoid the further deterioration of services.

According to the new paradigm, attracting private sector investors would reduce the financial burden on the State. In addition, enlisting market

forces to attain efficiency in the competitive segments of the market could minimize the regulatory burden. A new incentive framework and new regulatory institutions could be established to foster competition, attain efficiency in monopoly segments and protect the consumer. Finally, social considerations could be addressed by using, well-targeted instruments that are free distortions.

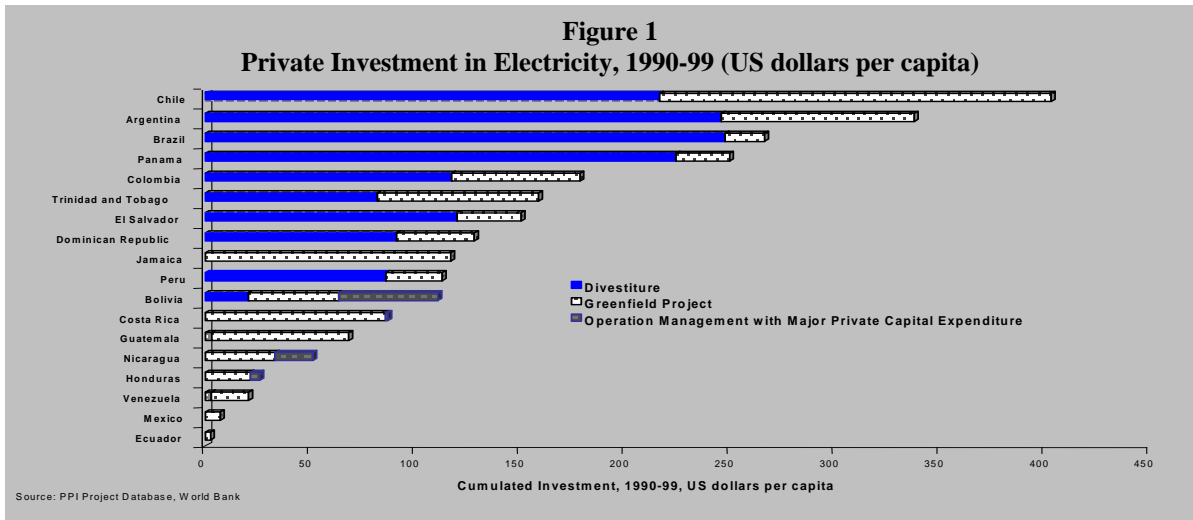
While there have been major achievements as a result of reform, and the new regime certainly is an improvement over the old one, in practice, as will be seen, it has proven difficult to put such reforms into effect and important issues threaten its direction and sustainability in the long term. Reforms are still young and while most stakeholders are surprised by the difficulties in their implementation, success cannot be judged by the naive expectations of the reformers. After a quick summary of some of the accomplishments and challenges of reform, this paper addresses some issues that affected reform performance and the status of current efforts to address them. First, it explains the difficulties in achieving a separation of the roles of the State in an environment in which it continues to play an important role as entrepreneur, and the difficulties of providing adequate regulation in an institutional and resource-constrained environment. Second, it discusses the stranded costs arising from the impossibility of following the correct sequence of reforms and the constraints imposed by this failure. Third, it provides an analysis of the difficulties encountered in achieving competition while assuring long-term resource adequacy. And, fourth, it looks at the regulation of non-competitive segments and the elusive goal of achieving cost recovery while addressing the needs of the poor.

# Accomplishments and Challenges

The reform process has occurred in waves and, so far, has not reached all countries in the region. Chile's example was first followed by Argentina in the early 1990s and shortly thereafter by Bolivia and Peru. By the mid-1990s it had spread to Brazil and Colombia, and then to several Central American countries, a trend that may eventually lead to the complete physical and regulatory integration of their electricity sectors. While enthusiasm for reform and private participation has weakened during the last five years, the only major players missing from the process have been Mexico and Venezuela, where transfers of electric assets to the private sector have been small and reforms limited. The accomplishments and challenges for the region in this area can be summarized in five general categories: private sector investment, efficiency gains, wholesale prices, the distribution of gains, and regulation.

*Private Sector Investment.* Generation capacity has expanded vigorously in the reformed sectors. The only major exception is Brazil where, until now, greenfield activity has been slow to take off. Between 1990 and 1999, the private sector invested \$16 billion<sup>1</sup> in new capacity and by the

end of the period the threat of power shortages had been reduced in most countries. Altogether, the countries of Latin America and the Caribbean account for the largest share of private electricity projects in developing countries: out of a total investment of \$193 billion in the developing world as a whole, over \$77 billion in private investment took place in the region (World Bank, 2000). Brazil, Argentina and Colombia are among the top ten developing countries by total investment. During the period, private sector investment in Brazil was worth \$29 billion, investments in Argentina were worth \$12 billion, and investments in Colombia were worth nearly \$6 billion. Chile, Argentina, Brazil, Panama and Colombia are among the top countries in terms of per capita investment (see figure 1). Nonetheless, the total number of new investors has been relatively small, particularly after demand growth stagnated because of meager economic growth during the first five years of the new century and the decline in interest by independent private producers following the collapse of Enron and events in California. In addition, SOEs are still major players in some countries. They carry the burden of social programs and priorities and some continue as vehicles for



<sup>1</sup> Unless otherwise noted, all amounts are in US dollars.

transferring rents to particular interest groups. Rather than being scaled down, some SOEs have extended their participation and the separation of the roles of the State in the sector has been difficult to achieve.

*Efficiency Gains.* Most privatized distribution companies substantially increased their efficiency by reducing technical and nontechnical losses and redundant staff while at the same time improving service quality. Chile played a pioneering role in improving the efficiency of privatized companies and later profited from this expertise by participating in the privatization of many distribution companies in Argentina, Brazil, Peru and Colombia. A good example of this pattern is CODENSA, a privatized distribution company in Bogota, which halved its losses (from 24 to 12.5 percent), increased the number of customers per employee (from 800 to 1,900), and reduced the frequency of service interruptions and mean interruption time by more than 30 percent in two and a half years (Ayala and Millán, 2003). Losses in Argentinean and Chilean utilities are even lower, between five and ten percent (Pollitt, 2004 a and b). These accomplishments notwithstanding, there are countries and regions where private investors are struggling to control losses and collect payments [this is the case mainly in economically disadvantaged areas and urban slums].

*Lower Wholesale Prices.* Wholesale prices fell in the countries where competition was introduced, declining by as much as 30 percent in Argentina (Pollitt, 2004a) and 20 percent in Colombia (Ayala and Millán 2003).<sup>2</sup> Nonetheless, competition is not always vibrant, and is often hampered by concentration. Despite some successes, wholesale markets have failed to offer the price signals needed to attract the new investment that would have ensured adequate resources. Security of supply seems to have improved as a result of reforms, but blackouts in

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<sup>2</sup> While it may be argued that the recession-driven drop in demand depressed prices in Colombia, that price decline was possible because of the existence of competition. Similarly, natural gas would not have come onstream in Argentina under the previous regime, which favored large hydroelectric investments.

Chile in 1998-99 and in Brazil in 2001 have raised concerns about the adequacy of the incentives introduced by the reforms.

*The Distribution of Gains.* While gains are real, their distribution is contested. In general, governments have benefited from privatization and the fiscal relief that it has provided. Society at large may have also benefited as public funds that were previously going to the SOEs are made available for spending on social needs such as education or health. However, the main beneficiaries of lower prices have been large customers and, in some countries, prices are still high. Cross subsidies from nonresidential to residential customers have been partially or totally dismantled in many countries. While a few countries have experienced increases in service coverage, an important share of the population in some countries still lacks access to the service.

*Regulation is Now Widespread.* Yet, the regulatory system has not always evolved toward improved transparency, simplicity or certainty. Regulators, governments and legislators frequently clash over jurisdiction, interpretation and implementation of the reforms.

In spite of these outcomes, public frustration with the economic crisis of the last six years, together with the Enron debacle and other unfavorable international developments in the sector, have taken a toll and there are increasing signs of reform fatigue. Most notably, among the many problems that have plagued the performance of the reformed electricity markets during the initial years, the steps taken by the Government of Argentina to deal with economic crisis have seriously jeopardized a so-far successful sector reform (Haselip, 2005). In the Dominican Republic, many factors have conspired with the meager results of reform leading to the exit of the main private distributor from the market.<sup>3</sup> While the privatization of existing generation has been stopped by the Government of Brazil,

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<sup>3</sup> Weak regulatory institutions, the strategic behavior of investors, government opportunism, high fuel prices and the existence of a culture of nonpayment and lack of trust in government institutions are among those factors.

the property rights of existing investors have been respected and private investors are encouraged to participate in new generation and transmission projects (Lock, 2005). Other small countries in Central America struggle to adjust an initial reform that may have been too optimistic, and latecomers, such as Ecuador, remain puzzled as to what route to take.

While these difficulties have exacerbated the widespread discontent with reforms in the region, there is no feasible alternative to cope with the sector's problems. Reform progress depends crucially on how well we understand the nature of the institutional and technical constraints that conspire against the successful transfer from models developed in other sectors and environments. For example, in the OECD countries, it took some time to understand the constraints imposed by the technologies of electricity production, nonstorability, the need to maintain voltage and frequency in the network, and the relative short-term price inelasticity of electricity markets, which makes them very different from the commodity markets that served as a model during the early years of reform. These inherent characteristics of the electricity industry raise many issues that must be taken into consideration by the regulators. Some of the most prominent issues are the needs to control and prevent

monopoly power in the wholesale market, and maintain free access to bottleneck facilities. Also important are the complications and trade-offs arising from the need to simultaneously maintain system reliability and security of supply while keeping price volatility low.

As stated by Joskow (2000b) referring to the United States, antitrust policy must be designed keeping in mind the organizations or institutions that will be in charge of enforcing it. This advice becomes even more critical in the case of the countries of Latin America and the Caribbean where institutions taken for granted in other countries are either missing or incipient.<sup>4</sup>

Clearly, inefficiencies in the regulatory environment are not inevitable. In principle, consistent regulations, along with regulatory institutions with clear incentives and sufficient resources, may overcome any such inefficiencies. In practice, however, in a country with a weak judiciary environment, possibly with a tradition of considerable political interference in judicial decision-making, the problem may not be easily solved. Furthermore, lack of expertise and regulatory experience may seriously constrain the possibilities for achieving sustainable electricity market reform.

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<sup>4</sup> These include, for example, the rule of law, clear and accepted property rights, an independent and competent judiciary, mechanisms for peaceful dispute resolution, contract enforceability, the quality of public bureaucracies and competition agencies.

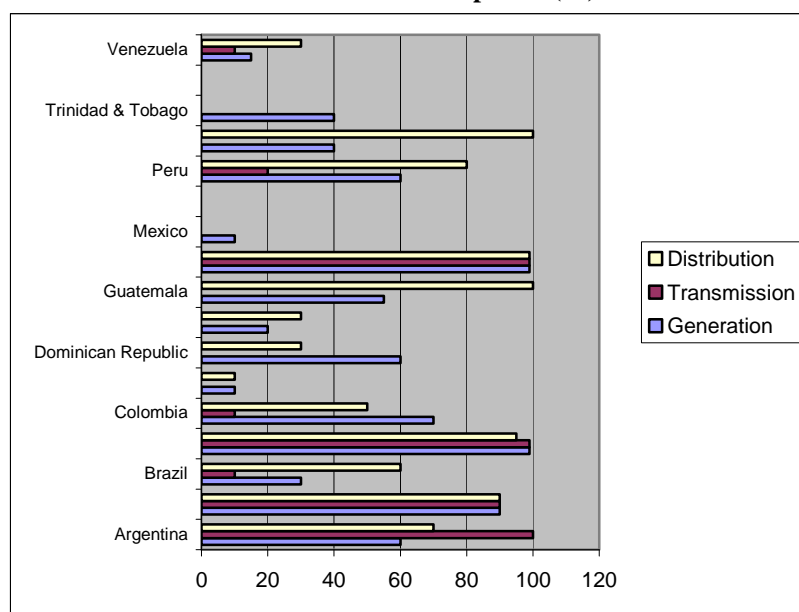


## The Role of the State and Regulatory Performance

In spite of the impressive investment figures presented earlier, figure 2 shows that privatization of the electricity sector in Latin America and the Caribbean has been more limited than most readers may suspect. In most countries, the government still controls sizeable amounts of the generation, transmission and distribution segments. In these circumstances, conflicts of interest may arise within the government itself. This may be caused by the fact that the government assumes different roles with respect to the electricity industry, as legislator, regulator, owner and purchaser of electricity. Multiplicity of roles may give origin to conflicts of interest and to the erosion of regulatory power. Efficient governance requires the various roles to be separated. It also requires clear rules to define the rights and responsibilities of individual agencies, in particular, for handling conflicts between different interests of the government when they occur, and between the interests of the government and those of private citizens or organizations.

While separating the roles of the State was almost an axiom among reformers, the evidence so far suggests that attaining this goal has not been easy in Latin America and the Caribbean. Fuzzy borders remain between policymaking and regulation. For example, this is evident in Colombia in the struggle between the regulator and the ministry about the liberalization of the natural gas market (Ayala and Millán, 2003). It has been particularly visible in the conflicts of interest in places where the State continues to play the role of entrepreneur, sometimes in competition with the private sector, by discriminating in favor of SOEs (for example, in Colombia and Brazil), by demanding that generation companies meet social obligations not related to their main purpose, such as in El Salvador, Guatemala and the Dominican Republic (Fundación Solar and Rufin, 2003; Rufin, 2004), or by forcing private investors to participate in joint ventures with the State (as is currently the case in Argentina).

**Figure 2**  
**Private Sector Participation (%)**



Source: Author's update of Espinasa (2001).

Most countries in the region have already established a formal regulatory organization; only Guyana has opted for a system of regulation by contract that suits its particular conditions. Jamaica, Costa Rica, Panama and Bolivia have multisectoral institutions for all their public utilities, while in Colombia and Mexico the same office deals with electricity and natural gas. With the exception of Colombia and Chile where surveillance and control functions are assigned to different agencies, both functions are located in the same regulatory agency in most countries. Chile's regulatory agency is also assigned a policy role.

For a variety of reasons, the performance, integrity, independence and credibility of regulatory institutions has been below expectations in most cases. The tasks of the regulator are difficult enough, but they are compounded at the initial stages when, in addition, it must set up the office, create the market and write the regulations, and to test them in an environment of apprehension where special interests predominate. Furthermore, it takes time to build a regulatory culture in countries whose legal systems follow the French tradition, which have weak or lacking complementary institutions and where human resources are scarce. Paraphrasing Joskow's reference to antitrust policies quoted earlier, one may say that it applies also to the design of regulatory institutions.

*Autonomy, Technical Integrity and Capture.* Regulators in the region have lacked autonomy. This is most noticeable in budget matters where even countries that finance regulatory activities through special user fees are subject to appropriations quotas established by the ministries in times of fiscal constraints. In addition, granting regulators a competitive remuneration has been a recurrent problem in many countries due mainly to the jealousy of other bureaucrats who receive lower salaries. This reluctance to pay market salaries to regulators, together with a strict system of restrictions intended to avoid conflicts of interest, leads to an even further decline in the already limited pool of suitable candidates. While it is clear that taking measures of this nature helps to avoid the capture of the regulator by the regulated because it limits the op-

portunities for "the revolving door," they also result in less suitable candidates, thus facilitating the technical capture.

*Lack of Credible Commitment.* The initial assumption that governments could show a credible commitment not to use their power opportunistically to favor their own companies or to expropriate investors by delegating regulatory matters to independent bodies was too naive. In most cases of conflict between governments and regulators the former have intervened to override the regulators (sometimes firing them). Very few people doubt that the real power to fix tariffs still remains with the government, regardless of the original intentions of the legislation. There are several reasons for this behavior, including the legal tradition, a turbulent transition period that includes a learning process, the long time required for regulators to consolidate their prestige and, last but not least, the tremendous importance of tariffs in the political realm together with the fact that the public will always hold governments accountable for disruptions in the continuity of supply.

*The Need for Flexibility.* Since regulation is an incomplete contract between the regulators and the regulated firms, there is a trade-off between the credibility of the regulatory commitments and the flexibility required to accommodate unforeseen circumstances and changes in the interests of the various actors. When credibility is low due to, for instance, weak rule of law or poorly protected property rights, the advantages of flexible regulations must be exchanged in favor of rigid rules. This explains the extreme rigidity of some of the regulatory systems in the electricity sector in the region that followed the Chilean example.

The experience of Chile exemplifies the trade-off: the rigidity of its regulatory system was key in assuring potential investors that their investment would not be expropriated by the regulator, but it had the undesirable effect of making the regulatory framework unresponsive to changes in the environment, as shown by the 1998-99 drought.

The experience of California demonstrates that designing electricity markets requires an ongoing effort because adjustments are inevitable. The challenge is to create a system that ensures that rules change efficiently. Panama and some states in the United States have adopted similar approaches, setting up market surveillance groups made up of independent outside experts to “institutionalize change” (Arizu et al., 2001). Their experience suggests two lessons. First, the experts must be perceived as independent and objective. In small and medium-sized countries, this probably means hiring experts from overseas. Most knowledgeable nationals will be perceived, at least initially, as biased because of past connections with the industry. Second, the experts must have a broad mandate. They should be charged with assessing not only the performance of the market, but also the performance of the system operator and the regulator. And they should be able to recommend changes in structure as well as in rules. An excellent account of the issues involved in establishing these institutions is presented in a recent IDB publication (Wolak, 2004b).

*Transparency and Accountability of the Regulatory Process.* This is another academic axiom of regulation that has been difficult to accomplish. While some countries have achieved some progress in improving the consultation process with stakeholders and the public, the concept of a transparent process is foreign to the region’s

culture. In many cases the regulatory style is very heavy, dominated by complex technical procedures (written in the language of engineers) that rest on formulas whose results can be easily changed by manipulating parameters. This makes it difficult to monitor regulatory performance. Moreover, appeal processes are not very efficient and frequently lead to lawsuits. In fact, because of pending litigation, regulators are reluctant to revise even those regulations whose inadequacy has been clearly demonstrated.

*Lack of Complementary Institutions.* The regulatory model chosen in the region is very demanding in terms of complementary institutions, such as a suitable judicial system, competition authorities, policy bodies, and the rule of law. The lack of strong and complementary institutions undermines the performance of the reformed industry and may even slow the pace of reform. For instance, at best, the absence of a relevant competition policy and competent antitrust bodies leaves the regulator with the burden of overseeing competition; at worst, this task is left in the hands of unqualified bodies subject to capture by special interests. Consequently, the number of workable options for the market’s architecture is limited. Legal uncertainty is also an important issue arising out of institutional constraints. Legal uncertainty may not only discourage investors, it may also provide them with the wrong incentives and lead them to seek comfort in the capture of judiciary and regulatory institutions.

# The Sequence of Reform

Because, prior to the reform, most utilities were vertically integrated SOEs, reformers in Latin America and the Caribbean were spared the type of stranded costs debates that plagued liberalization in the United States and Europe. Nonetheless, the sequence of reforms has proven to be a critical element in the performance of the post-reform sector by introducing stranded costs of its own. The sequence of reforms that most textbooks advise starts with the establishment of a sound regulatory framework, and continues with restructuring government assets and organizing the markets, after which it moves to privatizing, starting with the distribution segment. This sequence has many advantages: it allows the sector to develop the desired structure, facilitates privatization by giving clear signals to investors, assures the existence of financially sound buyers in the wholesale markets and avoid the presence of SOEs in competition with private companies.

Unfortunately, the window of opportunity for the reform is usually very short, forcing governments to deviate from this ideal sequence (as will be illustrated by examples presented below). With the only exception of Chile, which followed the textbook prescription, most reforms have been the result of negotiations among stakeholders that required compensations and compromises. This often led to prolonged periods of coexistence between the new and ancient paradigms that provided opportunities for special interests to position themselves. Reformers were right in assuming that losers would oppose reforms—not only because they lost out, but also because compensation would turn them into winners. The problem is that the privileges, subsidies and all sort of rent-seeking activities that resulted from compensations may have created an interest in stalling the reform process and prevented extending the benefits of reform to critical groups. Since compensations and compromises are unavoidable, actual reform will usually depart from the reformer's dreams.

## THE TEXTBOOK REFORM SEQUENCE

Attracting private investors in a market-driven sector was a major concern of reform in Chile. This was not an easy task given that this model was still untested even in developed economies endowed with the market institutions and legal tradition that the new model required. Chile's reformers understood that accomplishing this task would demand a tremendous amount of effort and patience. Fortunately for reform, although costly on other accounts, the autocratic nature of the government afforded reformers all the means and time available to develop their plan in stages.

They began well before they even talked openly about privatization, with a well-structured process of corporatization of SOEs accompanied by the adoption of a tariff policy based on marginal costs, which was developed with the help of mathematical models suited to Chile's hydroelectric dominated generation segment. These elements were incorporated in a detailed law, enacted in 1982, which left very little discretion to the regulator. Given Chile's political regime at the time, it became very difficult to change the legislation. An important feature of the Chilean model that often escapes pundits is that the regulator is not truly independent. Regulatory functions are held by the National Energy Commission (*Comisión Nacional de Energía*), which is made up of cabinet-level persons who are policymakers as well as regulators. Once again, given conditions in Chile, this feature does not seem to have affected performance.

Once corporatization was completed, and before any restructuring took place, the government ensured the provision of electricity during the transition by entering into contracts with multilateral banks (mostly the IDB) for loans to finance several important hydroelectric development projects. Only then was distribution un-

bundled and privatization started. To ensure the success of this phase, the government provided generous incentives to local financial groups and SOE employees, which would later take control of the sector through retirement funds (which were initially the major investors). Once distribution was unbundled and privatized, generation followed. Notice that foreign investors were absent from the plan.

### **TAKING ADVANTAGE OF WINDOWS OF OPPORTUNITY MAY REQUIRE CUTTING SOME CORNERS**

Chile's success in privatizing its electric system without jeopardizing the continuity of service led a number of countries in the region to follow in its footsteps. Unfortunately, time was not on their side and they were forced to depart from the ideal sequence. In Argentina, the vertically integrated company serving the Greater Buenos Aires (SEGBA) was privatized before the regulatory framework and the wholesale market were fully in place. Initial contracts for power generation lasting eight years and generous distribution tariffs valid for ten years were handed out in order to attract investors. Later, several factors contributed to attracting investors into both existing and greenfield projects. Those factors included a competitive generation market driven by abundant natural gas, macroeconomic stability brought about by the 1991 convertibility program, and a sound investment climate. The only exception was the transmission segment where market mechanisms have not been successful.<sup>5</sup> In spite of these departures from the "textbook plan" and episodes of government intervention, the regulatory office performed reasonable well until the events unleashed by the 2002 economic crisis made it irrelevant, for all intents and purposes.

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<sup>5</sup> A significant share of generation, nuclear facilities and the binational projects of Salto Grande and Yaciretá remained in the hands of the federal government as independent companies, and several provinces continued to own and provide electricity services. While there were no instances of conflicts of interest originating in the government's role as entrepreneur, SOE performance was hampered by governance problems that remained from the previous regime.

However, cutting corners may lead to high costs. In Brazil, for example, the first step in the reform process was the privatization of distribution companies. But it took an extremely long time to complete the regulatory framework and put in place the wholesale energy market. This delay, together with other uncertainties (such as the stalled privatization of the generation segment resulting from opposition by SOE bureaucracies in alliance with local politicians) was one of the main causes of the current lack of appetite for greenfield investment in generation. Lack of investment, in turn, led to shortages and the eventual dismissal of the model.

### **THE COST OF COMPROMISE AND EMERGENCY SOLUTIONS**

Sector reform in Colombia was made possible by a compromise whereby most distribution companies were *not* privatized and remained subject to the incentives and political patronage of the old regime. These companies remained highly inefficient. For example, they billed only 70 percent of the energy spent because of physical losses, theft, lack of measurement and poor billing (Ayala and Millán, 2003). Furthermore, many of these companies served low-income and rural markets with limited payment capacity and high distribution costs that made them dependent on unreliable subsidies from the central government. Private capital was brought to Colombia's largest utility (EEEB, which serves Bogota) only after the company was at the brink of bankruptcy. EEEB was unbundled and a controlling share was offered to private investors willing to provide fresh cash to pay debts and finance expansion. As described elsewhere (Bakovic and Millán, 1998), it took a tremendous amount of political courage and financial and legal skills to complete the process successfully. Today, in spite of Colombia's economic downturn, the companies are in relatively good financial condition and municipal government revenues have contributed to making this an urban rehabilitation success story. Unfortunately, this success has not been replicated in other places, particularly in Colombia's Caribbean coast where private investors struggle with a difficult market (Manzetti and Rufin, 2005).

Emergency solutions are also costly, but sometimes there are no other choices. Lack of resources for investment in generation forced most Central American and Caribbean countries to engage in costly build-operate-and-transfer (BOT) operations before undertaking the necessary reforms. This has left the burden of the power purchase agreements (PPAs) on financially weak SOEs. The lack of a clear regulatory framework and the urgency of these operations allowed independent power producers (IPPs) to exact high rents and impose inflexible conditions like take-or-pay contracts, exacerbating the

financial problems of the SOEs. Furthermore, many PPAs entered into prior to the reform have been accompanied by accusations of corruption. In Guatemala, the high cost of pre-reform PPAs has become a huge financial burden on the sector, forcing the government to use its remaining assets to buffer the impact on tariffs. While by no means a small country, constitutional and political constraints to reform in Mexico have left the PPA option as the only available way of involving the private sector.

# Achieving Competition While Keeping the Lights On

Competition was considered a key element of power sector reform packages in Latin America and the Caribbean. The assumption was that competition was necessary to ensure economic efficiency while keeping a light regulatory burden. However, as in most countries in the world, establishing competitive markets for electricity has become a more difficult task than anticipated. In addition to the plethora of implementation problems that plagued markets in more developed countries, the region faced difficulties of its own. Small size, country risk and the strategic behavior of big investors conspired against the minimum number of players needed to ensure competition in the market. In several countries, growing demand and an energy-constrained system periodically resulted in tight markets, exacerbating price volatility and market power. This, together with market failures (particularly the lack of local capital markets), exacerbated resource adequacy problems. Furthermore, lack of human resources, weakness in or the lack of institutions to oversee and regulate competition, and the ambiguous role played by the judiciary, made it difficult to oversee competition and enforce regulations. In an excellent paper, Frank Wolak (2004a) summarized the problems facing wholesale electricity markets in the region and proposed some solutions.

After a review of the different market designs adopted in the region, this section presents a summary assessment of their performance and discusses some of the flaws that may explain the difficulties experienced so far.

## WHOLESALE MARKET DESIGNS

Given the peculiar characteristics of the electricity sector, exacerbated in many countries of the region by their high share of hydroelectric production, it should come as no surprise that prices tend to fluctuate considerably as a result of changes in demand or supply conditions. Not only are these price fluctuations unavoidable in a deregulated market, to some extent they may be

desirable signals for the efficient use of a scarce resource. Yet, price volatility is disliked by both consumers and investors, although for different reasons. Consumers see any price hike as permanent, and worry about a deterioration in their well-being. Investors fear that low prices will never recover and prefer a guaranteed revenue stream to reward their investment. Not surprisingly, consumers and investors also agree on the appropriateness of government subsidies to solve their problems if prices are not of their liking.

Aware of these problems, early reformers in Latin America and the Caribbean sought to address them in their market designs (see box 1 at the end of this chapter). In most markets, generators were not allowed to make bids.<sup>6</sup> In addition, prices were determined by a mathematical model fed with parameters provided by the generator (including conversion factors and fuel prices when relevant), and other parameters that were determined by the regulator (such as the cost of rationing).

To complement the spot markets, generators and load serving entities were allowed to engage in forward contracts of a financial type (physical in the case of El Salvador). However, while some countries required contracting a certain amount of demand in forward contracts of specific duration, Guatemala and Panama made it mandatory to hold contracts for 100 percent of the next year's capacity (ECLAC, 2002). Brazil required that 85 percent of the energy be held in contracts, while other nations left these decisions to the discretion of the distributors.

Because the lower step of the rationing price constituted a cap on the spot market price (diminishing incentives for new investment), the Chilean and Argentinean models adopted a *ca-*

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<sup>6</sup> There were two exceptions: Colombia and El Salvador. Colombia's pool resembles that of England and Wales (pre-reform) and El Salvador's pool resembles the Nordic model.

capacity charge to be collected from the load and received by generators that got dispatched. Variations of this capacity charge were later adopted in Colombia and the Dominican Republic. Guatemala and Panama adopted variations of the capacity markets used in the eastern United States.

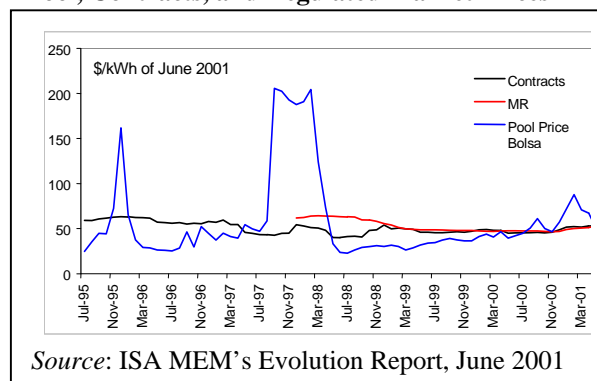
## MARKET PERFORMANCE

Market performance can be measured by the extent to which it has managed to allow for vibrant competition while still providing the required signals for new investment that are necessary to keep the lights on. More competition in the spot market can keep prices down, which benefits the consumer, but prices that are too low are a poor incentive for new investors. Argentina was successful in halving prices from around \$50 per MWh in 1992 to \$25 per MWh in the late 1990s, mainly as a result of competition. But its flawed capacity charge may have led to too much investment in new capacity (Estache and Rodriguez-Pardinas, 1998). In El Salvador, the exercise of market power by generators, together with an ill-conceived procedure for passing wholesale prices on to consumers with a lag of at least four months, led to high consumer prices and forced the government to hastily intervene in the market. Regulatory interventions establishing a *de facto* cap on prices on an energy-only market did not provide enough incentives for new investment, requiring further government actions to organize a mandatory long-term forward market. Price comparisons with pre-reform situation may be misleading because, as in most other countries in the region, they were kept low for political reasons.

In Colombia, recurrent droughts resulting from the El Niño phenomenon led to the pattern of prices shown in figure 3, which indicates concentrated spikes when the market is stressed during droughts, and long periods of low prices when conditions are more favorable. Overall, real-time prices have increased, as would have been the case of a vertically integrated monopoly entitled to recover generation investments approved in an expansion plan. Notice that those prices include a capacity charge that has been cause of controversy in Colombia (Ayala and

Millán, 2003). The capacity charge fails to meet the basic objectives (a long-term signal for investment), it does not remunerate the energy delivered, and it involves income transfers among generators who continuously argue about it. The regulator is currently discussing a new design after several failures to find a replacement. Market power opportunities grow in the Colombian system whenever the market is stressed, which may also occur when transmission constraints lead to local market power.<sup>7</sup>

**Figure 3**  
**Pool, Contracts, and Regulated Market Prices**



Source: ISA MEM's Evolution Report, June 2001

Prices in Chile also declined. In the 1997-2003 period they fell to about half of what they were in the late 1980s, but the drop became significant only after the mid-1990s when competition was more effective as a result of the use of imported natural gas from Argentina. The scope for competition in the Chilean pool is small and its main function is to price exchanges among generators. Nonetheless, experience shows that even this limited spot market can be captured if it is concentrated and its governance is not transparent. Blackouts during late 1998 and early 1999 (which analysts traced to incompatible incentives experienced by market participants), together with the failure to transfer efficiency gains to consumers, ignited a political crisis that

<sup>7</sup> During 2000 and 2001 repeated terrorist attacks on the Colombian transmission grid led to a *de facto* fragmentation of the market and provided strong incentives to generators to exercise market power. Thus, spot market prices during the first quarter of 2001 showed unusual spikes until the regulator intervened. However, the intervention was not very successful (Ayala and Millán, 2003), and contributed to alienating market agents and increasing confusion.



led to the first major overhaul of Chilean electricity legislation in 18 years. Some observers (Pollitt, 2004b) notice that the convoluted procedure to use forecasted node prices to define pass-through to regulated consumers has inhibited the development of long-term contract markets. Also, the sole reliance on capacity charges has prevented the development of much needed ancillary services markets.

Although the Peruvian and Bolivian markets (which are almost perfect clones of the Chilean market) and others that have similar features (like that of the Dominican Republic) have avoided major shocks, they are limited by the same constraints as in Chile. As mentioned before, Panama and Guatemala also have cost-based markets but instead of capacity charges they use obligations to contract capacity. It is too early to judge if they can pass the investment test.

The performance of the Chilean markets and other evidence, as reported by the Committee for the Oversight of Competition in Panama, are good reminders that cost-based markets are not free from manipulation. Nonetheless, while these may lead to high average prices, cost-based markets are less prone to extreme prices. The 2001 drought in Brazil brought to light the weakness of its wholesale market model and the particular dangers posed by the transition.

### **FLAWS IN MARKET DESIGN**

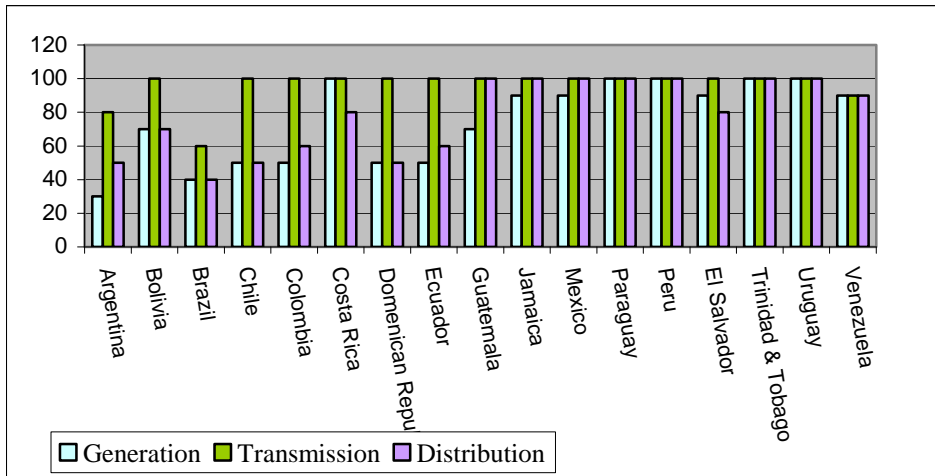
To enable competition the sector should be properly unbundled, both vertically, into competitive and natural monopoly segments, and horizontally to assure a sufficient number of participants. There is no ideal market design, since no one can fully prevent market power, but the difficulty in coping with market power may be exacerbated by poor market structure. A defective structure lies behind the failures of El Salvador's market (which had only two generators in a very small market) and the limited competition experienced by the Chilean market because

of the small number of participants. While the government insisted that hydroelectric developments in Chile were not subject to economies of scale, (which would have made competition in the market feasible), it failed to adopt a proper structure for the sector. Seeking private companies strong enough to undertake large hydroelectric developments, the government kept most of the generation and transmission assets and most of the water rights in the hands of one group, ENDESA. Financial maneuvers later led to the control by one group of more than 70 percent of the generation, 60 percent of the distribution and all of the transmission of the central interconnected system. Real competition was not present in Chile until the building of the first natural gas pipeline from Argentina. Foreign investors came to Chile years later, bought the existing assets at high prices, and invested in a few greenfield projects. Their appetite for investment has since decreased.

Perhaps the most obvious examples are those in which an insufficient number of competitors have been established before market-based exchange is introduced. Market failure is often the result of excessive optimism with respect to what transactions may be efficiently delivered by decentralized means, given the size of the market. When markets are small, the real question is not so much whether measures exist that can make competition effective, but rather what can be done to mitigate the consequences of imperfect or nonexistent competition. Since market power is a fact of life in the electricity sector, regulatory oversight is a must (Millán and Vives, 2001).

Even by the standards of most markets, electricity generation is heavily concentrated in most Latin American and Caribbean countries. The three largest producers in Argentina or Brazil control between 30 percent and 40 percent of the *national* market. In other countries this measure of concentration stands at 50 percent or more (figure 4).

**Figure 4**  
**Market Share of the Three Largest Firms (%)**



Source: Espinasa (2001).

By early 2005, three small countries (Jamaica, Guyana and Trinidad and Tobago) had opted to keep their markets vertically integrated. Most other countries adopted some sort of unbundling. While Argentina unbundled its electricity sector and established strict rules that prevented cross-ownership, other countries were not as successful in keeping an adequate separation. As mentioned earlier, the structure of Chile's market was flawed. Guatemala and El Salvador placed no limits on vertical and horizontal reintegration. AES, an investor controlling close to 80 percent of distribution in El Salvador, plans to build a new generation plant, as it did in the Dominican Republic. Various public and private ownership models co-exist in Colombia; however, utilities are only required to keep separate accounting, and limitations on concentration have been legally challenged. Fearful of not having enough new investment in generation to prevent an imminent crisis, Brazil relaxed the rules allowing a significant amount of self-dealing to take place. Reintegration makes it more difficult to control anti-competitive behavior and imposes an additional challenge on regulators.

Before concluding that concentration is inevitable, those measures that do exist for improving competition should be given due consideration. Some of these constraints may be removed or

lessened through time and effort, thus making feasible the type of workable competition that reformers originally had in mind. For instance, integrating individual markets, as intended in Central America, to form a larger market is not easy and will take some time (as the experience of the European Union has shown). Additionally, it is still necessary to craft the transition period carefully to avoid having the interests created during the interim period prevent the attainment of the ultimate goal.

Retail competition has been generally limited to very large loads and may be significant only in some countries. For example, it accounts for 25 percent of the market in Colombia, 20 percent in Guatemala and 40 percent in Chile. However, the benefits of allowing retail competition for smaller loads are unclear. Where this has been practiced (for example, in Colombia), it has often led to cream-skimming because of the heterogeneity of consumers and the existing subsidy system for low-income consumers.

The existence of properly designed and professionally staffed market institutions whose governance can steer debate away from the particular interests of stakeholders is crucial for the operation of the market. Most markets are operated by a single institution, the system operator,

which performs the technical dispatch and the commercial functions. The exceptions are Brazil, which has both a system and a market operator, and Colombia, which is considering separating these functions. As mentioned before, in spite of the advantages of having stakeholders in control of the market institutions, the experiences of Chile and Brazil show that it is better to have independent governance, giving proper role and voice to all stakeholders in operation committees. While financial and human resources have not been a constraint in large countries, small countries often lack the technical expertise.<sup>8</sup>

As elsewhere in the world, the countries of Latin America and the Caribbean have failed to use prices as a tool to engage demand. Analysts have been unanimous in blaming the lack of demand response as one of major reasons behind the collapse of California's electricity market in 2001. Some argue (Borenstein, 2001) that even limited applications of real-time pricing (RTP) to large consumers should have been enough to dampen the price spikes and ameliorate the blackouts. Nonetheless, the fear of high transaction costs and an insufficient understanding of the importance of demand elasticity prevented the timely adoption of this type of measure. It is interesting to compare the experience of California with that of Brazil a year later. While there are many common features to both crises, the Brazilian government's willingness to use the market to allocate the shortage allowed it to avoid California's rolling blackouts. Brazil's government imposed a rationing quota and large users were free to trade their share or sell it in the spot market. Large residential users were levied a surcharge, but they also received bonuses if they saved more than their quota. Any consumer failing to meet the quota was disconnected for a number of days.<sup>9</sup> Unfortunately, the new Brazilian electricity sector model failed to incorporate these useful lessons in its design.

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<sup>8</sup> The Dominican Republic solved this problem by hiring foreign consultants.

<sup>9</sup> The Government of Argentina adopted similar procedures in 2004 and 2005 when faced with imminent shortages caused by lack of investment. Unfortunately, prices were so low that the effect was small.

This reluctance indicates a deeply felt aversion to let consumers face actual electricity prices. In some Latin American and Caribbean countries governments have subsidized prices to avoid passing oil price volatility and/or the stranded cost of the reform on to consumers. In addition, several countries have granted special conditions to investors, tax holidays, higher prices for local renewable energy and other such exemptions whose cost will ultimately be paid by consumers or taxpayers. While some of these measures may be justified on individual grounds, they may create problems of their own. In most cases, even the muffled price signal sent by the markets failed to provide a good signal to consumers. In El Salvador, for example, initial intentions to use the spot market price to set the pass-through to regulated consumers soon faded under strong public reactions to volatility. To smooth volatility the regulator initially used estimates of average future prices for a period of three months, which later changed to the observed average during the previous quarter (and later, the previous semester). This type of smoothing was common in most countries that used the spot market as a partial reference. The implicit lag led to important distortions: consumers were passed the relatively higher prices prevalent during the dry season later in the year when it was already the wet season, hydroelectric energy was abundant and the cost of production was lower.

Dampening natural price movements may increase shortage problems, which could be the main concern in the first place. For instance, the incentive to maintain reservoir levels high results from future price expectations so that if prices are capped the incentive is reduced. Hedging instruments are ordinarily used to avoid volatility. However, when price movements are impeded, the incentive to develop hedging instruments is reduced. It is only when the development of such instruments is unlikely, due, for instance, to weak financial markets, that price regulation can be advocated as a means of protecting market participants against the costs of price volatility. Furthermore, dampening seasonal price movements may provide perverse signals to consumers as was the case during the 1999 Chilean crisis when regulated consumer

prices and reservoir levels were falling at the same time (Fischer and Galetovic, 2000).

Several countries in the region are currently studying modifications to their market design aimed at providing better incentives to new investors while lowering volatility and incentives for exercising market power. It is well known that long-term contracts can accomplish this, but the trouble is how to provide incentives for actors to enter into contracts. A solution initially suggested by von der Fehr and Wolak (2002) in their report to the Government of Brazil, is to establish mandatory auctions to cover an important share of the load with forward contracts and/or options. The decision to split the market between old and new energy, and to hold centralized procurement of power purchase agreements for new energy, adopted by the government of Brazil, is an extreme modality that, while removing commercial risk from new generators, introduces new uncertainties and transfers to the consumer the costs of overcapacity required to increase resource adequacy.

In summary, achieving competition while keeping the lights on has not been an easy task in Latin America and the Caribbean. Market structures, the reluctance to let prices play their market-clearing role, the lack of adequate incentives for new investors in generation, and incipient institutions impose severe constraints on market design. Nonetheless, wholesale markets in the region have managed to innovate and adjust in most cases. Given the difficulties in operating a fully decentralized market, even in the most developed countries, the cost-based approach adopted by many Latin American and Caribbean countries does not seem to have been such a bad idea after all, particularly in small countries where market size may render full competition unworkable and more cautious approaches may be required. In spite of difficulties wholesale markets are fully operational today in Panama, Guatemala, Peru, Bolivia and Chile.

#### Box 1

##### A Guided Tour of Selected Electricity Markets in Latin America and the Caribbean

**Chile: The pioneer and its followers.** The Chilean wholesale market consists of regulated contracts between generators and distributors (priced by a simulation of the future operation), and free contracts with large customers (larger than 2Mw). A centralized dispatch model is used to price exchanges among generators, which are the only participants in the spot market. There is no market-clearing price that results from the interaction of supply and demand, but rather prices are set by an administrative system. By design, the Chilean system is not aimed at increasing competition, but at promoting private investment in generation and distribution. Chile's success in privatizing the electric system without jeopardizing the continuity of service led Peru, Bolivia and other countries in the 1990s to follow its example.

**Argentina: Improving the model.** Argentina improved the scope for competition by unbundling the sector's structure (both vertically and horizontally) and establishing limits to cross-ownership. The availability of natural gas and new gas-turbine technologies made it possible to increase the potential number of participants. The wholesale electricity market model in Argentina differs somewhat from the Chilean model in makeup and details. Dispatching continues to be based on costs, but the basis is the generators' semiannual statements of costs, including hydroelectric power. Spot prices are used for trade between generators but distributors (at a stabilized price) and large users can also buy on the wholesale market. CAMMESA, the system operator, is not a club restricted exclusively to generators, but includes all market agents and the government, making it less vulnerable to capture. Other innovations include the introduction of payments for ancillary services and procedures to deal with congestion. However, not all the changes are improvements, capacity charges have given the wrong signals.

(continues)

**Box 1 (continued)**

**Colombia: A second generation of power pools.** Colombia, which also has a predominantly hydraulic system, decided to break even further with the Chilean model and, in the mid-1990s, adopted a system of centralized auctions similar to the England and Wales pool. Although bilateral contracts are permitted, they are financial in nature, similar to contracts for differences, and use the pool price for settlement. The price formation process is similar to that of England and Wales, with identical bid patterns for hydraulic and thermal generators. The model does not include zonal pricing or locational marginal cost pricing (LMCP). When constraints are binding, costs are allocated among producers and consumers. The Colombian model is novel for the region and is the first market to include traders as participants. Like the Chilean and Argentinean models, it complements its energy-only market with a highly controversial capacity charge designed to reward generators that are able to dispatch during critical hydrological conditions (for example, during occurrences of El Niño event).

**El Salvador: Too much of a good thing.** In 1997, El Salvador, driven by ideological considerations, approved the world's most market-friendly electricity market. Retail competition was immediately allowed for everyone. While the existing grid was kept in the government's hands, distribution and transmission were not recognized as a monopoly activity, and there were no limits placed on horizontally or vertically integrated ownership. A bid-based spot market, similar to the Nordic model allows bilateral (physical) contracts indexed to the spot market. Distributors pass through spot market prices to retail consumers.

**Brazil: A stillborn market.** The Brazilian power system is over 95 percent hydraulic; it has a large storage capacity and is made up of groups of physically interdependent reservoirs and plants located in the same river basin. Coordinated operation of the system is a must to obtain synergy gains. Because of these features Brazilians departed from the bid model adopted by Colombia and initially adopted a mandatory forward market to cover most of the load, and a spot market for the balances (with prices obtained by the system operator with the help of a complex mathematical model). Every hydroelectric plant was assigned a fixed amount of *assured energy* that it could sell to distributors or large loads, the owner's only obligation was to keep the plant running. In addition to the system operator, there is a market operator (MAE) in charge of settlements. MAE governance is controlled by stakeholders, which together with SOE behavior, paralyzed decisions and failed to settle any transaction years after initiated. While many factors account for the supply crisis of 2001 (and, in addition, the model was not fully operational at the time), it was clear that its flaws compromised security of supply (von der Fehr and Wolak, 2002). Seeking to attract new investment while keeping the prices low, the new government decided to keep two separated environments, a free environment for large loads, which could freely negotiate contracts and buy in the spot market, and a regulated environment in which distributors procure energy through auctions of forward contracts for both existing and new energy. Existing energy is procured in yearly auctions with distribu-

## The Regulation of Noncompetitive Segments, Cost Recovery and the Needs of the Poor

Electricity transmission and local electricity distribution are usually considered natural monopolies that must be regulated. With the exception of some ancillary services, there is little scope for actual competition in the provision of electricity transportation services (though benchmarking may be possible). Nevertheless, regulations must take into account the incentives both for the short-run operation of existing networks as well as for extending the networks while meeting quality constraints.

Countries have adopted different price regulations in the three broad segments of the electricity industry. These price regulations range from rate of return cost of service to price cap and the efficiency standard scheme (see table 1). The latter method, which was implemented with the Chilean reforms for the distribution (wires) segment and adopted later by other countries in the region, is based on the cost of a model distribution system. It is a combination of yardstick regulation, price caps and replacement cost accounting. Critics point to the enormous information burden on the regulator that the method imposes (Joskow, 2000a). The inability of the Chilean system to transfer to final consumers the gains in efficiency obtained has prompted a review of the procedures for handling disputes about cost estimations. Colombia does not use a pure price cap method. Instead, it permits the revaluation of assets with some *ad hoc* criteria to control for efficiency in investment and operation cost.

The experience with distribution tariff reviews has shown that initial expectations that price-cap regulation would mitigate asymmetry against the regulator and reduce the regulatory burden compared to cost of service mechanisms were too optimistic. In many occasions, investors complained about demanding quality standards without properly acknowledging their cost in the tariff base. Because this type of regulation is relatively new, only a few distribution cost re-

views have been conducted. While it is natural to expect these processes to be highly contentious, the debate has been particularly bitter in the places where they have taken place (such as in Colombia).

Transmission was poorly regulated in Argentina (Pollitt, 2004a) and no incentives were provided for the construction of new lines. In most other countries, expansion is centrally planned and cost is allocated to consumers following different cost of service formulations. While there may be some issues surrounding incentives for the location of generation plants, the main objective of the tariff system should be to contribute to finance the expansion of the transmission grid. Because transmission costs are usually a small fraction of the customer price, it is unlikely that the regulatory agency will engage in significant efforts to fine-tune the rate of return permitted on transmission to significantly reduce the customer's price.

Regulators face particular challenges in countries where public and private ownership coexist in distribution because companies respond to a different set of incentives. Currently, none of the countries that have sectors dominated by SOEs have tariffs that allow full cost recovery. Unfortunately, this has also been the case for some private companies in countries where governments have kept tariffs low for political reasons.

While private participation has resulted in significant improvements in efficiency signaled by a quick reduction in losses and increased collections, in some countries (such as the Dominican Republic, Nicaragua and the north coast of Colombia), private entrepreneurs have had little success. The reasons for this range from strategic behavior of investors who expect to be able to influence the price review to difficult local conditions (including extreme poverty, a culture of nonpayment, weak law enforcement and others). Some foreign investors in distribution have

**Table 1 Price Setting Mechanisms**

	<b>Generation</b>	<b>Transmission</b>	<b>Distribution</b>
Argentina	Market	Price Cap	Price Cap
Bolivia	Maginal Cost	Price Cap	Efficiency Standard
Brazil	Market	Cost of Service	Price Cap
Chile	Maginal Cost	Cost of Service	Efficiency Standard
Colombia	Market	Price Cap	Price Cap
Costa Rica	Cost of Service	Cost of Service	Cost of Service
Dominican Republic	Market	Cost of Service	Cost of Service
Ecuador	Market	Cost of Service	Efficiency Standard
Guatemala	Market	Cost of Service	Efficiency Standard
Jamaica	Cost of Service	Cost of Service	Cost of Service
Mexico	Cost of Service	Cost of Service	Cost of Service
Paraguay	Cost of Service	Cost of Service	Cost of Service
Peru	Maginal Cost	Efficiency Standard	Efficiency Standard
El Salvador	Market	Price Cap	Efficiency Standard
Trinidad & Tobago	Cost of Service	Cost of Service	Cost of Service
Uruguay	Cost of Service	Cost of Service	Cost of Service
Venezuela	Cost of Service	Cost of Service	Cost of Service

*Source:* Espinasa (2001)

Note: The generation segment refers to the cost of generation that is passed to the regulated final consumer, and the transmission and distribution components refer to the wire portion of such services. The generation component is referred to as “market” when the prices at which the retailer buys energy in the wholesale market are passed on to the consumer adjusted by losses with some sort of smoothing. “Cost of service” encompasses a variety of procedures to fix tariffs based on a regulated return on assets, and “efficiency standard” refers to the Chilean method for the wires segment.

been slow to realize that low-income people behave and face financial constraints that are very different from those faced by low-income persons in the OECD countries.

An interesting illustration of the difficulties involved, as well as some of the solutions, was presented in a series of workshops held at IDB headquarters during 2004 (Manzetti and Rufin, 2005). The main lesson that came out of those workshops was that solutions required slowly building a culture of payment by making payments easier and more affordable and demonstrating concern for customers. This necessarily requires the provision of targeted subsidies to the poorest. However, with few exceptions, countries have not been successful in designing well-targeted subsidies for the poor. Instruments for doing this must minimize the exclusion error (that leaves some poor persons behind), and the

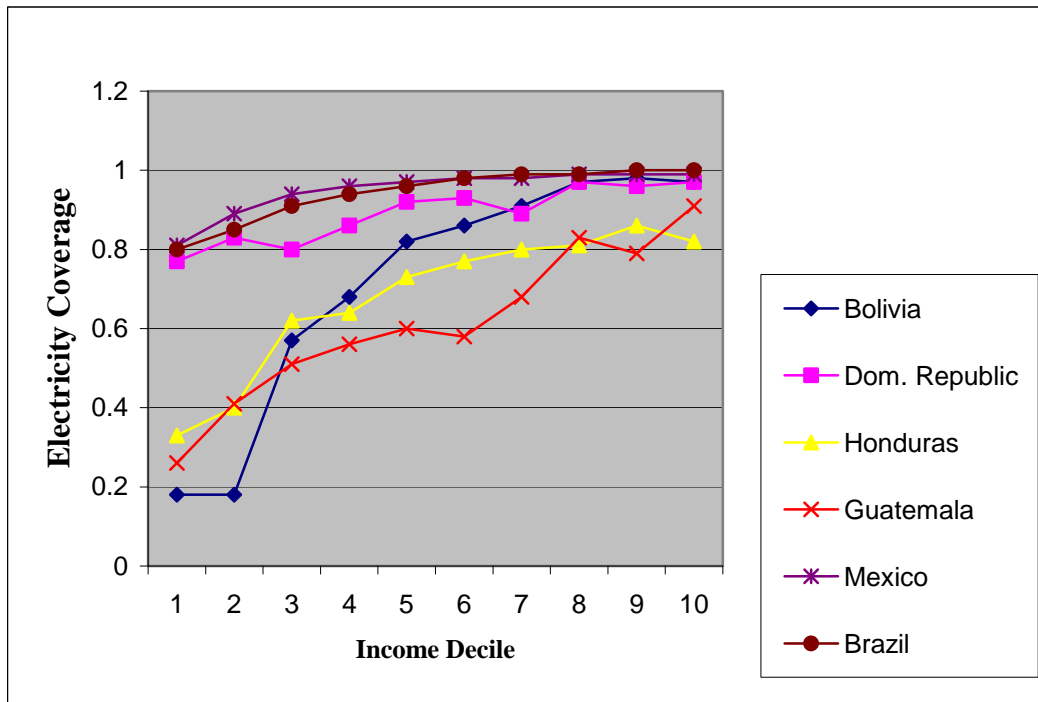
inclusion error (which provides subsidies to those that do not need them). The most common form of subsidy in the region is establishing reduced tariffs for users whose level of consumption is below an arbitrary lifeline. The subsidies are financed by the rest of the consumers (who are overcharged) and/or by the government through the SOE. This lifeline has been set very high (at 300 kwh per month in Guatemala and Honduras) in order to appease politically influential urban middle-income voters. As a result, it has led to significant inclusion errors and most of the subsidy going to the nonpoor (Foster, 2003). A few countries (like Colombia and Brazil) use additional criteria to target subsidies. These criteria include stratification based on dwelling characteristics or qualifying to receive other government support services. Coelba, a private distributor serving the state of Bahia in Brazil, has obtained remarkable increases in collections after it concentrated its mandatory investments in energy efficiency on providing free

energy efficiency appliances to the poorest (Pinhel, 2005).

A more critical issue is that of expanding the service to those segments of the population that

still lack access to electricity. As indicated in figure 5, access is heavily skewed against the poor. Any subsidy avoiding this segment of the population incurs in high exclusion errors.

**Figure 5**  
**Households with Electricity by Income Decile**





## Conclusions

The main proposition of this paper is that while power sector reform has made significant progress in overcoming the problems that plagued the sector in Latin America and the Caribbean, it still faces significant challenges. Some of these challenges are the result of technological features of electricity markets. Other challenges arise because many countries in the region lack the institutional development and human resources that the models they adopted implicitly require. As a result, gains from the reform have varied from country to country. Nonetheless, reform success should be measured with a pragmatic yardstick, weighing what is desirable against what is feasible.

Substantial improvements in productive efficiency have been achieved as countries privatized and attracted private investment. In addition, a process of institutional learning has been put in place. However, because of the limitations mentioned above, consumers have not always benefited from these improvements. While wholesale markets have shown some successes and managed to maintain reasonable prices while keeping the lights on, vibrant competition remains an elusive goal in many countries and investors are still reluctant to commit their capital to greenfield development without considerable guarantees and high prices. In spite of significant progress in most countries, service coverage still lags in some countries and, with a few exceptions, subsidies have not been used wisely to address the needs of the poor. Countries are struggling to implement price-cap regulation of the distribution segment and price reviews have been difficult. Governments still play a significant role as entrepreneurs in many countries and the separation of the government's roles has been hard to accept.

While a comparison with the vertically integrated monopoly is difficult to make because of the need for counterfactuals and each case's specific characteristics, it may be reassuring to learn

that the countries that have chosen this alternative (Mexico and Venezuela, for example) have not obtained better results. Compared with the flaws of the old regime (lack of efficiency incentives and vulnerability to political manipulation), the challenges facing reform seem minor. However, reformers should be aware that the reasons behind the failure of the old regime (naive assessment of the incentives that motivate behavior and failure to understand the nature of constraints and the governments' capacity to stay the course) might come back to haunt them. How each country will manage to cope with these problems remains to be seen. It will depend heavily on realistic and pragmatic assessments of constraints to identify and resolve the necessary trade-offs, including the kind of competition that is achievable without compromising the basic goal of attracting investments that can keep the lights on.

Although both starting points and objectives were rather different, reforms in Latin America and the Caribbean more or less followed the same lines as those of the pioneering OECD countries. The possibility that their experience was dependent on the particular context in these countries seems to have been given scant attention. Indeed, reform efforts appear to have been based on ideological considerations that took for granted that the market could be trusted to solve the problem. A more cautious approach might have been based on the realization that, while some basic elements are essential, no universal model exists, and that the success of sector reform is dependent upon the institutional setting and the timing of associated reform. Unless those tacit or implicit elements that were crucial to the success of the original countries who put these measures into effect are replicated or replaced with local versions, and unless reforms are coherent across the economy, transferring a model out of context is a considerable gamble. Indeed, while blueprints, best practices, international codes and standards and harmonization

may prove useful for some of the more narrow technical issues, large-scale institutional development requires a process of discovery of local needs and capabilities (Rodrik, 1999).

Experience has taught many lessons:

- Many Latin American and Caribbean countries lack some of the political and regulatory institutional conditions for supporting the types of reforms implemented. Reforms and institutional conditions should conform. One way to go about this is to improve the institutional conditions, such as the regulatory institutions and human resource endowments. Alternatively, reforms will have to be modified to better fit actual institutional conditions until existing constraints are overcome. Because institutions take time to develop, sometimes it is preferable to take an evolutionary rather than a big bang approach to reform.
- The ideal may be to follow a reform sequence that begins with a well-designed regulatory framework, moves to setting up and testing a market design, then to unbundling and, finally, privatization. However, with the exception of Chile, this has not been possible for a variety of reasons. Departures from this sequence results in stranded costs and vested interests that may affect reform performance. Countries must weigh carefully the implications for future development imposed by forced departures from the ideal sequence.
- Regulatory oversight is always required in the electricity sector. A criterion for the design of the regulatory system may be the minimization of regulatory transaction costs in the short term to buy time to develop the necessary institutional capacity while ensuring that future avenues for competition are not closed off. The main consideration when designing or evaluating a regulatory framework should be to carry out a basic assessment of the people and organizations that will be in charge of implementing and enforcing it.
- It is critical to keep the wire business, transmission and distribution, independent from supply, generation and commercialization. The existence of a constraint-free transmission system is of vital importance for the market and its expansion should not be limited by narrow efficiency considerations. The public sector is still called upon to play an active role in the expansion of transmission grids in most countries. Crucial for the operation of the market is the existence of market institutions that are properly designed, professionally staffed and with governance that can steer debate away from the particular interest of the stakeholders.
- While few countries, if any, have succeeded in involving the demand-side in the market, making progress toward this goal should be a major priority for every country in order to fully grasp the benefits of a market system. With existing technology, the cost of extending retail competition beyond the large industrial and commercial clients seems to exceed its benefits.
- It is now widely accepted that institutional and technical constraints make difficult the achievement of strong competition in small markets. However, even if competition is not feasible in the short term, care should be taken not to foreclose future options for competition when present constraints are removed. While still debated, there is some consensus on the advantages of market arrangements that require that a significant share of the load is contracted through long-term forward contracts or options as a way to minimize the exercise of market power and to lower price volatility, while still providing incentives for timely investments required to meet demand.
- Regulation of monopoly segments remains a difficult undertaking. Hopes that price-cap regulation would reduce the regulatory burden have proven too naive. Regulators cannot escape the task of collecting and analyzing tons of data, but they should avoid the

dangers of heavy-handed regulation of every detail.

- Serious research remains to be done. Given the state of knowledge on the regulation of the sector, the best piece of advice that could

be advanced at this moment is: be pragmatic, be aware of institutional weaknesses, be aware of turnkey solutions (but remain abreast of international developments), and be humble. Remember, not enough is known.

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