



# Electricity reform in developing and transition countries: A reappraisal

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## Abstract

Since about 1990, many developing and transition countries have undertaken market-oriented reforms in their electric power sectors. Despite the widespread adoption of a standard policy model, reform processes and outcomes have often failed to meet expectations. Drawing on an extensive literature review and case studies in Asia, Africa, Latin America, and Eastern Europe, this paper describes common features of non-OECD electricity reform and reappraises reform policies and underlying assumptions. Comparison with the sector-focused policy goals of deregulation in OECD countries highlights the importance of national fiscal crises, macroeconomic reforms, and persuasion by multilateral lenders in shaping non-OECD reforms. It also makes clear reform's dependence on attracting foreign capital, and consequent vulnerability to volatile international financial conditions. Case studies of Bolivia, Ghana, India, Poland, and Thailand illustrate reform's diverse pathways and problems in different settings. A broad range of non-OECD reform experiences indicates that disappointing results have often resulted from a narrow focus on finance and cost recovery, inflexibly applied. The paper concludes that improving reform will require emphasizing a broader set of objectives, including service provision, public benefits, effective regulation, and social/political legitimacy. Above all, reforms must be based on realistic assessments of national needs and capabilities.

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## 1. Introduction

Since about 1990, market-oriented electricity reform has swept across developing and transition economies, much as electricity deregulation has in OECD countries. These processes have been different in important ways, but both are important to the future of the electricity industry worldwide. Among the issues that link power sectors across the OECD/non-OECD divide are the industry's investment climate, connections to oil and gas supplies, regional power trade, and climate change

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policy [1–12]. With more than a decade of experience in electricity reform, there is both an opportunity and a need to synthesize the lessons from the very diverse processes and outcomes that have occurred in Asia, Africa, Latin America, and Eastern Europe [13–16].

This paper is a step toward characterizing current conditions and issues in electricity reform in non-OECD countries. As a short article it cannot be exhaustive, but draws on examples in each non-OECD region to focus on four objectives: (i) deriving a useful set of categories for analyzing reform; (ii) illustrating the national and international conditions that shape reform processes and outcomes; (iii) contrasting key features of OECD deregulation and non-OECD reform; and (iv) identifying key issues and recommendations relevant to the current situation. We hope this paper will draw greater attention to underemphasized policy issues and to the need for analytical improvements in non-OECD reforms going forward.

## **2. Electricity sector conditions before reform**

Outside the industrialized world, rapid growth of the electricity industry began only after World War II, and in many cases the end of colonial rule. In most countries, governments owned and operated the electric utilities. Economic efficiency was often only one of the industry's priorities, as governments sought to catalyze economic development and extend modern infrastructure and services to a much larger share of the population. Key roles for state utilities included national industrialization, rural electrification, and technology indigenization.

Electric utilities were often linked to upstream suppliers (e.g. fuel) and downstream consumers through the state plan or budget. The national economy as a whole was subsidized through low electricity prices. The state-led model, which was encouraged by the Cold War superpowers and multilateral development agencies such as the World Bank, largely succeeded on its own terms as generation outside the OECD grew from 130 billion kWh in 1950 to 2.9 trillion kWh in 1980 [17,18]. During this period, public ownership was bolstered by overall economic growth, international development aid, and expanding national budgets.

By the 1980s, conditions varied widely among state utilities. Some were financially sound, but others were not. The revenues of many utilities were insufficient to cover costs, which left them dependent on state budgets for operating expenses and new expansion. Chronically undercapitalized, many systems suffered from supply shortages, deteriorating equipment, and high system losses; the worst offered the public poor service, high pollution, and inability to expand electricity access among the poor. Some key features of non-OECD electricity sectors prior to reform are shown in [Table 1](#).

## **3. Macroeconomic drivers of electricity reform**

Though many non-OECD state utilities were troubled and in need of reform, factors external to the power sector played a major role. The most important of these factors was finance. The oil shocks of the 1970s led to serious downturns in developing country economies, which by the early 1980s were burdened by foreign debt, budget shortfalls, and inflation. Macroeconomic and fiscal crises led governments to implement economy-wide structural adjustment programs, with the goal of reducing

Table 1  
 Characteristics of pre-reform electricity sectors in non-OECD countries (ca. mid-1980s)

	Common sector characteristics	Range of conditions
Sector structure	State owned Highly bundled Vertically integrated	Generation and distribution utilities often separate. Central governments often owned major generating units and high voltage grid, local governments owned smaller facilities
Government priorities for sector	National industrialization Universal access to electricity Counter-cyclical employment Technology indigenization Improved standards of living National prestige, nation-building	Electricity central to government's development policy. Power sector often used to subsidize the rest of economy, sector balance sheet not contained within sector itself. Economic efficiency and financial autonomy of sector often low priorities
Policy and regulation	National energy ministry Provincial electricity authorities	More provincial autonomy in larger countries (e.g. China, India). Production and regulation authority often co-located in ministry. Power tied to other sectors through central planning
Revenue and tariffs	Tariffs set by ministry Direct subsidies from state budget Cross-subsidies from industry Metering and collections constraints	Cross-subsidies common for agriculture, residential, and public agencies. Limited use of meters and collection enforcement weak in some countries (e.g. much of Africa, South Asia, Soviet bloc)
Financial and investment conditions	Utility finances tied to national budget Self-financing limited by revenue generation, tariff arrangements	Rates of return range from negative to > 15%. Operating losses common, requiring subsidies from national budget. Public debt financing of capital projects
Physical organization	Extent of grid integration determined by geography of load and generation Urban-centered with grid expansion pattern outward from primary and secondary cities	Integrated national grids in compact, densely populated countries (e.g. Korea, Eastern Europe). Regional/provincial grids in largest countries (e.g. China, India). Urban grid plus isolated grids in poor, mountainous, and island countries (e.g. Bolivia, Philippines)
Operational performance	Operational performance tied to utility financial conditions, national technical capacity, physical and geographical endowment, national economic conditions, and management practices	System losses range from < 10% (Korea, China, Romania, Venezuela) to > 30% (South Asia, Africa). Consumers per employee range from 6 (Rwanda) to 292 (South Korea). Wide range of service quality, capacity factors, reserve margins
Consumption and access	Per capita consumption and access show a straight-line function of per capita GDP	Access > 90% in Eastern Europe, East Asia; < 30% in South Asia; < 10% in Sub-Saharan Africa. One-third of global population without electricity
Fuel mix and sources	Fuel mix a function of domestic resources, bundling of energy sector, energy security concerns, finances Most countries moved away from oil generation in response to 1970s oil price shocks	Coal dominant: China, India, Poland, South Africa. Hydro dominant: Sub-Saharan Africa, Latin America. Nuclear dominant: Korea. Natural gas just emerging as important generation fuel in most countries. Wide range of import dependence
Environment	Access to clean fuels and technology limited by finances, resources, subsidies for domestic fuels Environmental protection institutions new, limited authority and capability Emergent environmental movements	Serious local pollution, acid rain, and climate concerns from coal-dominated sectors (China, India, Eastern Europe). Ecological and population displacement problems with large hydro projects (Asia, Africa, Latin America)

Source of numerical data: Escay JR. Summary data sheets of 1987 power and commercial energy statistics for 100 developing countries. Washington, DC: World Bank; 1990.

public spending and increasing private capital flows into the economy. A second wave of reforms—which in many countries began around 1990—focused on liberalizing the energy, technology, and infrastructure sectors. State industries such as oil and gas, mining, and telecommunications were featured as having the greatest potential for revenue generation through commercialization and privatization.

Within this macroeconomic climate, many governments worried about power sector finances [19]. Loans for power development accounted for about 25% of total developing country public sector foreign debt service during the 1980s [20]. State utilities that ran chronic deficits were seen as unsustainable burdens on state budgets in a time of fiscal austerity. Even when utilities were profitable, governments were concerned that public debt financing would not be able to meet the need for future power sector investment, as demand was predicted to grow dramatically in most of the developing world. Total installed generating capacity was expected to increase from 471 to 855 GW over the 1990s, with a corresponding growth rate of about 6.6%. Capital requirements over the same period were estimated at about US\$1 trillion, or US\$100 billion a year (in 1995 US dollars) [20,21]. Finding an alternative source of sector finance thus became the driving priority of power sector policy. Cost recovery and private investment emerged as the key precepts of sector reforms. Tariff increases of 50% or more were estimated to be necessary to cover costs and to finance planned investment programs over the 1990s [20].

International forces were also extremely important. By 1990, governments increasingly saw foreign direct investment (FDI) as a way to bridge the gap between investment needs and available public sector funds. This view was strongly encouraged by the World Bank and IMF, which embraced the neoliberal doctrines of the ‘Washington Consensus’ in their structural adjustment lending policies [22–24]. In 1993, the World Bank made new power sector loans contingent on government commitments to introduce competition and private participation [25]. Other international financial institutions, such as the Asian Development Bank, European Bank for Reconstruction and Development, and the Inter-American Development Bank followed suit [26,27].

The influence of the World Bank varied from country to country depending on the country’s options for raising capital, and on how well the country’s own objectives matched the increasingly standardized reform model promoted by the Bank (see Section 5). In some countries, electricity reform arose from national efforts that had garnered some level of public support by promising to improve macro-economic and service conditions (for example, see Bolivia case study). In other countries, the Bank’s lending policy obligated national policy makers to begin an externally defined reform agenda under conditions of high risk, limited experience, and uncertain benefits (see India case study).

Initially, substantial foreign direct investment flowed into non-OECD power sectors [28]. This reflected not only the broad-spectrum investor exuberance of the ‘Roaring Nineties,’ but specific interest in new markets by energy multinationals liberated by OECD gas and electricity deregulation, and the attraction of other energy and utility industries with which electric power was often bundled [2,29]. Table 2 describes some typical macroeconomic factors relevant to the initiation of electricity reform. The five country case studies in Section 7 illustrate the different ways that domestic and international factors shaped reforms in different countries.

Table 2

Macroeconomic context prior to electricity reform

Economic dimensions	Key elements
Power sector investment constraints	High electricity demand growth predicted Economic growth linked to adequate electricity supply Existing supply shortages Poor hydrological conditions System modernization required Utilities lacked ability to self-finance
National government fiscal constraints	High public debt (often linked to oil price shocks of 1970s) Need to reduce government spending and borrowing Limited resources to fund operations and finance investments Utility borrowing contributes substantially to national debt
Catalytic macroeconomic events	Latin American debt crisis, 1980s 'Lost decade' in Africa and Latin America, 1980s Post-Soviet economic transition, 1989 Asian financial crisis, 1997–1998 Widespread national crises (e.g. India balance of payments crisis, 1991)
Options for raising capital	Public debt, World Bank and development bank loans Public debt, commercial bank loans Stock exchange offerings Joint ventures Privatization of state assets Greenfield private investment
International investment climate	Deregulated capital markets Rapid growth of FDI in 'Roaring Nineties' New energy multinationals created from natural gas and electricity deregulation in US and Europe looking for investment opportunities Investor interest in Asian, Latin American, energy as rapid growth sector
Multilateral structural adjustment/commitment lending policies	Era of structural adjustment and conditionality, 1980s IMF often makes power sector restructuring, asset privatization, foreign participation a condition of macroeconomic stabilization lending World Bank adopts policy in 1993 of liberalization and reforms as a requirement of new power sector loans; also adopted by regional banks (e.g. Asian Development Bank in 1994)
National economic reform context	Economy-wide liberalization and reform programs initiated as result of fiscal crisis and structural adjustment policies Extensive sector reforms of state-owned enterprises Fuel price reforms (coal, oil, gas) raise power generation costs Optimism over ability of private capital/investment to solve fiscal problems, minimize public burden, generate tax revenues, develop key industries Bundled energy and public utilities sectors (gas, oil, water, telecomm, electricity) among the most attractive to investors

#### **4. Contrasting OECD and non-OECD reform contexts**

Electricity reform in most non-OECD countries was a fundamentally different undertaking from deregulation in the OECD, with respect to motivations, sector conditions, and institutional context.

Though electricity deregulation in OECD countries was influenced by deregulation in other industries, for the most part it involved changes within the electricity sector itself, which rested on the robust legal and institutional foundations of highly functional national political systems. In terms of motivations, deregulation was ultimately justified as a way of optimizing the economic performance of an already well-developed industry. In many non-OECD countries, by contrast, electricity reform was not an undertaking confined to the sector, but closely tied to changes throughout the national economy. It often occurred within ill-defined or problematic legal and institutional contexts. Its basic goal was seldom optimal efficiency, but rather improvement of deteriorating national and/or industry finances, and of

Table 3

Contrasting elements of OECD deregulation and non-OECD electricity reforms

	OECD deregulation	Non-OECD electricity reforms
Key concepts	Competition, choice, efficiency	Private investment, economic growth
Paradigm change	Natural monopoly model considered no longer relevant for generation, retail services Undo cost of service and rate of return regulation, replace with competitive markets	State utility model producing public debt, sometimes poor performance Dismantle state-led development model, replace with outward-oriented model attractive to investors, commercial operation with full cost recovery
Stated objectives	Lower prices Customer choice Higher efficiency Increase national competitiveness	Unburden national finances (to service debts) Operate sector w/o government financial support Expand investments and upgrade technology Avoid electricity supply constraint on growth
Basic premise	Deregulation will drive industry to operate at long-run marginal cost Firms' efficiency will be rewarded in market	Full commercialization only viable model Private sector best at operating commercially Private sector can mobilize necessary capital
Key features of policy model	Restructure industry to facilitate competition  Change management and investment incentives by exposure to price signals from competitive market	Put utilities on commercial footing, liberalize prices, eliminate subsidies Change management incentives via commercialization and/or private management Change investment incentives by unbundling, ring-fencing, legislation, contract terms
Driving forces and design constraints	Large-consumer demands for cheaper power  Merchant generators seeking new markets  Investors seeking higher returns from power sector Utilities aim to avoid regulatory burdens, operate unregulated affiliates	Government worried about fiscal conditions, macroeconomic growth Capital available from investors, multilaterals, in exchange for liberalization Focus on commercial viability and attractiveness to investors, not on consumer concerns
Achilles heels	Stranded assets Market power Manipulation of pools, trading schemes Ensuring adequate long-term investment in transmission, reserves, reliability Low public tolerance for price spikes	Absence of secure legal and property rights for investors Government interference for political interests Lack of competent regulation Power theft, unaccounted losses Corruption, cronyism, corporate malfeasance Low public tolerance for cost recovery without service improvement

grossly sub-par industry performance that sometimes included large unaccounted losses and rampant power theft. Importantly, deregulation's success depended mainly on how well the new electricity markets themselves functioned; in non-OECD reform, success depended largely on attracting capital from outside the country, over which governments had only limited control. Some of the key contrasts in the OECD and non-OECD reform contexts are shown in [Table 3](#).

## 5. A standard menu for reform

Despite fundamental differences in motivations and conditions, non-OECD reform policies were largely based on the theoretical analysis and policy recommendations of economists concerned principally with deregulation in the US and Europe. The measures Sally Hunt has called 'the standard prescription' aimed to create competitive markets in already well-functioning electricity systems, in order to maximize economic efficiency and reduce government's role to that of a market referee [30, p. 15]. These measures and the assumptions underlying them were transmitted to non-OECD countries by development banks and consultants, usually with extensive reference to the deregulation experiences of countries such as the US, England, Wales, and Norway (Chile was the lone developing country frequently cited as a model) [27,31]. The language and modalities of the standard prescription were incorporated into reform policies, despite mismatches with the expectations and capabilities of the reforming countries. By the mid-1990s, non-OECD reforms, if not always following a standard prescription, certainly drew from a standard menu. Typical elements of this menu are shown in [Table 4](#).

The prescriptive nature of the electricity reforms urged on non-OECD countries is illustrated by a well-known 'scorecard' published by the World Bank in 1999 ([Table 5](#), results discussed in Section 6) [32]. In addition to being a snapshot of the reform process, the scorecard and accompanying report indicate a high degree of uniformity in expectations about reform goals and processes. Privatization and competition were treated as the ultimate objectives, regardless of differences in starting point between developing and industrialized countries; for example, Independent Power Producers (IPPs) were discussed as a 'Trojan Horse strategy' deployed en route to more extensive reforms [32, p. 19]. The report warned that privatization of generation and distribution were 'required in order to make a major improvement in the performance of the sector' [32, p. 16]. It also described 'an optimal sequence of steps,' deviation from which would 'likely lead to less effective reform,' regardless of differences in conditions or motivations among non-OECD countries [32, p. 18]. (This progression appears in [Table 5](#)'s sequence of key reforms, from left to right). While other World Bank analyses did emphasize locally adapted reforms, such nuances were often lost on the energy ministries, business interests, and foreign advisors who wrote or influenced reform legislation.

Whatever might be said of the standard menu/scorecard approach, its focus was clearly financial. Societal concerns such as access, service, social pricing, and environment, while often featured during legislative debates, were not among the priorities when it came to actual reform design. Typically, the technical committees that designed and implemented reforms treated these as secondary issues, best dealt with after reforms were completed [33]. The sidelining of these issues in the standard menu has often been reflected in the reform policies actually adopted.

Table 4  
Common elements of electricity reform

Policy dimension	Key features
Corporatization	Separate utility from ministry Create clear accounting framework Install private management (common in Africa)
Commercialization	Cost recovery in pricing Reduce or eliminate subsidies Enforcement of collections
Energy law	Legally mandate restructuring Legally permit private participation/ownership Legally permit foreign participation/ownership/imports
Regulator	Remove regulatory function from ministry Create independent regulator Legally define scope, authority, methods
Independent power producers	Create by privatizing state utility generation Greenfield development Power purchase agreements
Restructuring	Vertical and/or horizontal unbundling Create independent transmission authority/company Separate profitable parts for sale to private investors
Privatization	Outright sale Stock sale Joint venture
Competitive markets	Single buyer Bilateral forward contracts Cost-based pool Bid-based pool

## 6. Reform trends

The World Bank scorecard described the progress of electricity reform in developing and transition countries in 1998. Of 115 countries surveyed, in less than a decade some 57% had undertaken at least one of the 'key reforms' listed. About two-fifths had corporatized their state utilities or contracted with IPPs; about one-third had passed new electricity laws, established independent regulators, or restructured their power sectors; and about one-fifth had fully or partially privatized state-owned generation or distribution. There was a strong regional distribution of reforms: the most extensive had been carried out in Latin America, the least in Africa, with Asia and Eastern Europe in between.

Table 5  
Developing countries taking key reform steps in the power subsector, 1998 (Sample of 115)

Corporatize	Pass a new electricity law	Establish regulator	Independent power producers	Restructure	Privatize generation	Privatize distribution
51 (44%)	38 (33%)	33 (29%)	46 (40%)	40 (35%)	24 (21%)	21 (18%)

Source: ESMAP, Global energy sector reform in developing countries: a scorecard. Report 219/99. Washington, DC: Energy Sector Management Assistance Program, World Bank; 1999.



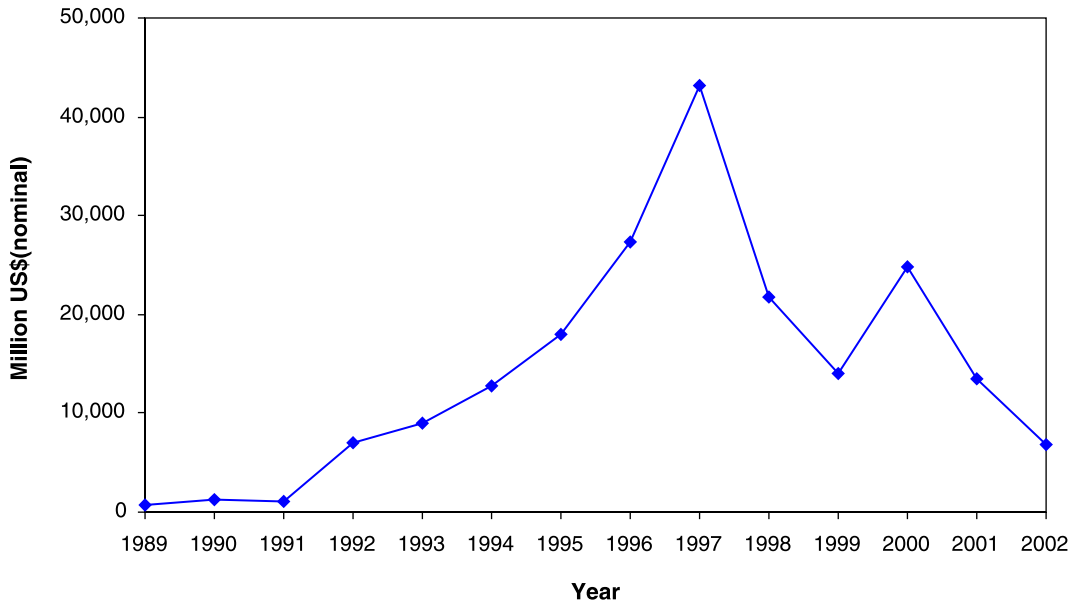


Fig. 1. Foreign direct investment (FDI) in non-OECD power sectors, 1989–2002. Data Source: World Bank. Private participation in infrastructure database, 2003. See also: <http://ppi.worldbank.org>.

This was reflected in privatization, which had occurred in 40% of Latin American countries surveyed, and only 4% of those in Africa.

The scorecard survey was taken at an important moment in the electricity reform process worldwide, namely the Asian financial crisis of 1997–1998. The crisis had two opposite effects on reform. In Asia, a number of countries (South Korea, Thailand, Indonesia, and the Philippines) were compelled to initiate or accelerate electricity reforms as a consequence of IMF and World Bank conditions attached to macroeconomic stabilization loans.<sup>1</sup> On the other hand, the Asian crisis triggered a steep decline in foreign direct investment in non-OECD power sectors. As seen in Fig. 1, investors responded to the new openings provided by reforms with growing enthusiasm, in 1997 reaching a peak of over \$40 billion a year, an amount equal to all worldwide development bank lending for all economic sectors combined; this appeared to validate World Bank advice that countries must and should turn to the private sector for major capital investment. Yet the same year marked an inflection point in the FDI curve, from which it plummeted nearly to pre-reform levels, where it currently remains. There may be multiple causes for this phenomenon—including the Asian crisis, the global investment climate, and investor experiences—but regardless of origins, continued low levels of FDI are an important reality of electricity reform today.

Fig. 2 illustrates how private investment in non-OECD electricity was divided by region during the 1990s. Out of \$180 billion invested worldwide, \$80 billion went to Latin America and \$55 billion to East Asia; together these two regions comprised 75% of the total. South Asia and the former Soviet bloc countries of Eastern Europe and Central Asia received less than \$20 billion each, and Sub-Saharan Africa by far the least, less than \$4 billion. Fig. 2 also illustrates what purposes

<sup>1</sup> See government Letters of Intent to IMF at <http://www.imf.org/external/np/loi/mempub.asp>.

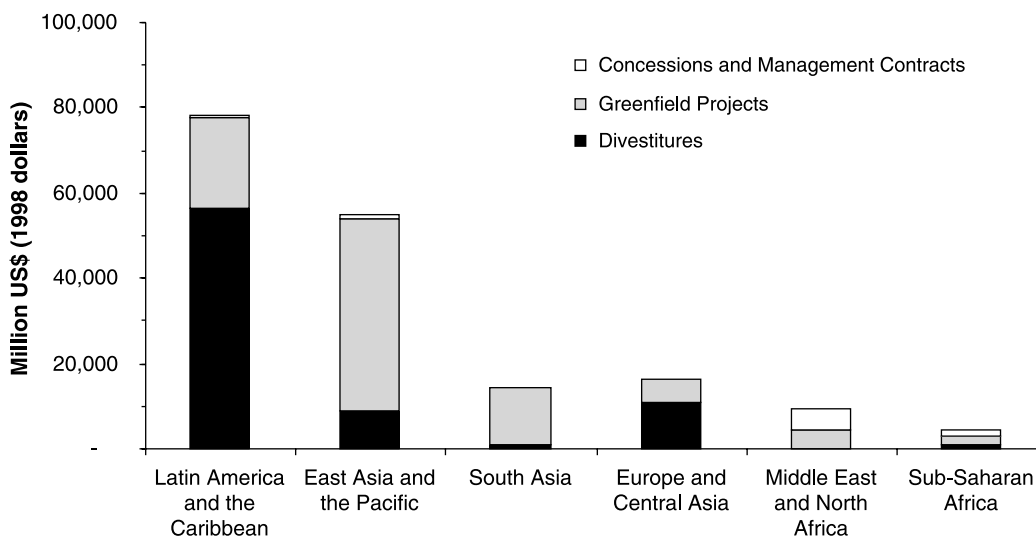


Fig. 2. Private investment in non-OECD energy projects, 1990–1999. Data Source: World Bank. Private participation in infrastructure database, 2003. See also: <http://ppi.worldbank.org>.

private capital was used for, reflecting the regional reform characteristics indicated in the World Bank scorecard. In Latin America and Eastern Europe, investment mostly went to privatization of existing state assets in the power sector; in Asia, to greenfield IPP projects; and in Africa, to privatization and private management contracts.

In addition to the downturn in FDI, developments in electricity deregulation in the OECD countries, which had been held up as a model for the developing world, have had a significant effect on non-OECD reforms. The impact of the California electricity crisis on government and public confidence in electricity reform was felt everywhere and can hardly be overestimated. As one Chinese power official remarked, “California’s crisis warned us that we should be very cautious when undertaking the reforms and consider all the circumstances” [34]. Other international developments that raised doubts about reform policies were price spikes and evidence of market failures in high-profile competitive experiments such as the UK, Norway, Ontario, and Alberta [35]; the collapse of Enron and Arthur Andersen, two of the most zealous missionaries of electricity reform in the developing world; and the blackouts of 2003 in North America and Europe, which raised concerns about the ability of electricity markets to coordinate reliability and long-term planning [36,37].

Experiences within non-OECD countries themselves have also altered the course of reforms. In Asia and elsewhere in the mid-1990s, foreign IPPs were lured by generous power purchase agreements that placed most risk on the host governments. When the Asian crisis struck, countries such as Malaysia, Thailand, and the Philippines were stuck with expensive take-or-pay contracts, often denominated in hard currency [33 (p. 80–81), 38 (p. 1068)]. When honored, these contracts further degraded the finances of state utilities; when broken or renegotiated, they undermined the confidence of investors. IPPs also proved a political liability in a number of countries. As the World Bank scorecard noted, less than half the countries that had introduced IPPs had a regulatory framework in place at the time, which inevitably led to abuses and public suspicion. The Enron IPP at Dabhol, India, became a lightning rod for public protest on the grounds of high cost, lack of transparency, and resentment of US government pressure on Enron’s

behalf [39]. The Paiton and Tanjung Jati IPPs in Indonesia were protested as corrupt deals favoring cronies of the Suharto family [40, p. 77–82]. The Prachuab Kirikhan IPP projects in Thailand were halted by public protests against their anticipated environmental impacts [41, p. 530–532]. In Asia, Latin America, and Eastern Europe, privatization was often vigorously opposed by labor unions and incumbent state utilities on employment and public interest grounds; in Africa, utility workers opposed private management contracts. In some countries, such as Argentina and Bolivia, where privatization per se proceeded smoothly enough, electricity reform was caught up in public unhappiness with the outcomes of economic reform in general (see Bolivia case study in Section 7) [42–44].

Currently, electricity reform in non-OECD countries is very much a process in flux. Some countries have completed the transition to market-based systems, but in many more reform is a work in progress, often moving much slower, or in a different direction, than originally anticipated. To be sure, the changes identified in the World Bank's scorecard have continued—electricity laws have been passed, industries restructured, regulators established, IPP plants built, and state utilities privatized. In many countries, tariffs have approached commercial levels for the first time, and industrial consumers have the right to direct access or self-generation. At the same time, however, in many cases IPP contracts have been broken, foreign investors have pulled out, privatization plans have been stalled and in a few cases reversed, and some unbundled utilities have been rebundled. Realities often do not correspond to new laws on the books, and competent independent regulation is rare. Bid-based competitive power pools are on the very distant horizon for most countries; highly managed markets, single buyer arrangements, and regulated tariffs remain the order of the day. Many national electricity industries, reformed or not, continue to perform poorly financially and operationally. For most countries, it is government, not the market, that continues to hold the commanding heights of the sector.

## 7. Case studies of electricity reform

Electricity reform in developing and transition countries has not been a uniform progression toward a common outcome, but an irregular process that involves complex interactions between state and market elements. It is difficult to account for present conditions or to think clearly about the future without considering the process itself, which has frequently had great influence on outcomes. This is best seen in the context of individual countries. Below we describe electricity reform in five brief case studies: Bolivia, Ghana, India, Poland, and Thailand. While no five cases can be perfectly representative, these cases are drawn from the main non-OECD regions, and span a variety of national and sector conditions (see Table 6)<sup>2</sup>. The main findings are summarized in Table 7 at the end of the case studies.

### 7.1. Bolivia

Bolivia's electricity reforms occurred in the context of the Latin American debt crisis. Structural adjustment and austerity measures in the mid-1980s—the world's first experiment with economic 'shock therapy' [45]—reined in hyperinflation (23,000% in 1985) and reversed a negative growth trend, but debt remained high (74% of GDP in 1994). In a second stage of economic reform, the government's strategy

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<sup>2</sup> Poland's energy sector reforms began nearly a decade before it gained OECD membership in 1996.

Table 6  
National and power sector characteristics in five developing and transition countries

Country	Bolivia	Ghana	India	Poland	Thailand
Region	Latin America	Sub-Saharan Africa	South Asia	Eastern Europe	Southeast Asia
Population <sup>a</sup> 2002 (Million)	9	20	1050	39	63
GDP/capita <sup>b</sup> 2002 (US\$ per person)	867	308	486	4905	2014
Population below national poverty line <sup>c</sup> (%)	63%	40%	29%	18%	13%
Electricity access <sup>d</sup> 2000 (% population)	60%	45%	46%	100%	95%
Generating capacity <sup>e</sup> 1990 (GW)	0.6	1.2	71.8	26.8	8.3
Generating capacity <sup>e</sup> 2002 (GW)	1.2	1.2	120.3	29.3	23.2
Main generation fuels <sup>f</sup> 2001 (% generation)	Hydro 55%, Nat gas 45%	Hydro 93%	Coal 78%, Hydro 13%	Coal 97%	Nat Gas 70%, Coal 19%
Transmission and distribution losses <sup>g</sup> (% generation)	17% (1999)	24% (1996)	>30% (2001)	10% (1999)	8% (1999)

<sup>a</sup> Energy Information Administration. World Population, 1980–2002 (Table B.1), International Energy Annual 2002. See also: <http://www.eia.doe.gov/iea/>

<sup>b</sup> World Bank, GDP current US\$, World Development Indicators 2004, See also: <http://worldbank.org/data/wdi2004/index.htm>

<sup>c</sup> UNDP, Human Development Report 2004, See also: [http://hdr.undp.org/statistics/data/index\\_countries.cfm](http://hdr.undp.org/statistics/data/index_countries.cfm); CIA World Factbook 2004, See also: <http://www.cia.gov/cia/publications/factbook/index.html> (Poland data).

<sup>d</sup> International Energy Agency, Chapter 13: Energy and Poverty (Table 13. A1), World Energy Outlook 2002, See also: [www.iea.org/dbtw-wpd/textbase/weo/pubs/weo2002/EnergyPoverty.pdf](http://www.iea.org/dbtw-wpd/textbase/weo/pubs/weo2002/EnergyPoverty.pdf); Provincial Electricity Authority 2002, CS Greacen pers comm. (Thailand data); IEA, Electricity in India, See also: <http://www.iea.org/dbtw-wpd/textbase/nppdf/free/2000/elecindia2002.pdf> (India data).

<sup>e</sup> Energy Information Administration, World Total Electricity Installed Capacity, January 1, 1980–January 1, 2002 (Table 6.4), International Energy Annual 2002, See also: <http://www.eia.doe.gov/iea/>

<sup>f</sup> Energy Information Administration, World Net Electricity Generation by Type, 2001 (Table 6.3), International Energy Annual 2002, See also: <http://www.eia.doe.gov/iea/>

<sup>g</sup> World Bank, T&D losses, World Development Indicators 2002, See also: [http://humandevlopment.bu.edu/dev\\_indicators/show\\_info.cfm?index\\_id=655&data\\_type=1](http://humandevlopment.bu.edu/dev_indicators/show_info.cfm?index_id=655&data_type=1); data for Ghana and India from case study references.

centered on reducing government borrowing, increasing foreign direct investment, and developing natural gas exports. Electricity reform was a component of this strategy [46].

Before electricity reform, generation and distribution were already partly unbundled with diverse ownership (state, private, municipal, and cooperative). Nonetheless, the main player in the sector was the vertically integrated state utility Empresa Nacional de Electricidad (ENDE), which controlled 80% of generation and operated the grid. The system provided satisfactory service, with adequate supply, and was operated efficiently, with low T&D losses by South American standards (13% in 1993) [47]. ENDE was profitable at the time of reforms, with tariffs above cost recovery levels. While able to self-finance ongoing operations, ENDE required public debt financing for major investments [44].

Bolivia's reforms featured privatization of energy sector assets through capitalization,<sup>3</sup> a procedure which after unbundling, half the shares in state enterprises were sold to international investors under

<sup>3</sup> Bolivia was the first country to use capitalization to privatize an electric utility. Capitalization was first proposed for the East German economy by Sinn and Sinn in Jumpstart, 1992.

competitive bidding, with the proceeds retained by the new owner to capitalize future investment. The other half were invested in an old age pension fund (with 2% set aside for employee purchase). By pursuing this approach, the government was able to gain political acceptance among industry, labor unions, and citizen groups who were opposed to outright sale of national assets to foreigners. It also forestalled political opposition by reducing cross-subsidies to poor residential households gradually, using savings in generation to avoid dramatic increases.

A 1994 Electricity Law fully unbundled the sector and created a new public utility regulator outside the energy ministry. ENDE was turned into three private generation companies and a private transmission company. Privatization throughout the sector was essentially complete by 1998. Bolivia's current wholesale market consists of regulated contracts supplemented by a competitive spot market (one of the world's smallest), with distribution utilities required to buy 80% of expected demand on 3-year contracts [48]. These arrangements have so far resulted in significant investment in expansion and upgrades, with more than US\$250 million invested in new generation, \$156 million in distribution, and \$17 million in transmission [48,49].

The World Bank was intimately involved with Bolivia's electricity reform, providing technical advice and financial support, and facilitating private investment. The Technical Group, a committee of industry representatives headed by a World Bank consultant, was responsible for reform design and the rapid implementation of privatization [47]. The process was technocratic, but policies were consistent with the Lozada government's political compromise on the broad outlines of reform. Gradual tariff reform and a substantial pension-fund payoff in 1997 earned public tolerance, at least in comparison to the contentious debate over oil and gas, while electricity privatization was being implemented.

The World Bank considers Bolivia's electricity reforms a success in terms of sector finance and operations, and the government's fiscal goals [47,48]. Reform has not been successful in substantially improving rural service and access, which remains at 25% of the rural population.<sup>4</sup> This problem is a failure of reform design, which did not mandate rural access provisions for privatization contracts, or assign regulatory authority over Bolivia's isolated grids. Still more serious, energy pension payouts have not matched early promises or public expectations, having been paid out at lower than promised levels in some years, and not at all in others [44]. Protests over water privatization and the failure of economic reform to improve living standards in the fall of 2003 led to bloody riots and the president's resignation, and cast doubt on natural gas export plans. In the future, because of the way it is embedded in the larger reform context, it is possible that Bolivia's electricity reforms will be seen as a technical success but a political failure.

## 7.2. Ghana

Ghana's electricity reforms took place in a context of episodic fiscal crises associated with government debt, poor financial performance of state enterprises, and fluctuations in the world price of cocoa, the country's main export [50]. Structural adjustment in the late 1980s reversed a decade of negative growth, but high spending prior to national elections in the 1990s led to a series of fiscal crashes

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<sup>4</sup> 'Rural access' increased from 16 to 25% between 1992 and 2001 (see <http://www.eia.doe.gov/emeu/cabs/bolivia.html>), however, gains resulted from infill of the existing grid near cities rather than new grid extension to rural areas.

marked by high inflation (74% in 1995) [51,52]. Ghana's economic policy became closely tied to World Bank and IMF adjustment and stabilization lending [51,53].

Prior to reform, Ghana's small electricity sector consisted primarily of two state enterprises, the Volta River Authority (VRA) and the Electricity Corporation of Ghana (ECG). VRA owned all generation and transmission, and supplied power to ECG, the main distribution utility. VRA also sold power directly to large industrial consumers and neighboring countries, who paid in hard currency. VRA performed well technically and financially, but ECG did not, with high system losses (>20%) and poor service quality [50,54]. Even after a series of increases, tariffs only recovered one-third of long run marginal costs in 1993. Only 24% of the population had access to electricity in 1993 [54].

Electricity reform began in 1993, triggered by a supply crunch due to rapidly rising demand and to drought, which reduced the output of Ghana's hydro-dominated system (>90% of net generation) [17,55]. When the government approached the World Bank to finance new thermal generation, it was required to increase tariffs, remove barriers to private participation, and plan a comprehensive reform [50,56]. In 1997 the cabinet approved a restructuring plan that would open generation to competition, open transmission access, unbundle VRA, and reorganize distribution as geographically-based concessions to end market segmentation. Small customer (<5 MW) tariffs would remain regulated, while large customers would be served directly by generators. A new grid operator would provide merit-order dispatch and run a balancing market.

This reform plan was never implemented, in part due to opposition by VRA, which argued that unbundling would weaken it as a competitor in the proposed West Africa Power Pool, and by the country's largest consumer, a subsidiary of Kaiser Aluminum, which sought to maintain a sweetheart deal with VRA (1.7 c/kWh for 40% of the country's electricity [57, p. A5]). The plan was also undercut by contradictions between the logic of the power sector and the fiscal logic of reform. Plans to unbundle VRA ran counter to the needs of its joint-venture partnership to build new thermal generation; its American partner (CMS Generation) wanted VRA to be a stable company with maximum assets. Restructuring legislation in Parliament was shunted aside in 2000 and has not been revisited [58, p. 21].

Some other aspects of reform also worked out poorly. A 3-year private management contract with a European company failed to reduce EGC's system losses [59]. In the election-induced fiscal crisis of 1997, the energy ministry announced a 300% tariff increase, which triggered such a national uproar that it was immediately rescinded by the president [50, p. 133]. This crisis did have a positive result in the creation of an independent regulator, PURC, which has raised tariffs but also rejected proposed increases without adequate demonstration of service improvements, imposing a degree of alignment between fees and service [55]. However, electricity access, which was not part of the financially-focused reform agenda, has not significantly improved [50, p. 129]. When Kaiser Aluminum declared bankruptcy in 2001 and pulled its operations out of Ghana, the country lost its largest consumer, and was left with excess capacity and expensive obligations to buy gas-generated thermal power [58, p. 40]. Sector losses continue to strain the national budget, but after a decade of reform, the basic structure of Ghana's power sector remains the same.

### *7.3. India*

Electricity reform has been a component of India's economic liberalization since the early 1990s [33,60,61]. Before reform, ownership and authority in the power sector were divided between central and state governments. The central government generating companies, the National Thermal Power



Corporation (NTPC) and National Hydro Power Corporation (NHPC), which currently own about 30% of generation, are considered efficient, well-managed utilities. Most of India's power sector problems revolve around the poor financial and technical condition of the State Electricity Boards (SEBs), the vertically integrated utilities that own about 60% of generation and operate the distribution system. (Private generators now own about 10% of generation). On average, SEBs recover less than 80% of their operating costs, and have T&D losses estimated at 30% or more, with widespread power theft and unmetered consumption [62,63]. SEB commercial losses reached US\$5 billion in 2001, constituting more than one-fourth of the states' fiscal deficits [62]. A combination of poor service and the high cost of cross-subsidies has led many industrial customers to self-generate, further worsening SEB finances. At the same time, the SEBs are unable to provide electricity to half of the population. In 2000, only 46% of Indians had access to the grid, including 82% of urban residents and 33% of rural residents [63].

The initial stage of reform did not address the problem of SEB finances. In 1991, the government responded to a balance of payments crisis with a package of economic reforms, which included amending the electricity law to encourage IPPs. Believing that capacity expansion to meet projected demand was the sector's highest priority, India provided generous incentives and a fast-track approval process for large IPP projects. By 1996, the government had received 190 project applications representing 75 GW of new capacity and more than US\$100 billion in investment; however, only 15 of these projects advanced to the approval stage, and some that were actually built encountered serious difficulties [60]. The most notorious was Enron's 2 GW gas-fired power plant at Dabhol, in Maharashtra, which became the focus of a popular protest movement [39]. The take-or-pay power purchase agreement, which even the World Bank regarded as being financially unsustainable, was ultimately not honored by the state and central governments. Mired in litigation, the plant has sat idle since 2001.

The second stage of electricity reform involved experiments by individual states, with the intimate involvement of the World Bank and US, UK, Canadian, and Japanese development agencies [64]. In 1996, Orissa became the first state to unbundle its SEB and privatize generation and distribution. Orissa's reforms were designed by World Bank consultants, who focused on rapidly divesting assets, eliminating subsidies, and raising tariffs. In order to attract investors, the transmission company, which remained in public hands, took on the lion's share of joint liabilities in the T&D system. The World Bank created a US\$997 million financing package, the bulk of which went to T&D rehabilitation [65]. Despite this, the privatization attracted few bidders. The Orissa results were poor, though the causes are disputed. The public transmission company was left in dire financial straits. The US company AES, which purchased one of four unbundled distribution utilities, pulled out of Orissa in 2001, complaining of government interference [60]. An official inquiry found that the new distribution companies failed to provide significant new investment, increase collections, or reduce T&D losses [66]. The public experienced substantial tariff hikes without corresponding improvements in service, and government revenues from privatization were not recycled into the power sector for public benefits. A more successful aspect of the Orissa experiment was the creation of an independent regulator, which has been duplicated across India, though with mixed results. Following Orissa, several other states passed similar reforms, but by 2002 distribution privatization had only occurred in Delhi. Some states have sought to reform their SEBs through commercialization rather than privatization.

A third stage of reform is marked by passage of the Electricity Act of 2003, which seeks to replace ad hoc state experiments with a uniform national framework [60]. To reform distribution, the Act requires mandatory metering, punishes power theft, and requires that subsidies must be explicitly paid for out of

state budgets. To satisfy industrial customers, it calls for the phase-out of cross-subsidies and the phase-in of open access, and eliminates licensing requirements for generation. It also includes consumer protection measures and mandates rural electrification, but without specifying funding mechanisms. Where this legislation will lead is unclear, as the fate of electricity reform ultimately resides in the hands of the states. After the surprise defeat of the incumbent party in the election of 2004, in which electricity reform was an important issue, three states announced a policy of providing free electricity to farmers. Clearly, the direction of India's power sector remains a contentious political issue.

#### *7.4. Poland*

Electricity reform was one component of Poland's dramatic post-Cold War transition from socialist to market economy. Early reforms were shaped by a shock-therapy style Economic Transformation Program in which state enterprises were rapidly restructured and placed on a commercial footing [67]. The mixed results of this transformation were reflected in the slow progress of electricity reforms, which changed direction in the late 1990s, when Poland focused on European Union (EU) membership.

Prior to reform, electric power was part of a massively integrated energy sector (along with oil, gas, district heating, and coal, including mining) that accounted for 10% of Poland's GDP and 5% of its workforce [68]. Between 1987 and 1990, electricity was separated from the energy monolith, but remained a vertically integrated industry. The country was fully electrified, supply was adequate to meet demand, and fuel supplies were secure. On the other hand, T&D losses were 19%, and the combination of coal dependence (97% of generation was coal-fired) and inefficient technology produced major environmental impacts. Electricity tariffs were massively subsidized through housing subsidies; tariffs paid by residential consumers recovered only 1% of the cost of supply.<sup>5</sup>

In 1990, the electricity sector was unbundled vertically and horizontally into autonomous state-owned enterprises, with generation dispatched by a new transco, Polish Power Grid Company (PSE). In 1993, all distribution utilities and a number of generators were turned into joint stock companies, which were to be privatized through stock sales (with a limit of 50% on foreign ownership). PSE operated the grid as a single buyer based on power purchase agreements with the generators. After a delay of 5 years, a 1997 law created an independent regulator and nudged the wholesale market from the single-buyer model toward competition. A spot market, setup as a public-private consortium, began operations in 2000.

These gradual moves toward privatization and competition have met only limited success so far. By 2002, only four of 17 generating companies and one of 33 distribution companies had any degree of private ownership, the highest share being 38%; private participation is somewhat greater in combined heat and power plants. Joint venture IPPs have garnered a modest amount of foreign investment. The spot market, which was expected to handle 30% of power transactions, only handled 1% in 2002. Almost all market sales remain in the form of PPAs (80% of them long-term) between PSE and the generators [69].

The most noteworthy recent development has been the reversal of earlier reforms through rebundling and vertical reintegration. Two major new state-owned utilities, PKE (Poludniowy Koncern Energetyczny) and BOT (a holding company for Belchatow, Opole and Turow power plants),

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<sup>5</sup> Calculated by authors from [69–71].



representing almost half of Poland's capacity, have been formed by merging a number of gencos, distcos, and coal mines [72]. This move reflects a growing view in Poland that large, state-supported utilities will be more competitive in a unified EU market than small unbundled companies. Electricité de France has been cited as a role model for consolidation, rather than divestment, of national assets [69].

Average retail tariffs were increased by a factor of 35 in the first 2 years of reform, improving cost recovery and dramatically reducing the cross-subsidy from industry but at a high social cost.<sup>6</sup> Such dramatic tariff increases—in an economy with rising unemployment, falling real incomes, and more than a third of the population in poverty—imposed a serious burden on many families [67,73]. Since 2000, tariffs have again been sharply increased by the new regulator, in tandem with laws permitting the disconnection of customers for non-payment. These measures have raised tariffs to near 90% of full cost recovery, but at a high cost in public support for reforms. The World Bank now considers the lack of social pricing policies to have been key failures of Poland's early reform design [67].

The World Bank was closely involved in Poland's initial stage of reform through its structural adjustment and energy sector lending, advising, and technical support. The Energy Restructuring Group, commissioned by the World Bank and composed of foreign experts and their Polish counterparts, played a central role in reform design and implementation [68]. World Bank influence waned, however, as Poland gained increasing access to capital from European Banks, and became more focused on EU membership, which it gained in 2004 [46]. At the moment, Poland's electricity sector seems to be more driven by meeting EU technical and environmental standards (including a requirement of 7.5% of generation from renewable energy by 2010) and market-opening requirements, than by standard prescription policies embarked on a decade ago.

### 7.5. Thailand

Before reform, Thailand's electricity sector consisted of three state-owned utilities. The Electricity Generating Authority of Thailand (EGAT) owned all grid-connected generation and transmission and supplied power to the Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA), the two distribution utilities serving the greater Bangkok area and the rest of the country, respectively. In general the system provided satisfactory service (with relatively low T&D losses, and about 90% of all villages electrified by 1990) and the utilities were in good financial condition (cost-plus tariff structure) [41,74]. The system expanded rapidly, keeping roughly in step with the Thai economy during a period in which it was one of the world's fastest-growing (mid 1980s–mid 1990s) [75]. However, the large investment budget became a major strain on the government, as the utilities relied primarily on state-guaranteed foreign debt to finance their capital-intensive expansion.

Electricity reform was first proposed in the early 1980s when Thailand took out structural adjustment loans from the World Bank to ease a debt crisis sparked by high oil prices [76]. Due to fierce opposition by labor unions, reform was never seriously attempted until the early 1990s. Supply shortages caused by skyrocketing demand at the end of 1980s, plus the government's massive debt burden due to power sector investment, led to a new push for private participation [41]. In 1992, Parliament authorized the introduction of IPPs, Small Power Producers (renewable and cogeneration), and partial privatization of some of EGAT's thermal generation. The SPP/IPP program and EGAT's privatized subsidiary received

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<sup>6</sup> Calculated by authors from [69,70, Table 2].

strong interest from both foreign and domestic investors [77]. The government wanted further market reforms (the cabinet in 1996 approved a plan to unbundle the power sector in steps) but utilities resisted. However, the precarious financial condition of state enterprises in the wake of the 1997 Asian financial crisis, along with IMF loan conditions requiring privatization of state assets, gave a new impetus to the reform agenda [78]. A ‘Privatization Master Plan’ covering four sectors including energy was approved in 1998. Promising higher efficiency, lower government debt burden, and consumer choice, the master plan called for introduction of wholesale and retail competition, establishment of a power pool, and privatization of utilities [79,80]. In 2000, the cabinet authorized another privatized EGAT subsidiary, a detailed plan for the power pool (to go ‘live’ in 2003), and a draft Electricity Industry Act—which, if endorsed by the Parliament, would provide the legal basis for reform and establish an independent regulator [41,77].

Parliamentary approval never came. The new government that came to power in early 2001 was much more skeptical about neoliberal reform [81,82]. The California energy crisis, nationalist public sentiment, and strong resistance from the utilities slowed and eventually halted liberalization of the industry [41]. Since 2001, reform plans have de-emphasized competition and instead focused on turning EGAT into what Prime Minister Thaksin calls a ‘National Champion’ [41,83]. In this strategy, 30% of EGAT shares are to be sold on the Thai stock market in order to raise capital, so that the monopoly can better compete on the regional playing field against powerful international firms [84]. Resistance from the EGAT labor unions remains strong, however, and as of late 2004, electricity reform in Thailand appears stalled [85].

## **8. Players, perceptions, and politics**

Electricity reform is both an economic and a political process, and outcomes in both spheres depend on the actions of key players. This section considers ways in which the perceptions and motivations of investors, the public, donor agencies, and governments have changed in response to reform experiences, and how these changes in turn have helped to dictate reform outcomes. These changes are summarized in Table 8.

### *8.1. Investors*

During the global economic boom of the 1990s, non-OECD electricity sectors became attractive investment targets. As a US government publication asserted, “Privatization of formerly state-owned electric power assets has opened up enormous investment opportunities. For foreign investors, investment in overseas electricity assets offers opportunities to achieve potentially higher returns and, in many cases, to realize greater growth opportunities than are available at home” [2, p. 37]. As Figs. 1 and 2 attest, the lure of new markets, high returns, and less red tape brought substantial investment to privatizations in Latin America, and to IPPs in Asia, which was ‘expected to lead the way in the level of independent producers activity’ [2, p. 39]. By 2002, however, the number of transactions involving foreign direct investment in electricity had fallen to one-third of their 1997 peak, and the total amount of capital to one-sixth. The fall has been attributed to a combination of factors: international financial crises including those in Asia and Argentina, conditions in international capital markets, and investors’ own experiences with non-OECD power sectors.

Table 7  
Aspects of power sector reform in five developing and transition countries

Bolivia	Ghana	India	Poland	Thailand
<i>Grid description</i>				
Interconnected main urban grid, and isolated grids	Interconnected main urban grid, and isolated grids	Regional grids, with weak interconnections	Interconnected national grid	Interconnected national grid
<i>Pre-reform structure</i>				
National vertically-integrated utility (ENDE), Partly unbundled G&D including national, private, municipal, and cooperative ownership	National G&T utility (VRA), national distribution utility (EGC), highly segmented distribution sector	State-level vertically-integrated utilities (SEBs), national G&T utilities (NTPC, NHPC, NNPC, GRIDCO)	Massively integrated national energy sector (electricity, oil, gas, coal, lignite, heating)	National G&T utility (EGAT), national distribution utilities (MEA and PEA)
<i>Pre-reform sector finance</i>				
ENDE profitable, tariffs above cost recovery, ENDE dependent on public debt for capital, coop tariffs below cost recovery	VRA profitable, EGC unprofitable, tariffs 30% of cost recovery, dependent on public debt for capital	SEBs unprofitable, tariffs 70–80% of cost recovery, subsidized by state budget, high public debt	Service extremely subsidized, coal generation highly subsidized, tariffs only 1% cost recovery, sector finances/prices not independent	EGAT profitable, tariffs above cost recovery, but high public debt
<i>Pre-reform sector operations</i>				
ENDE good service quality, limited rural access	VRA service good, EGC service poor, very limited access	Poor service quality, limited access	Good service quality, universal access, high pollution levels	Good service quality, limited but expanding access
<i>Crisis precipitating national reforms</i>				
Latin American debt crisis	Effects 1980s 'lost decade'	India balance of payments crisis	Post-Cold War transition	Asian financial crisis
<i>Key changes in sector</i>				
1993 Power sector policy letter to World Bank	1994 World Bank requires reform as loan condition	1991 Electricity Amendment	1989 Separation of electricity from energy conglomerate	1992 Electricity Law
1994 Electricity Law, independent regulator	1996 EGC private management contract	1992 Fast-track IPP policy	1990 Unbundling of G&D, state transco PSE formed	1995 EGAT Privatized Subsidiary (EGCO)
1995 ENDE unbundled into three gencos, privatized	1997 Restructuring and privatization plan, regulator formed	1993 World Bank requires reform as loan condition	1993 Gencos and dis-tcos converted to joint stock companies, PSE is single buyer	1996 IPP Law
1996 Spot market established	1998 Short-term IPPs introduced	1995 Orissa Electricity Reform Act	1997 Electricity Law, regulator URE established	1997 Electricity privatization plan, IMF Letter of Intent
1997 Transco privatized	1999 EGC divestiture plan	1996 World Bank funds Orissa unbundling and distribution privatization	1999 URE regulates tariffs	2000 Power Pool and Restructuring Plan

(continued on next page)

Table 7 (continued)

Bolivia	Ghana	India	Poland	Thailand
1998 G&D privatization completed	2001 Reform legislation shelved by parliament	1998 Independent regulator law, implementation left to states 2003 Electricity Act	2000 Spot market formed 2001–2004 Rebundling of PKE and BOT large state utilities	2001 Power Pool abandoned 2003 ‘National Champion’ model, EGAT privatization plan 2004 EGAT privatization postponed
<i>Noteworthy outcomes</i>				
New electricity market functions well, but economic reform package unpopular, in political jeopardy	Private management fails to improve EGC losses; abandonment of restructuring and privatization plan	Orissa distribution experiment a failure; few states restructure SEBs; Enron/Dabhol IPP fiasco; investors leave India	Disappointing private participation; minimal use of spot market; rebundling and reintegration of state utilities	Power pool abandoned; privatization postponed

Sources: See case study references.

A World Bank report published in 2003 reported that more than half of the international investors surveyed were ‘less interested’ in investing in developing country power sectors than they had been before, and that only 6% described themselves as ‘more interested’ [86, p. 4]. More negative than positive experiences were recorded in South Asia, Africa, and Eastern Europe, and more positive than negative in East Asia and Latin America. Many of the positive experiences, however, were in countries with very small electricity systems (<1 GW) such as Guatemala and Jamaica; a majority of firms did not wish to return to such countries as China, India, Pakistan, Indonesia, Argentina, Columbia, and Venezuela [86, p. 6–8]. From the investor perspective, the main reasons for failed investments related to tariff adequacy, payment enforcement, legal foundations for contracts, regulatory frameworks, and political interference on the part of host governments. As the report stated, “Many investment decisions in the 1990s rested on basic assumptions—that collections would increase, that laws would be enforced, that government commitments would be sustained. But in many developing countries these assumptions proved invalid” [86, p. 9]. Notably, a high percentage of investors reported an expectation of returns on equity in excess of 16%, and a preference for non-competitive bidding processes [86, p. 6, 13].

## 8.2. The public—consumers and civil society

Electricity reform in non-OECD countries often met with a measure of initial acceptance among consumers and the general public. In the wake of democratization in the former Soviet bloc and the military dictatorships of Latin America and Asia, many ordinary citizens were willing to accept structural adjustment and austerity as the cost of changing the system, especially if these promised an end to recurring economic crises. They were also prepared to support reforms that addressed the failings of the power system. In many countries electricity was characterized by poor power quality

and intermittent service, limited access for poor and rural people, and pollution and other environmental damage. The public was seldom invited to participate in policy decisions about the sector; discussions were confined to the political arena of high finance. Active public opposition was limited as people waited to see if market reforms would deliver on their promise to alleviate these problems.

This situation has changed in many countries. Since reform began, it has generally led to tariff increases, sometimes very steep over a short period of time, and aggressive collection enforcement measures such as prepaid meters and service disconnections. From dramatic rate hikes in Poland to two million disconnections in South Africa, the improvement of utility cost recovery has often come at the price of public hardship and growing resentment [87, p. 162]. Labor opposition to utility privatization has been very potent in many countries, helping to derail privatization plans recently in Eastern Europe, Thailand, Taiwan, and South Korea. The failure of reform to produce environmental, social equity, and access improvements has resulted in organized opposition movements, ranging from local protests against specific projects to global movements against reform policies [33,88–92].

### *8.3. Multilateral donors*

In the early 1980s, the World Bank became preoccupied with the question of how to finance the rapidly expanding electricity industries of developing countries, and began to warn governments that they must turn to private investors to meet power sector needs [93]. By the end of the decade, these concerns overlapped with the free market development theories of the Washington Consensus, which emphasized ‘divestiture, competition, hard budgets, and financial sector reforms’ [94, p. 5]. The new focus on getting government out of the power business was articulated in the World Bank’s 1993 lending policy, which required commitments to commercialization, privatization, competitive structures, tariff increases, and subsidy elimination as a condition of new loans [25]. A united front developed in the donor world, as these policies were duplicated and reinforced by regional development banks, bilateral aid agencies, and the IMF [26].

Donor views have since begun to change and become more diverse. The Asian and Argentine financial crises disrupted the Washington Consensus, producing major divergences between the World Bank and IMF [23]. The World Bank, while still concerned with finance, has returned to a broader development paradigm that emphasizes social outcomes and backtracks on several aspects of its earlier policies. Private ownership per se has become less important than proper incentives for efficient management; shock therapies that completely eliminate social pricing subsidies are to be avoided [67]. In a 2003 internal review, the World Bank determined that the empirical results of private sector-led electricity reforms were poor [95]. Investors had fled whole regions, and many countries were left with a legacy of financial and political risk. The review concluded that there is no ‘universal blueprint’ for the electricity sector.

### *8.4. Governments*

Governments undertook electricity reform in response to macroeconomic crises, the problems of state utilities, international power sector trends, and World Bank/IMF persuasion. Many of the newly democratic governments of the early 1990s were led by rising liberal business elites, who replaced former military rulers and party bureaucrats [96]. These elites naturally tended to see market reform as a decisive break from the statism of the old guard. As a US government publication on electricity reform noted, “Democratic government and free market economics have been central to these reforms”

[2, p. 39]. In an increasingly globalized financial environment, many governments felt, or were compelled to accept, that the rewards of tapping into the expanding flow of international investment to solve their power sector problems outweighed the risk of abandoning the old state utility model.

After a decade of reform, for many countries the promise of benefits has collided with the complexities and problems of actual experience. Difficulties with IPPs, opposition to privatization from labor and civil society, consumer anger over higher tariffs, and the evident risks of new ways of managing electricity even in wealthy and sophisticated economies such as California have changed the calculus of reform. In the understated comment of one Malaysian scholar regarding reforms in his country, “recent unpleasant events in economies that have adopted the electricity pool mechanism have caused the Government to shelve its earlier plans” [38, p. 1068]. In countries such as Thailand and Poland, a new logic has asserted itself in thinking about state utilities; the prospects of expanding to become regional powers, instead of dismantling them to be purchased by foreign investors, has grown more compelling. Above all, without the international investment flows that had earlier validated their policies, the potential rewards to governments for implementing many reforms formerly on the standard menu are increasingly viewed as not worth the political risk.

## 9. Conclusion

The current status of electricity reform in non-OECD countries is one of mixed outcomes, stalled reforms, and uncertainty. This has led to a widespread rethinking of power sector policy and the underlying assumptions reflected in the World Bank’s 1998 scorecard [33,97–101]. Emphasis on private participation has given way to an accepted role for both public and private ownership. Competition is no longer viewed as a first priority for many countries, until legal foundations, regulation, and the domestic private sector are better developed. Distribution and sound management are seen to rival supply expansion in importance. More than anything, the idea of a uniform prescription itself has lost credibility. Surveying results across a variety of countries and conditions during the last decade, it is possible to identify some general features of an improved approach to reform. These are briefly described below, and contrasted with key elements of existing approaches in [Table 9](#).

### 9.1. Reality-based reform

The main policy challenge ahead is creating reforms that address the most important needs, are based on the actual conditions of the sector, and are consistent with the social and institutional capacities of the country. Standard-menu reforms have often been too ideological in their conception, too rigid in their execution, and too narrowly focused on finance to deal successfully with changing investment conditions, the political complexities of reform implementation, and the combined economic and public benefits functions that an electricity system must serve. Better reform begins with a locally-specific framing of problems and targeting of solutions, not the idealized image of a perfect market.

### 9.2. Strengthening public enterprise

As a rule, finance is critical in non-OECD power sectors, and public funds whether domestic or multilateral cannot provide all the capital required, therefore the private sector must play a significant

Table 8  
Changing perceptions among key players

	Pre-reform perspective	Emerging concerns
Investors	<p>Opening of new markets</p> <p>Good prospects due to surging demand in developing countries</p> <p>Higher returns on investment than in OECD countries</p> <p>Less regulation and red tape in developing world</p>	<p>IPP and other experiences with broken or renegotiated deals</p> <p>Unwarranted government interference</p> <p>Inadequate legal foundation for contract law and enforcement</p> <p>Public opposition to foreign ownership creates environment of political risk</p>
Consumers/public	<p>Service quality already poor, willing to take a chance on reform</p> <p>Environment of democratization, willing to accept some hardship if required in order to change the system</p> <p>Unhappy with pollution, environmental damage, hope reform will help</p> <p>Unhappy with lack of access for poor and rural people, hope reform will help</p>	<p>Tariff increases without comparable improvements in service</p> <p>Alienating emphasis on cost recovery, for example the use of prepaid meters</p> <p>Environmental improvement not a priority of reforms</p> <p>Improving access for poor not a priority of reforms</p> <p>Labor concerned privatization leading to job loss, lower wages</p> <p>Public left out of reform design and decision-making</p>
Donor agencies	<p>Financial focus, need for cost recovery and investment</p> <p>Governments must turn to private investors, donors can't provide the necessary capital</p> <p>Private ownership and competition are essential to reform</p> <p>Subsidies distort the market, should be eliminated</p> <p>Need to break with state-led model, create new market-oriented mindsets</p>	<p>Broader development focus, more discussion of social outcomes</p> <p>Emphasizing private ownership has not always led to successful outcomes</p> <p>Public ownership can be efficient with the right management incentives</p> <p>Recognize a role for targeted subsidies</p> <p>Government still has a major role to play in the power sector</p>
Governments	<p>Fiscal crisis, need to reduce budget deficits</p> <p>FDI is increasing worldwide, can be attracted with favorable conditions</p> <p>Development banks are urging and requiring reform</p> <p>Electricity industries not performing well and/or need more investment than they can self-finance</p> <p>Consultants and economists point to successful reform models in OECD</p> <p>Spirit of democratization, new leaders, departure from statism</p> <p>Rewards of reform appear greater than the risk of departing from state model</p>	<p>FDI no longer flowing freely</p> <p>Consumer anger over higher tariffs</p> <p>Public frustration with neoliberal reforms in general</p> <p>Evidence of risk in reform from OECD experience, e.g. California</p> <p>Bad experience with IPPs</p> <p>State utility growing and becoming a regional power, versus divesting and being gobbled up</p> <p>Greater concern with the risks of reforms</p>

role. Nonetheless, public utilities will continue to be a central feature of non-OECD power sectors for many years to come, as the World Bank has acknowledged in resuming its public power infrastructure lending [100,102]. Therefore it is essential to improve public utility performance. In part, this takes the form of incentives for improved management, efficiency, and cost recovery. But it also means rethinking the tradeoffs involved in weakening public utilities as a side-effect of attracting private investment, such as IPP contracts that worsen public utility finances, and the ring-fencing of profitable public enterprises to prepare them for sale while concentrating unprofitable segments in public hands.

### *9.3. Emphasis on service*

One of the main failings of electricity reform has been a lack of emphasis on service. In many countries, service improvement has not been commensurate with cost recovery; consumers have often seen reforms only in terms of tariff increases and payment enforcement. In some cases this has resulted from assuming long-term lower prices and benefits to consumers as a trickle-down result of reform, and in other cases from a financial focus that ignored consumer concerns altogether; the consequence has often been a loss of public support for reform. Service provision that balances cost recovery with measurable improvements in access, quality, reliability, and affordability needs to be reinstated as the basis of sound commercial operation in the sector. One approach is to incorporate service-based incentives for increasing new connections and for reducing outages, customer complaints, and installation lead-times into private management contracts and regulated performance criteria for utilities.

### *9.4. Effective regulation*

Despite the formation of regulatory bodies in many non-OECD countries, examples of effective power sector regulation are scarce, as indicated by the prevalence of IPP scandals, insider privatization schemes, and tariff regimes that range from inadequate to draconian. A key lesson of this experience is that laws and frameworks alone do not guarantee success. Effective regulators must have the political independence, professional capacity, and financial resources to design and enforce regulations in the public interest. Regulatory capacity does not emerge overnight, but through the long-term development of public institutions, a process undermined by de-emphasizing the public sector in the reform agenda of the 1990s. Nonetheless, regulatory development can and must be accelerated, in part by increasing public accountability. In many cases the focus of regulation must also shift. Where standard-menu reform placed newly-minted regulators in the role of arms-length referees for competitive electricity markets, the actual need in many countries lies more in areas such as tariff design, performance-based regulation, and integrated resource planning. Here, too, regulatory effectiveness will be enhanced by transparent adversarial processes that empower public advocates and provide a counterbalance to vested interests.

### *9.5. Public benefits*

Public benefits such as access, social pricing, and environmental protection, though sometimes discussed during legislative debates, have rarely been included in actual reform design. There is little evidence to date that such benefits trickle down naturally from reform, and in the absence of



Table 9  
Improving electricity reform in developing and transition countries

	Reform Failings and Dilemmas	Recommended Improvements
Reality-based reform	<p>Pre-ordained reform policies drawn from standard menu, poorly matched to conditions and capabilities</p> <p>Reforms focused on narrow, usually financial, goals—private ownership, foreign investment, competition, cost recovery</p> <p>Reform success judged in narrow terms—e.g. cost recovery, investment, supply expansion</p>	<p>Target solutions based on detailed understanding of sector problems, national objectives, and national capabilities</p> <p>Design reforms based on broad long-term goals for sector-financial viability, service, regulation, access, equity, environment</p> <p>Develop evaluation criteria that reflect the full range of sector goals and functions</p>
Stronger public enterprise	<p>Bias against government in reform rhetoric and policies; assumption that public institutions are a lost cause and privatization is the end goal of reform</p> <p>Unbundling and ring-fencing commercial components of public enterprises in ways that undermines finances and objectives of remaining public-sector components</p> <p>Costly, non-transparent IPP contracts doing long-term damage to public utility finances, undermined investor and public confidence, and limited future policy options</p>	<p>Assume ongoing state role and mixed public–private power sector; focus on improving efficiency, accountability, and transparency of both public and private institutions</p> <p>Develop integrated planning; require ring-fencing proposals to maintain the finances and capacities of components left outside the ring-fence</p> <p>Reinstate public sector power lending, develop national regulatory capacity, require transparent competitive bidding for IPPs, develop and enforce IPP contract accountability standards</p>
Emphasis on service	<p>Unbalanced consumer contract: tariff increases and payment enforcement not compensated by improvements in service</p> <p>Discarding subsidies as uneconomic, ignoring the role well-designed subsidies can play in improving commercial operation</p> <p>Customer service equated to billing, strict focus on revenues to the exclusion of consumer concerns</p>	<p>Add measurable service improvements to utility performance criteria (e.g. new connections, unplanned outages, customer complaints, meter installation lead-time)</p> <p>Design and implement effective social subsidies for different contexts (e.g. lifeline tariffs, basic needs allowances, connection cost credits)</p> <p>Monitor and address service quality, affordability, other consumer concerns (e.g. public hearings, consumer surveys, representation on boards, focus groups)</p>
Effective regulation	<p>Cost of service regulation often rewards utility inefficiency</p> <p>Narrow focus on laws and policy frameworks in the design and establishment of regulatory body</p> <p>Narrow regulatory focus on tariffs and financial dimensions to the exclusion of other public interests in the power sector</p> <p>Regulatory process often dominated by experts and those with vested financial interests</p>	<p>Develop performance-based regulation framework (PBR)</p> <p>Develop institutional context and funding sources that make regulator independent, competent, and accountable to public</p> <p>Expand regulatory purview to include broader public interests in the sector (e.g. access, equity, environment); develop integrate resource planning framework</p> <p>Emphasize broad stakeholder involvement in planning and decision-making</p>

*(continued on next page)*

Table 9 (continued)

	Reform Failings and Dilemmas	Recommended Improvements
Public benefits	Public benefits ignored, treated as secondary, or assumed to trickle down from increased economic efficiency Reform leads to loss of financing mechanisms for public benefits such as rural service and grid extension	Make social and environmental goals explicit components of reform design from the beginning Recoup lost financing from donors; institute public benefits charges; build public benefits into performance criteria
Social legitimacy	Public sees reform as fostering corruption, non-transparent dealings, clientelism, nepotism, looting of public assets  Public seeing reforms as failing to serve their interests as consumers or citizens, focused only on cost recovery  'Accountability' understood narrowly as responsibility toward investors and shareholders	Democratize regulation and policy-making, require transparency, accountability, and public participation in sector planning and operations  Link cost recovery to service improvement; design reforms to produce public benefits; involve consumers and address their concerns (e.g. utility focus groups, dispute resolution)  Broaden concept of accountability to include consumers and the public

countervailing policies the economic logic of reform can easily work against them. It is also not clear that reductions in government expenses arising from reform are in fact reallocated to public benefits, as sometimes claimed during reform debates. If social equity and greener power production are to result from reform, they must be included in reform design from the outset, with earmarked funding and performance incentives.

### 9.6. *Social legitimacy*

While electricity reform is an economic process, it is also unavoidably social and political. To be successful, it requires a measure of public acceptance, which rests on public perceptions of costs and benefits, promises kept and broken, and basic fairness and honesty. Reforms in many countries currently risk failing the test of social legitimacy on one or more counts. In some, tariff increases and payment enforcement outpace consumer service and public benefits. In others, idealized reform goals and models are outweighed by the corruption and non-transparent dealings that occur beneath the radar screen of formal policy. In still others (for example, the case of Bolivia described earlier in this paper), electricity reform may succeed in policy terms but fail politically if the public views it as part of a larger package of broken economic development promises. The consequences of reforms lacking social legitimacy have been expressed in different ways, from power theft and vandalism to protest movements and electoral politics. On the other hand, social legitimacy stands to be enhanced by pursuing the approaches described above—from reality-based models to emphasis on service to effective regulation—and not least by actively involving the public in the reform process, to increase both its input and its stake in successful outcomes (Table 9).

## Acknowledgements

The authors thank Amol Phadke, Margaret Torn, Chris Greacen, and Navroz Dubash for valuable comments and feedback. We also thank C.K. Woo for his helpful review and suggestions. Chom Sangarasri Greacen provided extensive comments and contributions to the Thailand case study. Kazim Saeed was a source of numerous reform discussions and contributions to the Ghana case study. R.G. acknowledges the support of the Link Foundation Energy Graduate Fellowship and the Energy Foundation.

## References

- [1] APERC. Energy investment outlook for the APEC region. Tokyo: Asia Pacific Energy Research Centre; 2003.
- [2] EIA. Privatization and the globalization of energy markets. Washington, DC: Energy Information Administration, US Department of Energy; 1996.
- [3] IEA. World energy investment outlook 2003. Paris: International Energy Agency; 2003.
- [4] Salameh MG. Quest for middle east oil: the US versus the Asia-Pacific region. *Energy Policy* 2003;31(11):1085–91.
- [5] Harrison SS. Gas and geopolitics in Northeast Asia: Pipelines, regional stability, and the Korean nuclear crisis. *World Policy J* 2003;19(4):23–36.
- [6] ESMAP. Development of regional electric power networks, report no. 17339. Washington, DC: Energy Sector Management Assistance Program, World Bank; 1994.
- [7] Charpentier J, Schenk K. International power interconnections. Public policy for the private sector note no. 42. Washington, DC: World Bank; 1995.
- [8] APERC. Power interconnection in the APEC region. Tokyo, Japan: Asia Pacific Energy Research Center; 2000.
- [9] Streets DG. Environmental benefits of electricity grid interconnections in Northeast Asia. *Energy* 2003;28(8):789–807.
- [10] Reid WV, Goldemberg J. Developing countries are combating climate change. *Energy Policy* 1998;26(3):233–7.
- [11] Cao X. Climate change and energy development: implications for developing countries. *Resour Policy* 2003;29(2003): 61–7.
- [12] Vrolijk C, editor. Climate change and power: economic instruments for European electricity. London: Earthscan; 2001.
- [13] Chow L, editor. Special edition on themes in current Asian energy. *Energy Policy* 2003;31(11):1047–178.
- [14] Karekezi S, Mapako M, Teferra M, editors. Special edition on improving modern energy services for rural and urban poor of Africa. *Energy Policy* 2002;30(11–12):909–1143.
- [15] Suding PH. Opening up and transition, success and problems: financing and reforms of the electric power sector in Latin America and the Caribbean. *Energy Policy* 1996;24(5):437–45.
- [16] Von Hirschhausen C, Opitz P. Power utility re-regulation in East European and *cis* transformation countries (1990–1999): an institutional interpretation. Research paper. Cambridge, MA: Harvard Electricity Policy Group, Harvard University; 2001.
- [17] EIA. International energy annual 2001. Washington, DC: Energy Information Administration, US Department of Energy; 2002.
- [18] UN. World energy supplies in selected years, 1929–1950. New York: United Nations; 1952.
- [19] Dunkerly J, Jhirad D, editors. Special edition on financing the energy sector in developing countries. *Energy Policy* 1995;23(11):927–1007.
- [20] Jhirad D. Power sector innovation in developing countries: Implementing multifaceted solutions. *Annu Rev Energy Environ* 1990;15:365–98.
- [21] Dunkerly J. Financing the energy sector in developing countries: context and overview. *Energy Policy* 1995;23(11): 929–39.
- [22] Williamson J. The political economy of policy reform. Washington, DC: Institute for International Economics; 1994.
- [23] Stiglitz JE. Globalization and its discontents. New York: Norton; 2002.
- [24] Watts M. Development II. The privatization of everything. *Prog Hum Geography* 1994;18(3):371–84.

- [25] World Bank. The World Bank's role in the electric power sector: policies for effective institutional, regulatory, and financial reform. Washington, DC: World Bank; 1993.
- [26] ADB. Bank policy initiatives for the energy sector. Manila, Philippines: Asian Development Bank; 1994.
- [27] Bacon RW, Besant-Jones J. Global electric power reform, privatization and liberalization of the electric power industry in developing countries. *Annu Rev Energy Environ* 2001;26:331–59.
- [28] Izaguirre AK. Private participation in the electricity sector—recent trends, note no. 154. Washington, DC: World Bank; 1998.
- [29] Stiglitz JE. The roaring nineties: a new history of the world's most prosperous decade. New York: Norton; 2003.
- [30] Hunt S. Making competition work in electricity. New York: Wiley; 2002.
- [31] Bates RW. Bulk electricity pricing in restructured markets: lessons for developing countries from eight case studies. Washington, DC: World Bank; 1997.
- [32] ESMAP. Global energy sector reform in developing countries: a scorecard, report no. 219/99. Washington, DC: Energy Sector Management Assistance Program, World Bank; 1999.
- [33] Dubash NK, editor. Power politics: equity and environment in electricity reform. Washington, DC: World Resources Institute; 2002.
- [34] AsiaInfo. China: slowdown on power reform. In: AsiaInfo daily China news; 26 April 2001.
- [35] Woo CK, Lloyd D, Tishler A. Electricity market reform failures: UK, Norway, Alberta and California. *Energy Policy* 2003;31(11):1103–15.
- [36] Lerner E. What's wrong with the electric grid? *Ind Physicist* 2003;9(5):8–13.
- [37] Yeh E, Lewis J. State power and the logic of reform in China's electricity sector. *Pacific Affairs* 2004;77(3):437–65.
- [38] Jaafar MZ, Kheng WH, Kamaruddin N. Greener energy solutions for a sustainable future: issues and challenges for Malaysia. *Energy Policy* 2003;31(11):1061–72.
- [39] Mehta A. Power play: a study of the enron project. Mumbai: Orient Longman Ltd; 1999.
- [40] Seymour F, Sari AP. Indonesia: electricity reform under economic crisis. In: Dubash NK, editor. Power politics: equity and environment in electricity reform. Washington, DC: World Resources Institute; 2002.
- [41] Greacen CS, Greacen C. Thailand's electricity reforms: privatization of benefits and socialization of costs and risks. *Pacific Affairs* 2004;77(3):517–42.
- [42] Bouille D, Dubrovsky H, Maurer C. Argentina: market-driven reform of the electricity sector. In: Dubash NK, editor. Power politics: equity and environment in electricity reform. Washington, DC: World Resources Institute; 2002.
- [43] Bouille D, Wamukonya N. Power sector reforms in Latin America: a retrospective agenda. In: Wamukonya N, editor. Electricity reform: social and environmental challenges. Roskilde, Denmark: United Nations Environment Programme; 2003.
- [44] Barja G, Urquiola M. Capitalization and privatization in Bolivia: an approximation to an evaluation. Cholula, Mexico: Institute of Public Policy and Development Studies; 2003.
- [45] Yergin D, Stanislaw J. The commanding heights: the battle between government and the marketplace that is remaking the modern world. New York, NY: Simon & Schuster; 1998.
- [46] World Bank. Bolivia: structural reforms, fiscal impacts, and economic growth, report no. 13067-BO. Washington, DC: World Bank; 1994.
- [47] ESMAP. Bolivia restructuring and capitalization of the electricity supply industry: an outline for change, report no. 21520. Washington, DC: Energy Sector Management Assistance Program, World Bank; 1995.
- [48] ESMAP. Introducing competition into the electricity supply industry in developing countries: lessons from Bolivia, report no. 003/91. Washington, DC: Energy Sector Management Assistance Program, World Bank; 2000.
- [49] EIA. An energy overview of bolivia: energy information administration US Department of Energy. See also: <http://www.fe.doe.gov/international/bolvoer.html>
- [50] Edjekumhene I., Dubash NK. Ghana: achieving public benefits by default. In: Power politics: Equity and environment in electricity reform. Dubash NK. editor. Washington, DC: World Resources Insstitute; 2002.
- [51] World Bank. Ghana country assistance strategy, report no. 20185-GH. Washington, DC: World Bank; 2000.
- [52] KapurM I, Hadjmichael MT, Hilber P, Szymczak P. Ghana: adjustment and growth, 1983–1991. Occasional paper no. 86. Washington, DC: International Monetary Fund; 1996.
- [53] World Bank. Ghana second economic reform support operation credit project, implementation completion report, report no. 26744. Washington, DC: World Bank; 2003.

- [54] World Bank. Staff appraisal report, republic of Ghana, national electrification project. Washington, DC: World Bank; 1993.
- [55] Opum M, Turkson JE. Power sector restructuring in Ghana reforms to promote competition and private sector participation. In: Turkson JE, editor. Power sector reform in Sub-Saharan Africa. New York: St Martin's Press; 2000.
- [56] World Bank. Ghana thermal power project. Staff appraisal report. Washington DC: World Bank; 1995.
- [57] MOME. Energy sector development program (1996–2000). Accra, Ghana: Ministry of Mines and Energy; 1996.
- [58] ECA. Ghana power sector review of reform program, submitted to the ministry of energy in Ghana. London, UK: Economic Consulting Associates Limited; 2003.
- [59] World Bank. Ghana national electrification project implementation completion report, report no. 22417. Washington, DC: World Bank; 2001.
- [60] Kale SS. Current reforms: the politics of policy change in India's electricity sector. *Pacific Affairs* 2004;77(3):467–91.
- [61] Phadke A, Rajan SC. Electricity reforms in India: not too late to go back to the drawing board. *Econ Political Wkly* 2003; 38(29).
- [62] Indian Planning Commission. Annual report (2001–2002) on the working of state electricity boards and electricity departments. New Delhi: Government of India; 2002.
- [63] IEA. Electricity in India: providing power for the millions. Paris: International Energy Agency; 2002.
- [64] Dubash N, Rajan SC. Power politics: the process of India's power sector reform. *Econ Political Wkly* 2001;36(35): 3367–90.
- [65] Dubash NK, Rajan SC. India: electricity reform under political constraints. In: Dubash NK, editor. Power politics: equity and environment in electricity reform. Washington, DC: World Resources Institute; 2002.
- [66] Kanungo Committee. Report of the committee on power sector reforms in Orissa. Bhubaneshwar, Orissa: Government of Orissa; 2001.
- [67] World Bank. Poland country assistance review, report no. 16495. Washington, DC: Operations Evaluation Department, World Bank; 1997.
- [68] ESMAP. Poland energy sector restructuring program, volume 1: main report, report no. 153/93. Washington, DC: Energy Sector Management Assistance Program, World Bank; 1993.
- [69] Krishnaswamy V, Stuggins G. Private sector participation in the power sector in Europe and Central Asia: lessons from the last decade. World Bank working paper no. 8. Washington, DC: World Bank; 2003.
- [70] IEA. Energy prices and taxes, quarterly statistics, second quarter. Paris: International Energy Agency; 2003.
- [71] Lieberman I, Gobbo M. Privatization practice note, Europe and Central Asia region. Washington, DC: World Bank; 2003.
- [72] EIA. North Central Europe Energy Information Administration, US Department of Energy, Washington, DC; 2004. See also: <http://www.eia.doe.gov/emeu/cabs/visegrad.html>
- [73] Albouy Y. Poland review of private sector development in energy. Washington, DC: World Bank; 2001.
- [74] Escay JR. Summary data sheets of 1987 power and commercial energy statistics for 100 developing countries. Washington, DC: World Bank; 1990.
- [75] Phongpaichit P, Baker C. Thailand's boom and bust. Chiang Mai, Thailand: Silkworm Books; 1998.
- [76] World Bank. Thailand: issues and options in the energy sector. Washington, DC: World Bank; 1985.
- [77] NEPO. Electricity supply industry reform and Thailand power pool. Bangkok: National Energy Policy Office, Royal Thai Government; 2000.
- [78] Government of Thailand. Letter of intent to IMF; 1997. See also: <http://www.imf.org/external/np/loi/081497.htm>
- [79] SEPC. Master plan for state enterprise sector reform. Bangkok, Thailand: State Enterprise Privatization Commission, Royal Thai Government; 1998.
- [80] NEPO. Privatisation and liberalisation of the energy sector in Thailand. Bangkok: National Energy Policy Office, Royal Thai Government; 1999.
- [81] Bowden, J. Thai election promises add hurdle to reform. In: Dow Jones Asian power. February 21; 2001.
- [82] Bangkok Post. State firms won't be sold off, says Thaksin. In: Bangkok post newspaper. July 10; 2003.
- [83] Boston Consulting Group. Developing a national strategy for the Thai energy sector: draft technical proposal document. Bangkok: Ministry of Energy, Royal Thai Government; 2003.
- [84] The Nation. PM pressing for EGAT IPO this year. In: The nation newspaper. Bangkok, Thailand. March 14; 2003.
- [85] Arnold W. General strike threatened over Thai utility proposal. In: New York times. April 30; 2004.

- [86] Lamech R, Saeed K. What international investors look for when investing in developing countries: results from a survey of international investors in the power sector. Washington, DC: World Bank; 2003.
- [87] McDonald DA, Pape J. Cost recovery and service delivery in South Africa. Cape Town: Human Sciences Research Council; 2002.
- [88] Palast G, Oppenheim J, MacGregor T. Democracy and regulation: how the public can govern essential services. London: Pluto Press; 2003.
- [89] Tellam I, editor. Fuel for change: World Bank energy policy, rhetoric versus reality. London: Zed Books; 2000.
- [90] Martin B. In the public interest? Privatization and public sector reform. London: Zed Books in association with Public Services International; 1993.
- [91] McDonald D, Pape J, editors. Cost recovery and the crisis of service delivery in South Africa. London/New York: HSRC Publishers/Zed Books; 2002.
- [92] Byrne J, Glover L, Lee H, Wang YD, Yu JM. Electricity reform at a crossroads: problems in South Korea's power liberalization strategy. *Pacific Affairs* 2004;77(3):493–516.
- [93] World Bank. The energy transition in developing countries. Washington, DC: World Bank; 1983.
- [94] World Bank. Bureaucrats in business: the economics and politics of government ownership. Washington, DC: World Bank; 1995.
- [95] Dominguez R, Manibog F, Wegner S. Power for development: a review of the World Bank group's experience with private participation in the electricity sector. Washington, DC: Operations Evaluation Division, World Bank; 2003.
- [96] Przeworski A. Democracy and the market: political and economic reforms in Eastern Europe and Latin America. Cambridge: Cambridge University Press; 1991.
- [97] Williams JH, Dubash NK, editors. Special issue on the political economy of electricity reform in Asia. *Pacific Affairs* 2004;77:3.
- [98] Jamasb, T. Reform and regulation of the electricity sectors in developing countries, report no. DAE working paper 0226. Cambridge: University of Cambridge; 2002.
- [99] Manibog FR. Power for development: a review of the World Bank group's experience with private participation in the electricity sector. Washington, DC: World Bank; 2003.
- [100] World Bank. Public and private sector roles in the supply of electricity services. Washington, DC: World Bank; 2004.
- [101] Wamukonya N. Power sector reform in developing countries: mismatched agendas. *Energy Policy* 2003;31(12): 1273–89.
- [102] World Bank. Infrastructure is once again part of the World Bank's mainstream business-interview with World Bank executive director Carole Brookins. *Transition newsletter*; 2003.