

*The following is a report of the February 19 and 20, 2003 conference on the Political Economy of Power Market Reform. The conference was organized by the Program on Energy and Sustainable Development (PESD), which is part of the Center for Environmental Science and Policy (CESP) and the Institute for International Studies.*

## **The Political Economy of Power Market Reform**

Conference Report  
February 19-20, 2003  
Stanford, CA

Speakers: *See attached conference agenda*

Chair(s): *See attached conference agenda*

Rapporteurs: Lesley A. Coben, PESD, Stanford University  
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### **CONFERENCE BACKGROUND**

The conference is part of ongoing studies conducted by PESD into the political economy of electricity sector reform in five major developing countries: Brazil, China, India, Mexico and South Africa. The study authors presented first drafts of five case studies; revision of the drafts is under way and will lead to a book on the political economy of international electric power restructuring, which is scheduled for publication by the end of 2003. Beginning in fall 2003, the research team will be hosting seminars in the five countries to discuss and disseminate the results of the study. Presentations along with the agenda and other materials from the conference, are available on the PESD website: <http://pesd.stanford.edu/> (click on “Events”)

## **DAVID VICTOR: OVERVIEW OF THE POLITICAL ECONOMY STUDY**

David Victor opened the conference with an overview of the study that examines the political economy of electricity restructuring in five major developing countries: Brazil, China, India, Mexico and South Africa. These countries are important in their own right and broadly representative of their regions.

Global trends in electricity restructuring commonly follow a pattern of introducing privatization, competition and independent regulation in the formerly state-owned electricity sector. In many cases, however, the transition towards this market model has been extremely difficult to sustain. What distinguishes this study from others is its focus on the political, economic and legal context within which reforms are undertaken—rather than idealized models of the form that reform “should” take. In each of the case studies, the study seeks to tease out the motivations for reform, how interests are organized, how coalitions that favor or oppose reform are shaped—in a phrase, the “political economy of reform”.

The study raises three themes. The first is state-owned enterprises (SOEs). In most countries—including all five of the case studies—the entities responsible for providing electric services are owned, controlled and financed by the state. The process of reform entails, first and foremost, disentangling the state from these enterprises. The study examines how the SOEs organized, financed and governed and explores how the existing functions and political relationships around the SOE affect the process of reform. The second theme, law and legal institutions, reflects the very special legal functions that are required for oversight of a competitive power market. In the attempt to introduce market forces in electricity one must create legal institutions—such as independent regulators—that truly able to serve as stewards of the marketplace. They need information as well as authority to supervise market transactions and intervene where needed. The third theme is the interaction of electricity restructuring with broader market reforms, such as reform in corporate governance, finance, and the judiciary. Financial market reform, in particular, affects how electricity firms raise capital needed for expansion. SOEs typically operate with “soft budgets” and thus have not had to face the discipline of a competitive capital market. Indeed, the study finds that shortfalls in “soft” state financing are often one of the key factors forcing countries to start restructuring. Restructuring is part of a larger program to attract new (private) capital into the sector, without which the lights literally go out.

Among the contributions that the study hopes to make, Victor identified three: (1) the specific ways in which legal, political and institutional reforms interact with one another and, in turn, affect the pathways of electric power restructuring; (2) the ways that restructuring electric power markets affect the “social contract”—measures such as protection of the environment and provisions of energy services to the poor that were built into the operation of SOEs but must, in a market-oriented system, be supplied in new and different ways; and (3) the possible impact of restructuring on the technological revolution in electric services that is on the horizon. New systems for interactive control of supply and demand of electric services—built, in part, on advances in decentralized generation and real time metering—could allow for an electric power system that is quite different from the centralized station scheme that is in place today. That system may be especially appropriate to encourage in developing countries as they rapidly build

their electric power systems, but whether and how that technological revolution arrives will depend on how markets are constructed.

## **INDIA CASE STUDY—RAHUL TONGIA**

India's energy sector revolves around State Electricity Boards (SEBs), which own and operate vertically integrated monopolies--in generation, transmission and distribution. Although SEBs were guaranteed a rate of return on their investments, in practice all have sustained heavy losses that the state and central governments in India are increasingly incapable of bearing. Large losses in the system are due especially to theft as well as to a transmission and distribution system that is not engineered for optimal reduction in transmission losses. In addition, the tariff-setting mechanism has been politicized and structured in ways that, in effect, subsidize agricultural consumption; now that agricultural interests favoring cheap electricity (used mainly for pumping water) are entrenched, the challenges to reformers have mounted.

Reform started in India in 1991 with a series of "fast-track" projects aimed to attract new generation capacity. Conceived at a time of broader reforms in India that were designed to open capital and trade to foreign competition, these Independent Power Producers (IPPs) were expected to operate on the basis of long-term power purchase agreements (PPAs) with highly profitable tariff structures that were intended to attract outside investors. Among these were the notorious Dabhol project, plagued by negotiations that lacked transparency and guaranteed tariff that was extremely high—leading to allegations of corruption that are a shadow over the project even today. In the end, few "fast track" projects were actually built, and the focus on generation has proved to be misplaced. The root cause of India's power crisis is the lack of profitability in the final distribution and billing for power—a problem that requires a focus on the SEBs.

The current thrust of reforms in India properly focuses on distribution. This second wave of reform began, improbably, with Orissa—one of the poorest states that, with World Bank guidance, privatized its distribution system. The Orissa experience is widely seen as a failure, stemming from the lack of reliable information at the time of privatization on the actual extent of losses in the sector. A new round of distribution reforms is under way and appears to be poised for greater success, in part because it is coupled with reform in tariff setting by truly independent regulatory authorities and in part because the leaders in these reforms are benchmarking the privately operated distribution companies. Andhra Pradesh and New Delhi are the leaders in this effort. In New Delhi, for example, the government is privatizing the distribution sector by inviting bids from private operators in which the terms of the bid focus on the amount of losses that will be reduced. Improvements in performance are to be split halfway between privatized companies and consumers—thus conferring incentives to innovate for companies.

A pending bill—the Electricity Bill 2001 (expected to be adopted in 2003)—would build on these reforms with a "big bang" approach to energy sector reform. It would open access to transmission for all players, thus creating a merchant market for generators. It would also solidify efforts by the central government and the states to remove losses from the books of the SEBs and extend efforts at restructuring distribution companies. Already the central government

has an effective program under way that rewards states with the best performance in their reform efforts.

## **CHINA CASE STUDY—CHI ZHANG**

In the last two decades, China experienced tremendous economic growth, which required a massive expansion in generation capacity. Whereas in 1953, Chinese generation capacity totaled 2.4 GW, China's total capacity reached 338.6 GW in 2002, the second-largest grid in the world (trailing only after the US).

China started its power sector reform in 1985 during a time of explosive economic growth. With demand for electricity surging, new sources of capital had to be raised to finance the expansion in generation capacity vital for continued economic growth. The central government diversified its investment policies and opened up investment to provincial and local governments who were allowed to use local revenues to invest in new power plants. In addition, provincial governments were allowed to add a capacity payment to industrial tariffs to finance new power construction and the government issued tax rebates to support the new IPPs. The diversified investment policies were highly effective and resulted in expanded ownership of power plants with the central government now owning 46% of generation capacity, while provincial governments control 54% of the total—a significant decentralization of energy supply.

In the face of unwieldy patterns of local and provincial power investments and resulting unequal patterns of growth, reforms launched in 1998 were motivated by the central government's efforts to regain control over local investment decisions and to provide central coordination over investment, especially in the effort to build a national grid. To improve control the central government decided to reorganize the governance structure of the industry. In the old structure, provincial power bureaux reported to the Ministry of Energy and to the provincial government, which hold equal status and occupy the same government rank. Because of the prior diversification of investment, however, the authority of the Ministry of Energy in day-to-day decision-making quickly eroded relative to that of the provincial government. The 1998 reforms aimed to re-establish central control by forcing corporatization—i.e. the separation of government from business operations—all the way down the hierarchy of government. The Ministry of Energy was abolished to make room for the newly corporatized State Power Corporation and similarly, provincial power bureaux were replaced by provincial power companies and provincial power administrations. These changes have allowed the central government to reassert control over investment policies, and more limitedly, over pricing and dispatch. Moreover, corporatization of the industry allowed the central government to move ahead with electric restructuring in that corporatization is thought to be an essential step before the introduction of market prices and real competition.

Recent reforms to gradually introduce market prices and competition in the sector must very much be seen in light of the trend to re-establish central coordination over provincial power investment and operating decisions. The introduction of competition within interconnected regional transmission networks is supposed to discipline provincial power companies by conferring appropriate investment and dispatch incentives. To facilitate effective market

competition, the State Power Corporation was broken up in five separate generation companies and two regional grid companies. An independent regulator, the Electric Power Regulatory Commission, was set up in March 2003, but it is as yet uncertain how regulatory functions will be divided between the State Economic and Trade Commission (SETC) and the new regulator.

In general, China's pace in electric restructuring reflects the transitional character of its broader government reforms. Despite the intended extraction of government from business operations through corporatization, it is likely that the central and provincial governments will continue to occupy important and in many cases, competitive positions in key decision-making areas such as finance, dispatch, tariff policy and social policy. At present, it is to be anticipated that the shape of China's future electricity sector will depend to a large extent on whether, and in what way, the current conflicts between the center and the provinces over investment, pricing and dispatch authority will be resolved.

### **MEXICO CASE STUDY—VICTOR CARREÓN & GUILLERMO GOVELA**

Rising demand for electricity associated with general economic growth also poses problems for the security of supply in Mexico. Mexico faces a shortage of capacity and sorely needs new investment. Traditionally, new capacity was financed by the state, but the oil crisis in the mid 1980s made it impossible for the state to continue to finance the shortfall with budgetary allocations. International private investment was seen to be the only avenue through which the sector could solve its capacity problems. But the attraction of private investment was not possible without significant reform of the current electricity industry.

Reform in Mexico started with the 1992 Electricity Act, which had as its primary objective to facilitate the introduction of private investment into the sector and to reduce dependence on public finance. A second goal of the Act was to stimulate the productivity of the sector. The Electricity Act specifically excluded self-generation, co-generation, small-scale production, independent power producers (IPPs), and export and import of electricity from a constitutional public service provision that traditionally reserved the supply of electricity to the exclusive province of the state. Other than allowing the introduction of private players, the 1992 Act had little impact on the sector. Moreover, future investment must await the final outcome of constitutional challenges to the 1992 Act that question the exemption of private investment in the sector to public service obligations. Not surprisingly, this slows down any effort to move toward a regulatory framework for market regulation and has dampened the enthusiasm of private investors to enter the market.

Three reform proposals are currently on the table: the PAN, the old PRI/PRD proposals, and a new PRI proposal. The PAN proposal by President Fox does not call for privatization of the existing SOEs, but includes: (1) constitutional amendments to allow IPPs; (2) Corporatization of the existing SOEs in an attempt to separate government functions from business operations; (3) tariff reform, with the aim of placing control over transfer pricing entirely in the hands of the regulator (CRE); and (4) to allow for non-discriminatory dispatch and open access to transmission on the grid. By contrast, the PRI/PRD proposals do not envision amendments to

the constitution, and intend to preserve the status quo of the public utilities and allow them to remain vertically integrated.

## **PANEL: CAPACITY GROWTH, INVESTMENT AND PRIVATIZATION**

One speaker focused on the pattern of investment of independent power producers (IPPs) in the 1990s. The Asian financial crisis in 1997 had a severe impact on foreign direct investment and IPPs in developing countries. Foreign direct investment has all but dried up. The question this raises is whether long-term power purchase agreements (PPAs) have failed and whether they remain the vehicle of choice around which to contract foreign investment. Or is it the case that the FDI crisis does not reflect the failure of the PPA paradigm, but can be attributed solely to Macro-economic Force Majeure (MFM), around which it will be very difficult in general to contract your way around? A study of macro trends showed that in countries affected by the Asian financial crisis, foreign investment in the energy sector all but dried up. By contrast, in countries not affected by the Asian financial crisis (primarily China), foreign investment still makes up a significant proportion of total investment.

The next speaker focused on India, where the primary question for the power sector is how to finance new capacity. Whether it be through domestic or foreign investment, new plants are generally financed under a 70/30 debt/equity ratio. In India, the existing domestic banking infrastructure is well equipped to provide sufficient debt capital, but financing through equity is more problematic, since the domestic equity market is underdeveloped and quite small.

India shows a mixed picture of reforms where states either choose to privatize or to corporatize existing State Electricity Boards (SEBs). So far, Orissa has privatized 3 distribution utilities, New Delhi has privatized 3 distribution utilities with state support to continue for a specified period on a tapering basis. The states of Karnataka, Rajasthan, Madhya Pradesh are all considering privatization of electricity assets, whereas in Punjab, Assam, Maharashtra and Gujarat corporatization of the SEBs is being pursued.

Overall, it was suggested that at the state level, the main issues concern: (1) restructuring of state subsidies away from agriculture and residential subsidies; (2) rural electrification with better accounting for losses; (3) the lack of firm database, especially with respect to the baseline for power projections, makes cross-firm comparisons impossible; (4) overstaffing in the sector; and (5) the need to adopt a long-term tariff outlook.

The speaker suggested that, although India needs to focus on capacity expansion, policy-makers should look more carefully at all the options available at the local level. In particular, the possibility to franchise rural service areas to private companies deserved to be investigated more thoroughly. With regard to the environment as well, new options to modernize the sector and provide environmental protection could be explored, specifically by: (1) exploring gas as an end-use energy alternative (use for cooking, etc. rather than for thermal energy production); (2) exploring decentralized generation; (3) increased efforts to support demand-side management; and (4) investigate carbon subsidies. However, all of these options depend critically on new financing and significant regulatory capacity.

The third speaker provided an investor perspective on IPPs. First off, he mentioned that there is an unprecedented melt-down currently going on in the share values of power developers. Rather than the poster child, energy developers and utility companies in general are now seen as risky investments by the financial capital markets. A previous speaker cited economic force majeure as the major cause for the investment slump, but investors usually regard these factors as part of the normal business cycle. And while it is true that power purchase agreements are changing, this speaker commented that investors saw PPAs only as stepping stones to a competitive market and not as solutions that were sustainable in the long run..

The new business reality from an investor perspective will need to understand energy as a commodity good subject to similar measures as in other commodity markets so it is likely that we see the PPA replaced by intermediate term hedging measures—as is common practice in the oil market. The investor is also concerned in trends with respect to end-use tariffs – everything else is ancillary and dependent on it. In particular, investors are concerned about trends in domestic subsidization, are subsidies increasing or decreasing?

With respect to contract enforcement; the notion of “sanctity of contracts” betrays an unhealthy naïvete. What we, as investors, mean by legal protection comes down to the actual possibility of making equitable adjustments over the lifetime of the agreement. It is exceptional that long-term PPAs are enforced without change during the lifetime of the agreement. Creeping PPA change is something the investor must be ready to live with. Another important factor for the investor is the availability and nature of sources of financing. Foreign equity or borrowing or the need to use imported fuel will immediately subject the deal to greater exchange rate risk. Use of domestic financial capital markets and access to domestic borrowing is able to decrease this risk. Finally, more transparent competitive tenders provide not only protection to the consumer, but also to the investor. The most transparent bids are usually the most successful IPPs—for example, in Turkey the bids were broadcast on TV. In Mexico as well, government procedures for recent IPP investment bidding are relatively transparent, which have made recent awards politically sustainable and robust against allegations of corruption.

## **SOUTH AFRICA CASE STUDY—ANTON EBERHARD**

South Africa experienced a progressive consolidation and integration of the electricity supply industry. Like elsewhere, it was believed that economies of scale were a natural attribute of the industry calling for integration of the grid. As a result, Eskom, the state-owned utility, presently owns 96% of generation and supplies approximately 250 municipal distribution entities. The integrated, state-owned nature of the industry however led to over-investment in generation capacity in the 1970s and a misallocation of resources. By the early 1980s it was clear that monopoly investment planning had led to considerable investment inefficiencies.

Reform in the 1990s however was primarily motivated by the wave of political change associated with the abolition of apartheid and the rise of the ANC government to power and not by narrow economic requirements of the sector. The South African experience is unusual in that the efforts of the new ANC government to promote black empowerment and increasing

electrification for black neighborhoods offered a political window of opportunity for economic reform and subsequent electricity restructuring, which the incumbent SOE, Eskom, managed to utilize cleverly.

Reform was propelled by the fact that the former apartheid regime only managed to provide electricity to 30% of the total population. Eskom assured the new ANC government that it would help achieve its social goal of connecting 2.5 million new (mainly black) households to the grid. Indeed, with surplus generation capacity, the effort to connect new users did not in fact require new plants to be built, and was limited by the need to build new transmission and distribution lines. As a result, Eskom quickly succeeded in connecting 67% of the population to the grid. In addition, the way in which this expansion of rural electrification was achieved is a textbook model of social financing. Rather than continuing to finance the capital costs of rural distribution lines through cross-subsidization within Eskom, the administration decided to set up a special electrification fund administered by the fiscus and paid for, in part, by taxes remitted to the government by Eskom. In the case of future competitors, there is thus no competitive distortion arising from the obligation to serve rural areas.

Clearly, the usual drivers of reform such as sectoral inefficiency, lack of generation capacity, or the need to follow international trends, are only weakly felt in South Africa. Instead, South Africa's electricity reform is driven by: (1) inefficiencies in distribution; (2) black empowerment; and in a more limited sense, (3) inefficiencies in investment. Yet there is a palpable sense among the South African professional community in the electricity industry of "living on borrowed time". Against the backdrop of increasing economic integration worldwide, is it the case that international trends in electricity reform are going to catch up with South Africa, and should it therefore take pre-emptive steps to restructure its electricity industry?

To summarize, South Africa took the following major reform steps in the 1990s: (1) establishment of an independent regulator; (2) rationalization and commercialization of distribution sector; (3) corporatization of Eskom; and (4) continued planning for managed liberalization of electricity market. With respect to introducing market competition, the current plan envisions to reshuffle ownership of generation plants, such that 70% will be in Eskom hands (with Eskom divided up in 4 separate Eskom generation companies) and 30% in the hands of IPPs. The liberalization plan envisions operating the grid independently by a state-owned transmission company and ownership of distribution assets is envisaged to be given to regional electricity distributors (REDS) which include former municipal and Eskom distribution entities.

## **BRAZIL CASE STUDY—ADILSON DE OLIVEIRA**

In Brazil, policymakers face the dilemma of how to create incentives for investment in thermal power capacity in a sector that is heavily dominated by hydro-power. Brazil's first supply crisis during the inflation years of the 1980s was precipitated by persistent conflicts between state and federal electricity companies. A single tariff system for the entire country was set up that required the state companies to compensate high cost federal companies. In addition, the decision to build the huge Itaipu dam forced the state generation companies to reduce their

power generation for several years, increasing costs and reducing profits. Both of these federal policies faced stiff resistance from the states.

State companies interpreted their legally mandated right to a 10% return on assets to mean that they could book the difference between that 10% and their actual rate of return (which was much lower) as revenues to be received in the future. This accounting solution, however, did not improve the immediate cash flow problem for state companies. To address this problem, state governments authorized electricity companies to halt payments for the federal companies supply of power, which wrecked the entire electricity system producing ultimately technical and economic crises.

In 1994, the Real plan finally managed to control double-digit inflation. Liberalization, privatization and fiscal austerity were the key economic guidelines of Cardoso's victorious campaign. In this new macro-economic context, privatization of electricity companies was felt to be the only way of attracting new capacity, since the preceding years of financial chaos had depleted the state and federal government of funds to make the necessary investments in the sector. From 1994 until 1998, these macro-economic policies produced large capital inflows into the Brazilian emergent market.

Within this period, privatization of distribution companies proceeded at a rapid pace. Sixteen distribution companies and four generation companies were privatized. Economic performance increased, quality of service improved, rural electrification stepped up and power outages were reduced. In addition, investment and operational costs steadily diminished.

Problems, however, emerged after 1998. The first problem related to the fact that liberalization did not include the market for fuels. Petrobras still commanded a monopoly and as a result, new gas-fired thermal plants depended on the same contract Petrobras had with its off-taker. This contract was a take-or-pay contract, indexed to the dollar and to the fluctuation of fossil fuels in the international market. It required thermal plants to commit their entire capacity (thus removing the option of bidding higher prices for peak-load capacity) to eliminate the risk of having to pay for gas while earning no revenue from electricity sales. The dollar denomination of gas also caused major problems for thermal plants after the large devaluation of the Real in 1999. Tariff review for distribution companies occurs only once a year. Therefore, distributors are not prepared to contract with thermal power plants that cannot guarantee yearly prices. Of course, the latter means that power plants have to absorb the risk of fluctuating gas prices, which in the absence of a futures market and hedging opportunities is very difficult for them to do.

The second problem related to the poor incentives that the power market conferred on thermal power plants. The guaranteed dispatch of hydropower meant that thermal power plants were supposed to cover residual demand available only in dry periods. No rational investor would take this risk to build a thermal power plant when operating under a take-or-pay gas contract. In any case, spot market prices would have to be very high to make private investment in thermal power plants rational, but spot market prices are regulated by ANEEL. The lack of government investment in thermal power generation produced a supply crisis in 2001 when the dry season hit.

In 2002, the continuing shortage in the energy supply forced the ministry to implement rationing of energy consumption. The results of the rationing crisis were severe in that consumption dropped 10% below previous forecast; electricity companies finances worsened; consumers were extremely dissatisfied about the tariff hikes; and the regulator lost all public confidence.

## **PANEL: MARKET DESIGN AND INSTITUTIONS**

The first speaker focused on the market design problem in Mexico, where reform must be designed with the following political, legal, economic and operational constraints in mind.

There are generally two market design options for restructuring the sector. The first is to introduce market forces in the sector by deintegrating the industry and allowing full wholesale competition in generation. The second option is to leave the integrated utilities intact and to corporatize the entities making them self-sufficient (a la EdF—the French utility). The latter option, however, is not available to Mexico, presumably because Mexico's sovereign debt burden precludes it from modernizing the state utilities through fiscal budget allocations.

Electric restructuring also faces major legal impediments in Mexico as the constitution contains a public service obligation that is interpreted to prohibit private participation in the electricity sector. To improve private investor confidence, these legal impediments must be removed which, however, requires amending the constitution. This is politically a very difficult task, since constitutional majority requirements make it easy for the opposition to veto the reform.

The political strength of the incumbent SOEs has led to the development of a hybrid model in the form of a centralized contract market (i.e. no power pool) and a centralized balance market in generation. As a political matter, both SOEs—CFE and LFC—are considered to fall within the sovereign interest of the state, which makes it very hard to break them up. Politics also shows up in the restricted size of retail competition. Retail competition was allowed, but with the proviso that a maximum of 40% of customers can choose to get out of the public system and choose for private companies—thus guaranteeing the SOEs a 60% share of the market.

As a result of all the above constraints, the final Mexican reform model was to keep CFE integrated, but to divest its transmission assets into a separate ISO. In addition, to prevent market power, CFE would not be able to access the spot market, but would continue to rely entirely on bilateral contracts. At the moment, there is a lack of confidence in Mexico to pursue a fully open market. Mexico has chosen to follow the Argentinian model of a cost-based market.

Another speaker focused on the issue of (how to achieve) credible commitment and regulatory capacity in the power market. Credible commitment is often reduced to the issue of how to achieve regulatory independence. To the detriment of other factors, regulatory independence frequently provides the sole lens through which donors see the task of building regulatory capacity. But regulatory specificity is also important—especially to secure the stability of investor expectations.

Regulatory specificity concerns the degree of specificity with which the regulatory “contract” is set up, i.e. the level of behavioral detail that the rules specify and the source of these rules: are the rules contained in primary laws, secondary laws, concessions, etc. For example, in Chile, Bolivia, Peru, the tariff-setting mechanism is fully described in the primary and secondary laws of these countries. Consequently, one would argue that regulatory specificity in these countries is high. In Bolivia, secondary laws specify the rate of return for generation companies. The rate base too is specified in a primary law. Presumably, since these laws are public and transparent, this means that investor transparency and confidence are increased. In Brazil, on the other hand, the price of purchase power is specified by the normative price of ANEEL, which is subject to regulatory discretion. The interpretation of this normative price was changed four times in recent years.

Another critical element of regulatory governance is dispute settlement. Special infrastructure tribunals equipped with technical expertise of the sector may be the most promising recent development in resolving disputes. The speaker mentioned electricity tribunals in Bolivia and India as specific examples..

Next to regulatory specificity and independence, regulatory capacity is also determined by the substance of regulation—especially the technical details of the tariff-setting regime. As a general principle, tariffs should be set such that risk is allocated to the party that bears it most well. Risk must be broken down in types of risk and by the category of risk-bearers.

The speaker summarized the four lessons associated with regulatory governance and regulatory substance: 1) independence is not enough: it is a necessary but not sufficient condition; 2) independence must be combined with sufficient specificity in the tariff regime; 3) economic incentives must be created to achieve a workable risk allocation; and 4) an effective dispute resolution mechanism is critical: we have to wait how the newly minted electricity tribunals perform.

The third speaker focused on the problem of market design. This problem can be summarized in the problem of how to contain market power. Market power in electricity markets is an especially thorny problem because of the small number of players that can capture residual demand in the market. In electricity markets, the last set of generators to be dispatched can exercise a disproportionate amount of market power, as the system operator needs to deploy these generators to guarantee system reliability. It will be rational for the last generator—who is able to capture residual demand—to monopolize over that residual demand curve, thus earning monopoly rents—even when he contributes a small fraction of total supply.

There are roughly three ways to address the exercise of market power: (1) allow forward contracting of power; (2) ensure price responsive demand, which will result in a flatter hourly residual demand curve (and thus less market power); and (3) ensure a transmission responsive demand curve. An economically reliable transmission service entails greater investment in the transmission network when compared with a transmission system optimized for a single integrated monopoly utility. Admittedly, this is over-investment relative to the engineering notion of reliability as the capacity to balance contingencies in different parts of the network, but such over-investment is needed to make it harder to exercise market power.

## **PANEL: DEVELOPING REGULATORY CAPACITY**

The first speaker gave a global overview of the requirements that need to be met when building regulatory capacity. He mentioned the availability of financial support from the government and a stable regulatory and political climate as critical factors in developing regulatory capacity. With respect to the substance of regulation, he noted that a key task of the regulator is to guarantee a reasonable rate of return to investors and to provide support for the advancement of research and new technology.

A brief discussion followed on the new paradigm in electricity industry in generation, transmission and distribution, and in end-user technologies. New generation technologies enable owners and operators of power plants to run plants in ways that respond in real time to the market, instead using of long-term planning models. Similarly, new transmission and distribution technologies enable the system operator to respond to real-time demand. Finally, new end use technologies are not only more energy efficient, but enable customers to respond to real-time market signals which hold the promise of creating a more price responsive demand.

The second speaker discussed the broad process of building regulatory capacity in Mexico where the regulatory agency (CRE) was created only in 1995 and as yet, with insufficient autonomous powers to regulate the sector effectively. At the moment, the CRE must share rule-making authority with the Ministry of Energy in approving new generation; in setting terms and conditions for transmission and distribution; in establishing public service tariffs; and in issuing administrative penalties. Most importantly, however, the CRE does not have power to regulate the publicly held sector, that is, it cannot set rules applicable to the state-owned utilities, CFE and LFC. Mexico's regulatory agency has only legislative powers to regulate the private sector, i.e. the new entrants. To date, it has issued 270 new generation permits to private investors.

The third speaker focused on training for regulators and the development of appropriate methodological frameworks and practices. It is clear that private players need transparent, fair and predictable rules of the game. However, prior to the choice to stimulate private entry, there are important decisions to be made concerning the degree of unbundling that directly affect the size of the market. . For one thing, it is obvious that the natural monopoly components must be regulated differently from the competitive part of the sector. With respect to regulating the natural monopoly component, in the absence of competition, great care must be given to the choosing the regulatory tools and the incentives that can sustain investment and operational efficiencies. With regard to regulating the competitive sector, it is apparent that a great deal of attention must be given to the task of market surveillance and the relationship of the electricity regulator with the relevant competition authorities.

The role of the regulator in supporting the reform process during the transition is critical, especially because there is often insufficient human capital in the government to regulate the energy sector. Over time, professional competence and specialized knowledge in regulation is likely to increase, and the regulator is likely to be called upon to assist in policy development with other departments. This requires considerable political skill and the ability to build complex relationships with other government actors.

Finally, with respect to training of regulators, this speaker mentioned that, in his experience, fly-in courses, which rely on temporary outside expertise, are of limited value. When building regulatory expertise, it is appropriate for the regulator to have a focus on regional, local problems and challenges, but the regulator should equally be informed by international experience. It is also critically important to sustain alumni and network of regulators. The speaker closed the session by addressing the need to build sustainable training capacity in developing countries.

## **PANEL: SOCIAL POLICY AND MARKET REFORM**

One speaker focused on the issue of energy efficiency. He argued that we should shift attention away from public benefit programs stimulating energy efficiency towards the design of regulatory frameworks that shift responsibility for energy efficiency to the utilities. Several examples were provided of how economic incentives can be built into the regulatory market design that would make utilities embrace the cause of energy efficiency.

The next speaker provided an Indian perspective on social justice in electricity restructuring. He discussed how public interest litigation in India has evolved as a result of a few high-profile conflicts, most notably, the Narmada Valley dam and the Enron Dabhol power plant. The visible result of these cases were the Indian Statutory Right to Know Act and the Regulatory Policy Act, both of which provide for mandatory public hearings when formulating new policy. In addition, the 1994 Environmental Impact Assessment regulations have established a national environmental tribunal; a special tribunal set up to hear public interest litigation cases. These acts are significant litigation weapons that can be wielded by public interest advocates. This is demonstrated by the Maharashtra Supreme Court who ordered the Maharashtra SEB to disclose the documents related to the Dabhol project. In the future, however, it is to be expected that supreme courts will show deference to the specialized electricity tribunal, in recognition of the special expertise reflected in these decisions.

The final speaker discussed how equity issues in electricity provision ought—ideally—to be resolved. In particular, this speaker commented that the benefits, costs and risks associated with different reform options ought to be analyzed carefully in terms of their social distribution and that more attention ought to be given to the democratic qualifications of the decision-making and implementation process. This speaker stressed that, importantly, reform must always be tailored to the capacity for reform in a particular country. When such attention is absent the cure of privatization and regulatory reform may well be worse than the disease. Many, if not most, developing countries are characterized by limited technical capacity, patronage politics, the lack of an open polity, and very little recourse for ordinary citizens. In such a climate, this speaker argued, reform must be calibrated very carefully in order not to produce outcomes that are worse than the status quo. In particular, if we pay insufficient attention to these transitory capacity issues, this speaker concluded, we may simply substitute the old nightmare of inefficient, stagnant and corrupt parastatals for a new nightmare—that of the inept, poorly supported bureaucrat who oversees massive wealth transfers without any public accountability.