

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

**POLICY ALTERNATIVES IN REFORMING POWER  
UTILITIES IN DEVELOPING COUNTRIES:  
A CRITICAL SURVEY**

*Alberto Gabriele*

No. 168  
February 2004

**DISCUSSION PAPERS**



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*\* The author is grateful to his colleague, Mehdi Shafaeddin, Officer-in-Charge of the Macro-economic and Development Policies Branch and Coordinator for ECDC of UNCTAD's Division on Globalization and Development Strategies for his comments and suggestions. The author, however, remains solely responsible for any shortcoming in this study. He also wishes to express his gratitude to the anonymous referee for the useful observations regarding the contents of the paper, and to Talvi Laev for her editorial assistance.*

UNCTAD/OSG/DP/2004/2

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\* Fax: (41 22) 907 0274; e-mail: [mdpb-ed.assistant@unctad.org](mailto:mdpb-ed.assistant@unctad.org).

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# POLICY ALTERNATIVES IN REFORMING POWER UTILITIES IN DEVELOPING COUNTRIES: A CRITICAL SURVEY

*Alberto Gabriele*

*United Nations Conference on Trade and Development*

## *Abstract*

*This paper examines the policy alternatives faced by developing countries in their endeavours to preserve and develop their electricity and gas systems, two service-oriented industries that – along with oil and coal – provide the bulk of the energy supply in both developed and developing countries. Even in very poor countries, industrially generated energy is indispensable for carrying out most economic activities. Therefore, Governments traditionally recognize that the supply of gas and electricity entails a fundamental public service dimension. Chapter I presents and defines the issues of liberalization, deregulation and privatization of energy utilities, and it attempts to locate energy reforms in a broader historical framework in which developing countries' Governments have faced increasing financial hardship. Chapter II reviews some experiences in energy sector reforms, focusing on some of the largest semi-industrialized countries in Latin America and Asia. A few remarks on the advisability of a flexible approach to reforming energy regimes in developing countries conclude the paper.*

## INTRODUCTION

This paper examines some aspects of the policy alternatives faced by developing countries in their endeavours to develop and enhance their energy systems, keeping in mind the ongoing multilateral trade negotiations. The focus is on electricity and gas, which, along with oil and coal, provide the bulk of the industrially generated energy supply to enterprises and households in both developed and developing countries. It is well known that the vast majority of the population in least developed countries (LDCs), and hundreds of millions of poor inhabitants of non-LDC developing countries do not have access to industrially generated energy, especially in rural areas. Even in very poor developing countries, the few existing export-oriented economic activities, such as tourism or the production and transportation of agricultural or mining commodities, cannot function without a minimum supply of industrially generated energy. Therefore, industrially generated energy is indispensable for carrying out virtually all “modern”<sup>1</sup> productive and consumption activities, especially tradeable ones.<sup>2</sup> Governments have traditionally recognized that, because of its crucial enabling function, the supply of gas and electricity has a fundamental public-service dimension, quite independently from the property regime and market structure in which the energy utilities operate.

Chapter I presents and defines the issues of liberalization, deregulation and privatization of energy utilities, and it attempts to locate the reforms in a broader historical framework characterized by an increasing inability on the part of developing countries' Governments to meet the financing needs involved in the maintenance and expansion of domestic energy supplies.

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<sup>1</sup> The term “modern” is used in contrast with traditional economic activities such as subsistence agriculture and petty industry and trade.

<sup>2</sup> Electricity and gas are the most widely used technologies employed worldwide to supply energy in nationwide or local power networks. However, the observations made in the text apply to other technologies – such as nuclear and renewable energies – frequently utilized as alternative means of producing electrical power. Oil is also an input for the production of thermal energy. Yet the oil industry as such is chiefly geared towards the production and transportation of a tradeable commodity, and thus has characteristics quite different from those of the basically service-oriented industries that are the object of this study.

Chapter II reviews some experiences in energy sector reforms, focusing on some of the largest semi-industrialized countries in Latin America and Asia. A few remarks on the advisability of a flexible approach to reforming energy regimes in developing countries conclude the paper.

## **I. OPENING ENERGY UTILITIES TO THE PRIVATE SECTOR: OPPORTUNITIES AND CHALLENGES**

### **1. Liberalization, deregulation and privatization**

The worldwide trend in favour of trade openness, market regulation, and the retreat of the State from economic activities, which peaked in the 1990s<sup>3</sup> and still informs the reform programs of many developing countries and the agenda of international financial institutions, did not leave out energy utilities.

Liberalization of a sector of economic activity strongly intervened and regulated by the Government consists, broadly speaking, in shifting it towards market regulation, guided by the principles of free competition. Deregulation, de-statization and privatization are techniques or instruments utilized for this purpose. Deregulation is a change from interventionist regulation to pro-libertate regulation, taking of course into account that once certain norms are abolished, they must to some extent be replaced by others, with the object of guaranteeing the effective functioning of the market. (For this reason, some analysts prefer to use the more neutral term “re-regulation”.) De-statization of economic activities means that those parts of economic activity that used to be considered a public service, and therefore were left to the State, are open to the intervention of private operators.<sup>4</sup> Finally, privatization means transfer of the ownership of a public enterprise so as to transform it into a private enterprise. Privatization sometimes requires the “atomization” (i.e., unbundling) of the enterprise.

The most widespread argument in favour of these reforms is that state-owned enterprises are intrinsically inefficient and are bound to be mismanaged, and that therefore a change of property rights will in itself lead to improved performance.<sup>5</sup> In a complementary fashion, liberalization is seen as a tool aimed at the creation of markets through the promotion of free competition (Trillo-Figueroa, 1993).

Notwithstanding the partial validity of these theoretical arguments, empirical evidence on the comparative performance of publicly and privately owned enterprises (especially in the case of

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<sup>3</sup> The radical neoliberal position epitomized by the Washington Consensus was weakened in the late 1990s by a number of previously unforeseen and interrelated events, among them the Asian crisis, the failure of the Seattle round of World Trade Organization (WTO) negotiations, and the surge of a mass opposition movement in many developed countries. As a result, the dominant orthodoxy is presently more nuanced; it has been dubbed the “enlightened standard view” by a leading international economist (Rodrik, 2001).

<sup>4</sup> Naturally, to the extent that they do embody a public service component, they are still bound to be subject to new forms of public regulation.

<sup>5</sup> This argument is further developed by more sophisticated analyses exploring the underlying theoretical and practical reasons: under a public property regime, enterprise managers face an inadequate incentive structure, while privatization forces them to focus on a clear-cut and unequivocal goal, the maximization of shareholder value. Another, related argument maintains that senior managers in state-owned companies are locked into the contradictions and distortions implied by the principal-agent relationship and by the asymmetry of information between them and their supervisory bodies, and that they are therefore far less accountable than they would be under a private property regime. According to the theory of public choice, managers of state-owned enterprises are thus likely to engage in rent-seeking behavior, resulting in suboptimal provision of public goods and services and in multiple allocative and productive inefficiencies (Peacock, 1992; Vickers and Yarrow, 1989).

utilities bound by public-service obligations) is inconclusive, as ownership of an enterprise matters little to its performance. Of far greater importance is the context in which the enterprise operates. Therefore, to improve the performance of energy utilities, a number of measures might be taken, largely independently of the property regime as such. The degree of competition of energy markets could be increased, forcing firms to achieve production efficiencies, ruling out the possibility of realizing extra profit at the expense of consumers, and thus driving prices down. Signals to management and incentives could be improved and made more transparent, increasing management's autonomy in day-to-day operations and correspondingly reducing government interference. In some cases, even in a public or partly public property regime, the constraints and opportunities stemming from capital markets can play a role in improving financial discipline and – along with adequate incentives – in inducing virtuous behaviour on the part of managers. Unfortunately, in many real-life attempts to implement the aforementioned measures, and especially to effectively enhance the degree of competition in which an energy utility operates, are greatly hampered, particularly in the developing world.

## 2. Quality of management and quantity of investment

As a general rule, the power sector in developing countries performs poorly. Plant availability is scarce (on average less than 50 per cent, versus 80–85 per cent in the United States),<sup>6</sup> transmission losses are high (over 30 per cent against 7–8 per cent in the United States), blackouts and brownouts are common, and many state-owned power utilities are in serious financial hardship (Stevens, 1998:1; see also Barnett, 1992; Munasinghe, 1992; Schram, 1993). However, it is difficult to determine to what extent these problems are specific to state-managed power sectors rather than a byproduct of the very (relative) underdevelopment dimension, which would in any case affect the State's regulatory capacity owing to multiple institutional shortcomings. Moreover, many government-owned power systems in developing countries do function efficiently, as for instance in Jordan and Thailand and in some Indian States (Sullivan, 1990). The bottom line is that the demand for energy in the developing world, driven both by economic activities and by the legitimate aspiration of large numbers of poor people to achieve the minimal comfort levels to which their counterparts in the North have been accustomed for a long time, tends to grow much faster than Governments' abilities to finance the expansion of supply capacity. This gap has grown much more dramatic since the 1970s, as the weakening of the State's economic power in many developing countries has been accompanied by a progressive drying up of the multilateral financing sources that were relatively abundant in the first development period after World War II. In other words, rather than facing a problem of quality of energy management, Governments in developing countries often face a problem of quantity, since the money needed for investments in energy capacity and facilities is lacking.

This tension was acknowledged as early as 1990 by one of the staunchest and most influential advocates of neoliberal reforms in the developing world, the United States Agency for International Development. One of its officers, in an article on the early experiences and perspectives of developing countries in developing private power supplies, observed that the growth rate of installed capacity in the developing world averaged 6.5 per cent, against 3–5 per cent in Organisation for Economic Co-operation and Development (OECD) countries, pointing to a \$100 billion per year financing bill over the 1990s: "These funds are not, and will not be, available from public treasuries" (Sullivan, 1990:336).

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<sup>6</sup> Plant availability measures the ratio between the effective working hours of a power plant over a year and the theoretical maximum possible working hours (24 hours multiplied by 365). A plant availability of 50 per cent means that the plant was inoperative, on average, half of the time.

**Box 1****Alternative institutional and legal settings for energy regimes**

In the international commercial terminology, privatization usually corresponds to Buy-build-operate arrangements (BBO): a private agent buys existing assets from the State (often with an engagement to upgrade them), retains ownership and is guaranteed the right to exploit it for an indefinite period of time. In many cases, however, the main problem with energy utilities in developing countries is not one of hopeless inefficiency (which would suggest privatization as a radical solution) but rather one of insufficiency: the Government lacks the financial, managerial, and institutional resources to build up and run new facilities at the speed required by development needs. It can let a private operator build the facility, choosing one of the following policy options:

- Build-own-operate (BOO): The private agent retains the ownership of the facility and the right to operate it for an indefinite period of time. A similar arrangement is the independent power producer (IPP), under which the private operator sells power to the government grid, without formal previous obligation to limit its profits or to eventually surrender ownership of the facility.
- Build-transfer-operate (BTO): The private agent transfers ownership of the facility to the State after completing the construction stage, and operates it thereafter.
- Build-operate-transfer (BOT): The private agent builds the facility and retains ownership and the right to exploit for a specified period of time, thus recovering construction, operating, and financial expenditure. At the end of the period, ownership reverts to the State at a symbolic cost.

It is also possible for a Government, on the one hand, to consider that existing state-owned facilities might be more efficiently run by a private operator, but, on the other hand, to be reluctant to permanently surrender ownership rights. The Government has the option of granting temporary exploitation rights to a private operator, whether through a concession (which entails full commercial risks and responsibility for new fixed investments), a service contract (which covers more limited operation and maintenance functions), or a lease contract. In the latter case, the private company is given the right to the revenue stream from the service in return for full operation and maintenance responsibilities. It pays a rental fee to the Government but does not engage in new investments.

**3. Is private capital really additional?**

Thus, developing countries are left with the option of courting private investors. Here they can opt for privatization/divestiture, according to the classical United Kingdom example, or foster the development of newly established independent power generating facilities (see box 1). In the late 1980s the first reform path was pioneered in the developing world by Chile, and the second by China, which were subsequently followed by many other countries. Mixed and intermediate approaches are also common, with private utilities coexisting with public ones in many countries, among them India (Sullivan, 1990:337). Whatever option is chosen, and leaving aside for the moment the crucial question of the respective long-term strategic development implications of the two reform paths, policy makers need to keep in mind that the most pressing goal of providing the energy industry with more financing in the short to medium term is not likely to be achieved automatically. This will happen only if “private capital is truly additional” (Sullivan, 1990:338). If, on the other hand, sovereign guarantees are needed to obtain equity or debt in foreign exchange, private capital may actually become a substitute for existing funds, because of the country’s international credit exposure. Local currency availability may also be scarce, especially in countries with poorly developed capital markets. Moreover, private capital tends to be more expensive than public capital.

Therefore, in the case of divestiture of a state-owned monopolistic utility, financial benefits are likely to accrue to the reforming country only if the hoped-for benefits stemming from competition and, possibly, other efficiency gains related to private management counterbalance at least the additional financial costs typical of international private capital markets. This condition, however, is necessary but not sufficient for the reform to be considered welfare-enhancing from the point of view of the general public.<sup>7</sup> For this purpose it is also necessary that the efficiency gain be large enough to be shared by the private utility operator and the consumers, and that an adequate institutional and regulatory mechanism be enacted to assure that the benefits are actually distributed according to policy goals.<sup>8</sup> The ability to undertake such policy design and implementation, while not unheard of, should not be taken for granted in the developing world, as will be made clearer in Chapter II.<sup>9</sup>

## **II. REFORMING ENERGY OWNERSHIP AND REGULATORY REGIMES: EXPERIENCES IN SEMI-INDUSTRIALIZED DEVELOPING COUNTRIES**

### **1. Structural reforms of energy utilities in the 1990s and earlier**

Until the early 1990s, significant reforms of traditional state-owned energy monopolies were infrequent in OECD countries (being virtually confined to Anglo-Saxon members), and even more so in the developing world.<sup>10</sup> The pioneering experiences of Chile and China in the 1980s, which have been rightly considered as paradigmatic and – especially with the benefit of hindsight – more successful than the norm, will be examined in Chapter II.3 below. As was mentioned earlier, Chile and China pioneered power market-oriented system reforms in the developing world. Both countries' reform strategies were gradual and rather successful, but they differed markedly in nature. Chile pointed towards divestiture, privatization, and the progressive withdrawal of the State from management of the power industry (albeit without forfeiting its regulatory function). China, on the other hand, saw the role of private investors as complementary and additional with respect to that of public enterprises.

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<sup>7</sup> This observation is static and would not, of course, apply in practice to extreme cases where the only realistic alternative to divestiture would be the collapse of a bankrupt and moribund state-owned facility.

<sup>8</sup> On the importance of regulation, see, for instance, Wälde and Gunst, 2003.

<sup>9</sup> As in most economic sectors, push the tendency towards deregulation and privatization of energy systems too far can have unintended negative technological and environmental consequences in the long run (Vickers and Yarrow, 1989; Peacock, 1992). An enhanced market orientation on the part of utility operators – which constitutes one of the main goals of the reforms – can lead towards exclusively profit-oriented short-term behaviour, while goals such as combating pollution or pursuing long-term research and development (R&D) projects aimed at the realization of clean and environmental technologies are sidelined. Actually, in the United States as in other OECD countries, the level of public support for energy R&D programs has declined dramatically in recent years. In the United States, in particular, private R&D funding also fell (Dooley, 1998).

<sup>10</sup> The partial or total liberalization/privatization of an important and traditionally state-dominated sector such as energy is likely to be easier to implement in a developed than in a developing country. In a developed country, in fact, the energy sector tends to be rather mature and well-established, and thus less pivotal and strategic from the point of view of economic sustainability and national security than in earlier development stages. The maturity of a sector, in fact, implies that its technology is not a frontier one and hence can be mastered with some ease by national private agents. The actual and perspective market for energy, moreover, is likely to be large enough to create at least the potential for a certain degree of competition. Yet, in the developing world, the above arguments can be overshadowed by other arguments, among them the frequency of quasi-emergency situations caused by economic imbalances and the decay of basic infrastructure, and the perennial hunger for finance and technology. In developing countries endowed with ample and still largely untapped natural resources, furthermore, this potential wealth can have an ambiguous impact on energy policies. On the one hand, it enhances the strategic character of the energy sector, strengthening the rationale for strong state intervention. On the other hand, it increases the urgency of acquiring updated technology to adequately exploit the energy potential, thus arguing in favour of leaving ample room for the operations of advanced transnational corporations.

Most structural energy sector reforms took place in the 1990s. The energy sector has been one of those most affected by privatization worldwide, with a global value of property transfers estimated at US\$37 billion in 1996, corresponding to around one-fourth of all privatization exercises carried out in that period (Lutz, 2001:25). According to another estimate, between 1992 and the late 1990s – the golden era of the Washington Consensus – about 20 privatizations of state-owned oil and gas industries took place all over the world, involving 15 countries. In eight cases, the Government retained a majority holding. Electricity industry reforms followed a similar path, and in most reforming countries most changes consisted of deregulation and the promotion of new private investments, rather than in the divestiture of state-owned utilities (Stevens, 1998; Thomas, 1997). These figures, albeit impressive, amount to less than what might have been expected taking into account the ideological climate of the time, reflecting the array of problems and constraints implied by energy privatization.

The analysis in the remainder of this chapter will focus on the cases of large, semi-industrialized countries, for two reasons. First, these are the experiences for which the most information is available. Second, in these countries the challenge of preserving and developing a national energy industry currently constitutes a strategic priority.<sup>11</sup> However, a few remarks will be made regarding other developing countries in Africa, Asia and Latin America.<sup>12</sup>

## 2. Latin America: widespread energy sector privatization

Total or partial privatization of energy subsectors has proceeded quite fast in many countries in Latin America, as the region has been the most consistent follower of the Washington Consensus policies promoted by international financial institutions.<sup>13</sup> In fact, Latin America contributed to about 40 per cent of the total value of energy privatizations worldwide (Lutz, 2001:26). Energy reforms in Chile and Argentina were the deepest and most radical. In Bolivia, Colombia and Peru, electricity markets were restructured and opened to competition. Reforms in Brazil and Mexico were more cautious and

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<sup>11</sup> Improving and expanding access to reliable energy sources is a necessary condition for development in every country. However, for historical reasons, semi-industrialized countries are particularly well placed to reap the potential synergic gains (in terms of overall industrial and technological upgrading) stemming from development of the energy sector.

<sup>12</sup> Since this paper focuses on developing countries, experiences in structural reforms in energy services in developed and transition countries are not covered in the short review of case studies presented in this chapter. Rather, they are very briefly referred to in this note.

The pioneering British experience with electricity and gas privatization has been studied and variously evaluated by numerous analysts (see, for instance, Stern, 1997; Rutledge and Wright, 1998; Yarrow, 1986 and 1996; Vickers and Yarrow, 1989; Hunt and Shuttleworth, 1996; Weir, 1999; Thomas, 1999, 2000a and 2000b). Arguably, the heavy requirements in terms of regulatory complexity constitute its most durable lesson. The still-embryonic energy market of the European Union, which holds the potential for significant welfare gains, still requires for its smooth functioning a series of converging market-friendly changes in the respective national energy regimes, which are occurring at different paces in the various member countries (Sioshansi, 2000; Lutz, 2001). Among extra-European reform experiences in the industrialized world, California's ill-fated electricity liberalization has been the object of particularly wide attention by both scholars and the media (Sioshansi, 2001; *Economist*, 2001).

Energy sector reforms in those European and Asian transition countries that formerly belonged to the COMECON are not covered in this paper. Energy reforms in former COMECON countries took place after the collapse of those mutually integrated centrally planned economies, in a crisis or post-crisis setting characterized by the transition towards a completely different market-based system. Therefore, more than from the vantage point of improving the efficiency and the effectiveness of energy utilities per se, they should be seen and evaluated as components of a broader strategy aimed at the total rebuilding of the economy as a whole. (On energy-sector reform in transition countries and the severe problems faced by energy regulators see, for instance, World Bank 2000; Von Hirshhausen and Vincentz 2000; Yekhanurov 2000; Dahl and Kuralbayeva 2001; Bannikov 2000.)

<sup>13</sup> For a critical balance of the results of the New Economic Model in Latin America, see, for instance, a special issue of *World Development* (*World Development*, 2000).

gradual.<sup>14</sup> Venezuela is considering partial reforms of the gas and electricity sectors that would maintain a strong role for the State in designing and implementing a competitiveness-enhancing and development-oriented energy strategy.

The reforms were instrumental in facilitating two important structural developments that profoundly changed the energy landscape in the region: the increase in the absolute and relative role of foreign investors and the surge of natural gas as a new, abundant energy source made particularly competitive by the availability of modern and relatively less capital-intensive technologies (Lutz, 2001). However, from one country to another, the reforms achieved uneven results with respect to the goals of increasing efficiency, boosting productivity, relieving public budgets and fostering capacity expansion. Especially in those countries where privatization is furthest along, the structural contradiction caused by the attempt to promote competition in oligopolistic service-oriented sectors, where powerful transnational corporations often face weak national States and poorly organized consumers, has not withered. Consequently, the tensions between private efficiency and profitability, on the one hand, and public service and development goals, on the other hand, have not been fully overcome either.

### **3. Energy reforms in Chile: early start and gradual implementation**

In Chile, during the 1970s, subsequent steps were undertaken to reduce the presence of the State in the power industry. The electricity industry developed a rational planning sequence: distribution companies were the first to be privatized, followed by power generation, according to the pragmatic criterion of proceeding first with the most profitable enterprises. ENDESA, the largest state-owned enterprise that had a dominant role in the sector, was maintained under State control. After the progressive privatization of distribution companies, the Government proceeded cautiously with (mostly partial) offerings in power-generating companies, opening them up as well to foreign investment. The privatization process was carried out over a long period of time, and the first shares of ENDESA were sold only in 1987. ENDESA shares were sold through the stock market, and an effort was made to present it as a model of “broadened ownership” and “popular capitalism”: A small part was reserved for employees and sold at a discount, and a larger one was reserved to a special class of “small-scale “ purchasers, who enjoyed very favorable financial and fiscal advantages (Sullivan, 1990).

While private firms were welcome to enter the energy sector, the Government of Chile remained in charge of most regulatory functions. Tariff and regulatory issues have been handled rather effectively by the National Commission of Energy, and the overall performance of the privatized energy system was relatively satisfactory up to the late 1990s (Bernstein, 1988). However, the regulatory bodies were still not endowed with sufficient powers and capabilities to achieve a fully satisfactory degree of control of the operations and strategies of powerful private companies. Moreover, unbundling and privatization of the power sector were not accompanied by adequate restrictions on ownership concentration. The result was a less-than-optimal degree of competition, with the transfer to private operators of significant monopolistic advantages (Lutz, 2001:12). The Chilean power sector remained a highly oligopolistic, vertically integrated industry acting in a very imperfect competitive context, while the legal and regulatory framework (still one of the most effective in the developing world,

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<sup>14</sup> While Brazil underwent a privatization process (see below), Mexico, like Central American countries, maintained vertical integration in the power sector, while allowing private electricity generators to set up new additional capacity and sell it to the national electricity utility.

thanks in part to a national tradition of almost non-existent corruption and of high professionalism among Chilean public servants), was slow in adapting to the evolving situation.

By the end of 1998 a serious energy crisis erupted. The proximate cause was a drought, but its impact was compounded by technical failures, delays in the operational setting of combined-cycle natural gas plants, and problems with coordination and transparency in the activities of power-generating enterprises. The crisis revealed a number of structural shortcomings, among them the inadequacies of the regulatory and institutional framework, the relative weakness of public bodies in dealing with short-term profit-oriented private firms, and the lack of a long-term energy strategy. According to a study by the UN Economic Commission for Latin America and the Caribbean (ECLAC), the crisis showed that economic efficiency criteria were not sufficient to guarantee satisfactory performance of the energy system. Market mechanisms should be improved and made more transparent, correcting the imperfections stemming from imperfect competition and asymmetry of information, while the regulatory bodies are to be revamped and strengthened (Rozas Balbontin, 1999). Notwithstanding these problems, the Chilean experience still stands among the most successful on the subcontinent. It is also made particularly interesting by the exceptional role played by cross-border energy trade, which has allowed Chile to overcome a crisis in the domestic coal industry, as consumption shifted towards natural gas imported from Argentina. The latter change in energy sources also contributed significantly to progress in the domain of environment protection.<sup>15</sup>

#### **4. Brazil: electricity privatization and energy crisis**

Brazil managed to increase its electricity supply capacity by 500 per cent in the last half-century under the traditional public-monopoly regime. The electricity system was complex, formed by several state-based generation and distribution companies. It ran into trouble in the 1980s, as the Ministry of Treasury imposed price caps on tariffs as a macroeconomic anti-inflationary tool. The utility's financial crisis and the subsequent decay in investment activity prompted calls for British-style reform, which was initiated in 1993. However, the creation of a truly competitive market for power generation in Brazil was bound to be extremely difficult, given that over 90 per cent of electricity is accounted for by hydropower (Schaeffer and Salem Szklo, 2001). Hydropower technology, especially in a semi-industrialized country, implies production conditions characterized by huge economies of scale, and therefore a regime close to that of a natural monopoly.

Nevertheless, privatization was a particularly attractive option in heavily debt-ridden Brazil, more for financial than for economic reasons (Mendonca and Dahl, 1999:81). From this point of view, it can be argued that the Government was successful in privatizing most assets of the industry, as it raised more than US\$15 billion by mid-1998. The reform plans envisaged that foreign investors and independent power producers would operate in the newly opened electricity market. An independent transmission grid and a new regulatory agency were also set up. Yet the regulatory regime proved inadequate. Tariff and price policies, in particular, were ill conceived, as they allowed monopolistic rents to be captured by distribution companies while failing to offer sufficient incentives to potential new investors in new capacity generation, who were already penalized by high interest rates (Mendonca and Dahl, 1999). As a result, generation capacity grew much less than reformers had hoped. This setback was particularly disappointing in a country where electricity demand tends to increase almost

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<sup>15</sup> Building on its more than two decades of experience in reforming energy utilities, Chile tabled a proposal on energy services in the framework of ongoing WTO negotiations. The proposal aims at "reinforcing the development of energy services in competitive and transparent markets; embracing the whole spectrum of energy services in the negotiations; ensuring marketing access, while respecting domestic regulations; and analyzing the issue of subsidies in the energy sector" (WTO, 2003).

three times faster annually than the gross domestic product (GDP). The risk of blackouts increased<sup>16</sup> and, partly because of poor rainfall, a severe energy crisis erupted in 2001. In June the Government launched official instructions to the population to achieve a much-needed 20 per cent decrease in usage through voluntary energy savings (Dyer, 2001). This measure could not, however, bring more than partial and temporary relief. By early 2002, the Government was proposing sweeping reforms that would increase State regulation and intervention (*Financial Times*, 2002).<sup>17</sup> In the long run, the Government's tackling of the energy issue will be further complicated by the need to upgrade and reconvert power generation capacity using technologies compatible with environmental-protection targets.

The sobering warning stemming from the multiple flaws in the privatization of utilities and the emergency of power emergencies in Brazil, along with the partially analogous experience of the power crisis in California, was not lost on participants in the UNCTAD Expert Meeting on Energy Services in International Trade (held in Geneva in July 2001). According to the Chairperson's Summary, the debate showed that

The lesson which can be drawn from these (power emergencies in California and Brazil) is that before creating a new framework for the energy sector, each country has to study carefully the features of its market and the related needs. The possibility of adopting solutions existing in other countries is limited since conditions vary greatly between countries ... (UNCTAD 2001b:11–12)

## 5. Argentina: mixed results of energy utilities privatizations

In Argentina, the gas sector, which is particularly important for its role as a primary source of electricity generation (Campodonico, 1999), underwent thorough regulatory and structural reforms in the early 1990s. The reforms were market-oriented, according to the United Kingdom model, and aimed to increase efficiency and foster private investment in the gas industry. Both the downstream gas company, Gas del Estado (GdE), and the upstream oil and gas company, Yacimientos Petroleros Fiscales (YPF), were privatized. GdE was also broken up into two transmission companies and eight (later nine) distribution companies. An open-access regime was established, price controls were removed, and an independent regulatory agency (ENARGAS) was created. The functions of the agency were very complex: they covered the preservation of market competition, the protection of the public service functions of gas supply and distribution, the prohibition of vertical integration among privately operated utilities, the monitoring of wholesale gas prices, the approval of gas transportation and distribution tariffs, and the supervision of fiscal subsidies. Analogous regulatory functions are or should be fulfilled by regulatory agencies in other Latin American countries that implemented similar gas-industry reforms, notably Chile and Bolivia (Campodonico, 1999).

In the case of Argentina, where structural conditions were favourable to the emergence of a certain degree of true competition, even taking for granted that ENARGAS would have had a hard time fulfilling all its multifaceted regulatory obligations, the first stages of gas industry reform appear to have been relatively well planned and successful. Gas drilling and investment have increased and supply reliability has improved, while prices have remained competitive (IEA, 1999). However, after 10 years of reform, the gas and electricity industries in Argentina still faced an array of problems,

<sup>16</sup> According to an estimate, the loss of load probability in three large Brazilian regions in 2000–2001 was about 12 per cent (Schaeffer and Salem Szklo, 2001:358).

<sup>17</sup> Pedro Parente, the minister heading Brazil's energy task force, stated: "The market is not enough to ensure an increase in the power supply; you need a bigger state role in regulation and supervision" (*Financial Times*, 2002).

typical of privatized energy utilities in developing countries. In the rapidly developing gas sector, the market was oligopolistic, dominated by a small number of vertically integrated suppliers obtaining extraordinary benefits. Tariffs increased noticeably in dollar terms, while consumers did not show strong opposition, as they were largely spared price increases in pesos due to the progressive overvaluation of the dollar-pegged Argentinian currency (Kozulj, 2000). In the long run, however, this phenomenon contributed to the development of the present, severe financial crisis. In the electricity sector, conversely, the degree of competition has been higher, mainly because of the effective vertical and horizontal de-integration introduced by the reforms. Still, part because of a lack of comprehensive planning, private operators appear to have over-invested in generating capacity and under-invested in transportation. By the end of the decade, as in many other countries, long energy breakouts occurred in Argentina, re-opening the issue of the reliability of supply and of the essential public service function of electrical utilities (Kozulj, 2000; Pistonesi, 2000).

## **6. Africa and East Asia: energy sector restructuring under divergent structural conditions**

In Africa and Asia the approach to energy sector reforms so far has been less radical than in Latin America. Most countries have pursued mixed energy regimes that maintain an important role for the State. Results, however, have been uneven. Apart from the specific features of each country's unique experience, a major difference tends to hold between the two developing regions.

In Africa, during the first post-independence period, many countries managed to achieve a certain development of their power industry, which was starting almost from scratch, under the then-dominant model of integrated state-owned monopoly. When economic crises erupted in the 1980s, African energy systems were not immune to the systemic long-run decay that hit the whole of their economic and social fabric. Public services and the economic functions of the State were particularly affected. The power industry and its inefficiencies were criticized, and Governments came under strong pressure on the part of international financial institutions to privatize and liberalize the industry. Most countries initiated reform plans, but so far few have enacted major changes in their statutory system. The others are at different stages of the reform process, but they show little enthusiasm and determination in this endeavour, as it implies serious social and political risks, besides being difficult to implement from a technical and institutional point of view. Countries are more eager to authorize foreign private firms to initiate new independent power production and interconnection development projects (Girod and Percebois, 1998).

In a quite opposite development, East Asian energy systems, which performed rather well in the past, underwent a "growth crisis" as demand for energy ballooned, fuelled by the very rapid growth of the economy as a whole, and had to search for additional sources of financing for their ever-increasing investment needs. East Asian electricity industries, traditionally dominated by vertically integrated state-owned utilities, are changing into ones in which multiple agents interact in a partially competitive environment. The ever-increasing need for financing, rather than the perception of inefficiencies in the public utilities, is the engine of the present restructuring drive. As demand for energy grows faster than gross national product (GNP), financing needs for power generation increase almost exponentially,<sup>18</sup> pushing Governments to seek additional funds from domestic and international private sources. Previously existing public monopolies are being opened to private investors. Most countries are implementing independent power producer (IPP) programmes, encouraging private operators to develop new power projects. Build-own-operate (BOO), build-own-transfer (BOT), and

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<sup>18</sup> Because Asia is the fastest-growing region in the world, demand for electricity has been skyrocketing, at a rate of 10 per cent a year in many countries.

build-transfer-operate (BTO) arrangements are also popular. Thus, there are now several players in the power-generation business.<sup>19</sup> Usually, the public transmission agency buys the privately produced energy under a power purchase agreement (PPA).<sup>20</sup> In a parallel development, power ministries or authorities are being restructured in a more commercially oriented fashion, and their status is being changed into that of corporations (e.g. in China, Indonesia and Viet Nam). In some countries (e.g. Malaysia, Pakistan, the Philippines and Thailand), existing state-owned assets in the electricity industry have been partially or totally privatized. The reforms require complex regulatory changes in order to adequately prepare the regulatory regime for the challenges of a pluralistic yet only partially competitive market, while at the same time preserving the strategic and planning functions of the State and fulfilling social and public service obligations.<sup>21</sup> The experiences with power-industry reforms carried out in the two most populous developing countries in Asia and in the world, India and China, are briefly reviewed in the two following sections.

## 7. India: a decentralized approach to reform of the energy generation sector

India's coal-dominated power industry developed quickly after independence, with generation capacity increasing from 1400 megawatts in 1947 to around 90,000 megawatts by the end of the century (Singh Yadav and Jain, 1999). However, per-capita power consumption in India is still among the world's lowest, at 300 kilowatt-hours against 13,000 kilowatt-hours in the United States, with supply chronically unable to match demand. More than 50 per cent of total energy demand proceeds from the industrial sector, and the demand is growing steadily, about 5 per cent yearly. Besides the inevitable growth in energy consumption resulting from the industrialization process itself, energy demand has increased particularly fast because of the lack of progress in total factor productivity<sup>22</sup> in energy-intensive industries.<sup>23</sup>

The Indian power industry has traditionally been fully controlled by individual States. By the early 1990s, it was plagued by the conventional problems of monopolistic public utilities in developing countries – insufficient capitalization and investments, politically determined low tariffs, overstaffing, suboptimal management – aggravated by interstate rivalries. The main problems were the low share of (renewable) hydroelectric power in total capacity (in spite of India's high potential), the skewed tariff structure that excessively subsidized domestic and agricultural energy consumption, and – partly as a result of the former – the enormous losses of most State Electricity Boards (SEBs). Reforms fell short of outright full-scale privatization, offering generous financial incentives to private investors to contribute to the construction and management of new generation capacities to be sold to the (monopolistic) State electricity board grids. This strategy, which was geared to mobilize additional financial resources rather than to improve the efficient use of already existing capacity, was mired in a contradiction. On the one hand, it was bound to imply considerable financial costs for commercially produced private power, as government policies permitted producers high depreciation allowances and

<sup>19</sup> Transmission tends to remain under exclusive public control.

<sup>20</sup> These important developments do not happen overnight. By the late 1990s, only a small fraction of negotiation processes had led to PPAs (Caruso and Chen, 1997:9).

<sup>21</sup> Many countries, for instance, still face a huge task in completing rural electrification.

<sup>22</sup> The concept of total factor productivity is controversial in economic theory (see Felipe, 1999). Here it is mentioned to refer in broad terms to productivity gains attributable not to increases in capital and labour, but rather to technological and managerial improvements.

<sup>23</sup> Taking into account the size of India's industry and thus its present and, *a fortiori*, future contribution to global carbon emission, the urgency of improving the energy efficiency both of the power industry and of energy-intensive industrial subsectors is also of concern for the international community, as it is the case for other large semi-industrialized developing countries such as Brazil and China (Mongia, Schumacher and Sathaye, 2001). It may be worth remembering that one of the main reasons the Bush administration in the United States gave for rejecting the Kyoto covenant on global carbon emission was the lack in that agreement of any specific target for emissions reductions on the part of developing countries.

indebtedness levels, while private operators, although likely to be more efficient and better placed to acquire the latest technologies, were generally too small to achieve economies of scale (Ranganathan, 1993). On the other hand, the lack of political determination in imposing financial discipline and commercial orientation on loss-making SEBs made the risk of financial default on their part quite high, discouraging potential investors. The reforms fell short also in the areas of institutional and regulatory capacity and policy coordination, while anxiety about securing international financing did not contribute to the creation and maintenance of a competitive environment in electricity generation (Ranganathan, 1996).

In spite of these and other problems, participation in energy generation in India increased during the 1990s. India presently permits a variety of ownership structures, and foreign investment in the energy sector has been greatly facilitated. In the various States, which had very different problems to begin with, reforms are at different stages of implementation (Arun and Nixon, 1998).

### **8. China: institutional and regulatory reforms, commercial orientation, and enhanced market access for foreign investors**

Steady and rapid expansion of the power sector is particularly crucial in China, a very large developing country with an exceptionally fast pace of industrialization and overall economic growth. Moreover, the future of the power industry in China is extraordinarily relevant to the outside world because of the sheer size of the country's electrical power sector and the opportunities it presents to foreign investors and suppliers, on the one hand, and the relevance of China in international endeavours to protect the global environment and reduce carbon dioxide emissions<sup>24</sup> in particular, on the other hand.

The Government of China has traditionally placed a high priority on the development of the power sector,<sup>25</sup> and early on it initiated experiments with innovative public-private ventures. Actually, the first power project properly developed as a build-own-transfer (BOT) venture in a developing country was carried out in South China under the initiative of Hopewell Holdings Ltd., a Hong Kong (China)-based private company (Sullivan, 1990).

In global terms, however, the overall structure of the power sector changed little until the mid-1990s. China's coal-dominated power industry was quite decentralized, with Provincial Power Companies and a number of lower-level entities (more than 10,000) playing important operating roles and interacting in a complex web of relations. Therefore, it was particularly difficult for the Government to reform and regulate the overall power system. In practice, rather than formal indirect

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<sup>24</sup> Until a few years ago, it was commonly forecast that by the year 2020 China would become the first culprit of this major form of global pollution, bypassing the United States. This event now looks unlikely: according to a study by the Lawrence Berkeley National Laboratory in California, and to data from the United States Department of Energy, carbon emissions in China actually declined in absolute terms by 17 per cent in the last four years, while GNP grew by 36 per cent. This unexpected improvement resulted mainly from drastic cuts in coal price subsidies and from an array of programs aimed at energy conservation and at curbing urban air pollution (Eckholm, 2001). However, the magnitude, albeit not a sign of a correspondingly dramatic improvement in energy efficiency, has been subsequently questioned, and even Chinese official sources acknowledge the likeliness of statistical inaccuracies. In the long run, anyway, the continuation of the present, favourable trend cannot be taken for granted, and continuous policy attention by the Government of China and, indirectly, the international community will be needed to the importance of reducing carbon emissions and other forms of pollution in the energy sector.

<sup>25</sup> Generating capacity increased from 47 GW in 1976 to 250 GW in 1997 (Andrews-Speed and Dow, 2000), putting China in second place in the world after the United States.

**Box 2**

**FDI in the Chinese power sector**

Since the early 1990s, China has progressively increased opportunities for foreign direct investment (FDI) in electricity generation. China needed FDI mainly because it lacked both the financial resources and the manufacturing capacity to produce the quantity of generating equipment needed for the projected expansion of the energy sector. Advantages of FDI, apart from those related to financing, relate to the potential for improvements in technology, management, and the reduction of pollutant emissions. The Government has stressed that the improvement of generating efficiency is an utmost policy priority.

Up to the mid-1990s, foreign financing provided about 10 per cent of investment funds in the power sector, but over 80 per cent came from foreign Governments and multilateral lending institutions. By mid-1998, 24 FDI plants were in operation, and 12 others were in construction, most of them operated by US companies. Plants in construction tend to be larger than already operational ones, as well as being more advanced technologically and more evenly distributed geographically, owing to changes in government policies and investor behaviour (Blackman and Wu, 1999).

FDI in China's power sector can be carried out in the framework of various institutional arrangements: cooperative joint ventures, wholly owned foreign ventures, equity joint ventures, BOT and BOO projects, loans, and stock in existing Chinese enterprises. For foreign investors, cooperative joint ventures constitute a practical, middle-of-the-road solution, and they tend to be preferred to wholly owned foreign ventures. They allow investors to retain adequate control over the project, while facilitating political and institutional alliances with Chinese public entities and access to inputs and foreign exchange. BOT contracts – which can be joint, cooperative, or wholly owned ventures – are becoming increasingly popular.

The most effective way to improve the institutional climate for FDI is to codify and streamline the approval process. However, it would be unwise to eliminate it altogether and rely exclusively on market-based mechanisms such as the competitive bidding procedures, because so far the approval process has allowed a certain degree of central control, creating strong incentives to improve energy efficiency and to transfer advanced generating technologies (see Blackman and Wu, 1999; Andrew-Speed and Dow, 2000).

regulation, direct supervision by higher-level government bodies, as well as horizontal and vertical inter-agency negotiations leading to consensus solutions, were the norms. This system weakened the ability of the centre to effectively supervise the provinces, and it was not without costs. With respect to the key task of constructing new generating capacity, in particular, it tended to provoke long delays in the approval process, or its outright avoidance, while encouraging the construction of small and inefficient plants to skip the need of approval from the centre.

Increasing awareness of the seriousness of these systemic weaknesses led to a series of reforms, which culminated in 1996 in the approval of a new Electricity Law that created the State Power Corporation of China (SPCC) as an entity separate from the Ministry of Electric Power (MOEP). The law was the first step in a complex reform process, to be seen at its stage as an integral part of the wider restructuring and overhauling of state-owned enterprises, which in its turn constitutes the core of industrial reforms.

The main goals of the Government are: to increase the capacity to generate, trade and effectively deliver power across the whole nation; to attract FDI into the energy sector in order to alleviate the State's financial burden in financing ever-increasing investment needs (see box 2); to raise productive efficiency, reducing costs and passing benefits to the consumer; to improve the energy efficiency of end users, using increases in average tariffs along with other policy tools; and to reduce the negative

environmental impact of the energy industry, diminishing the presently excessive weight of small thermal-power generation units.

These goals are being pursued in the context of enhanced – albeit far from exclusive – reliance on the progressive creation of a properly regulated and competitive market for electrical power. Since the introduction of market mechanisms inevitably involves significant transitional costs and institutional hurdles, reformers are trying to promote competition first in the domains of plant construction, operation and management. Regulation of competitive tendering for plant construction has been introduced, and competition is in fact strong even when confined purely to publicly owned Chinese firms. Progress in achieving transparency and competition in operation and management appears to be slower.

The ownership regime in the power industry is undergoing progressive changes, although total privatization (as in Chile, New Zealand or the United Kingdom) is out of the question. Ownership rights are reallocated in order to increase the autonomy of power-generating companies, and to create new local generating enterprises. A certain degree of control, however, remains in the hands of the State Power Corporation as the ultimate owner of a majority holding in many of these companies.

Policy caution is, however, warranted. If pursued to the end, market-oriented reforms would imply loss by the State (which in China has traditionally been stronger than in most other developing countries) of its ability to use the power sector as a policy tool – for instance to control inflation, or to promote rural electrification, or even to foster technological upgrading. Thus, the treatment of electricity as a purely commercial service, rather than a public one, would not necessarily bring overall improvements.

## CONCLUSION

The energy sector is one of the most strategic ones from a development perspective. Energy utilities, moreover, are characterized by a public-service component and have traditionally been run as integrated public monopolies in most countries. Developing and transition countries should strive to reap the potential benefits of globalization and new technologies, but without underestimating the risks and problems stemming from market failures, the tendency towards private monopolies, and the limits of regulatory power (Solanes, 1999). These countries face several policy options in dealing with their national energy sectors in the ongoing international trade negotiations. On the one hand, the need to obtain access to financial resources and technologies not available domestically, and, in some cases, the financial and practical impossibility of maintaining the traditional State monopoly in energy utilities cannot be ignored. On the other hand, the problems related to outright privatization are being increasingly recognized both in theory and in practice.

Therefore, Governments in developing and transition countries might find it advisable to adopt a flexible and multifaceted approach to energy reforms. In their trading relations with international commercial operators, in particular, they can opt for intermediate institutional arrangements. Some of these arrangements (e.g. BOT, IPP) are briefly referred to in Chapter II, but it is likely that the increasing sophistication and flexibility of alternative technological solutions and the accumulation of legal expertise in a relatively new domain of international trade relations will soon expand the range of feasible options.

These policy suggestions, drawn from the multifaceted lessons that can be extracted from many developing countries' experiences with reforming power utilities regimes, are quite consistent with the thrust of the debate that took place at UNCTAD's Expert Meeting on Energy Services in International Trade (Geneva, July 2001) (UNCTAD, 2001a; UNCTAD, 2001b; Zarrilli, 2003). The background note prepared by the UNCTAD secretariat recognized, in particular, that

Progressive liberalization of market access conditions for energy services should be pursued, taking into account differences among countries in their level of development, regulatory frameworks and market realities. The process of liberalization should be carried out under the appropriate regulatory framework with a view to ensuring the achievement of national policy objectives, including public service obligations, and the establishment of fair competition conditions. Liberalization should not necessarily be equivalent to deregulation. It should entail re-regulation in order to ensure the attainment of the above-mentioned goals. (UNCTAD, 2001b, para. 8)

Finally, it is important to remember that the degree of freedom enjoyed by national Governments in choosing any of these arrangements and in negotiating with transnational corporations is not independent from the binding liberalization commitments that may be undertaken during present and future WTO negotiations. This self-evident remark should be interpreted as a plea for particular caution and vigilance on the part of developing countries' WTO negotiators in the domain of international trade in energy services.

## REFERENCES

- Andrew-Speed P and Dow S (2000). Reform of China's electric power industry: Challenges facing the Government. *Energy Policy*, 28:335–347.
- Arun TG and Nixson FI (1998). The reform of the power sector in India: 1991–1997. *Journal of International Development*, 10:417–426.
- Bannikov M (2000). Energy regulators in the emerging markets. *International Energy Law and Taxation Review*, 8, August.
- Barnett A (1992). Financing of electric power projects in the LDCs. *Energy Policy*, 20 (4):326–334.
- Bernstein S (1988). Competition, marginal cost tariffs and spot pricing in the Chilean electric power sector. *Energy Policy*, 8:369–377.
- Blackman A and Wu X (1999). Foreign direct investment in China's power sector: Trends, benefits, and barriers. *Energy Policy*, 27:695–711.
- Campodonico H (1999). La industria del gas natural y su regulación en América Latina [The natural gas industry and its regulation in Latin America]. *Revista de la CEPAL*, 68. Santiago de Chile, Comisión Económica para América Latina y el Caribe, August.
- Caruso GF and Chen X (1997). Experiences of electricity: Sector restructuring in Asia. *Journal of Energy and Development*, 22(1):1–17.
- Dahl C and Kuralbayeva K (2001). Energy and the environment in Kazakhstan. *Energy Policy*, 29:429–440.
- Dooley JJ (1998). Unintended consequences: Energy R&D in a deregulated energy market. *Energy Policy*, 26(7):547–555.
- Dyer G (2001). Brazilians rally to the cause as power crisis hits home, but Government that brought inflation under control faces battle to escape blame for debacle. *Financial Times*, 15 July.
- Eckholm R (2001). China's great leap on gases. *New York Times Service*, 16 June.
- Economist* (2001). A state of gloom. 20 January.
- Felipe J (1999). Total factor productivity growth in East Asia: A critical survey. *Journal of Development Studies*, 35(4):1–41.
- Financial Times* (2002). 17 January.
- Girod J and Percebois J (1998). Reforms in sub-Saharan Africa's power industries. *Energy Policy*, 26(1).
- Hunt S and Shuttleworth G (1996). *Competition and Choice in Electricity*. Wiley, Chichester and Sons.
- IEA (1999). *Regulatory Reform in Argentina's Natural Gas Sector*. Paris, International Energy Agency.
- Kozulj R (2000). Resultados de la reestructuración de la industria del gas en la Argentina [Results of the restructuring of the gas industry in Argentina]. *Serie Recursos Naturales e Infraestructura* 14. Santiago de Chile, Comisión Económica para América Latina y el Caribe, November.
- Lutz WF (2001). Reformas del sector energético, desafíos regulatorios y desarrollo sustentable en Europa y en América Latina [Reforms of the energy sector, regulatory challenges and sustainable development in Europe and Latin America]. *Serie recursos naturales e infraestructura*, 26. Proyecto CEPAL-Comisión Europea: Promoción del uso eficiente de la energía en América Latina. Santiago de Chile, Comisión Económica para América Latina y el Caribe.
- Mendonca AF, Dahl C (1999). The Brazilian electrical system reform. *Energy Policy*, 27:73–83.
- Mongia P, Schumacher K and Sathaye J (2001). Policy reforms and productivity growth in India's energy intensive industries. *Energy Policy*, 29:715–724.
- Munasinghe M (1992). Efficient management of the power sector in developing countries. *Energy Policy*, special issue, February.
- Peacock A (1992). *Public Choice in Historical Perspective*. Cambridge, Cambridge University Press.
- Pistonesi H (2000). Sistema eléctrico argentino: Los principales problemas regulatorios y el desempeño posterior a la reforma [Argentina's electricity system: The main regulatory problems and implementation since the reform]. *Serie Recursos Naturales e Infraestructura*, 10. Santiago de Chile, Comisión Económica para América Latina y el Caribe.
- Ranganathan V (1993). Electricity privatization: The case of India. *Energy Policy*, 8:875–879.
- Ranganathan V (1996). Electricity privatization revisited: A commentary on the case for new initiatives in India. *Energy Policy*, 24(9):821–825.
- Rodrik D (2001). The global governance of trade as if development really mattered. Mimeo. Paper prepared for UNDP. John Kennedy School of Government. Cambridge, MA, Harvard University.
- Rozas Balbontin P (1999). La crisis eléctrica en Chile: Antecedentes para una evaluación de la institucionalidad regulatoria [The electricity crisis in Chile: Antecedents for an evaluation of the regulatory framework]. *Serie Recursos Naturales e Infraestructura*, 5. Proyecto CEPAL-Comisión Europea: Promoción del uso eficiente de la energía en América Latina. Santiago de Chile, Comisión Económica para América Latina y el Caribe.

- Rutledge I and Wright P (1998). Profitability and taxation in the UKCS oil and gas industry: Analysing the distribution of rewards between company and country. *Energy Policy*, 26(10):795–812.
- Schaeffer R and Salem Szklo S (2001). Future electric power technology choices of Brazil: A possible conflict between local pollution and global climate change. *Energy Policy*, 29:355–369.
- Schram G (1993). Issues and problems in the power sector of developing countries. *Energy Policy*, 7.
- Singh Yadav S and Jain PK (1999). India's power sector: Need for a better management. *Revue de l'Énergie*, 511, November.
- Sioshansi FP (2000). Opportunities and perils of the newly liberalized European electricity markets. *Energy Policy*, 29:419–427.
- Sioshansi FP (2001). California's dysfunctional electricity market: Policy lessons on market restructuring. *Energy Policy*, 29:735–742.
- Solanes M (1999). Servicios públicos y regulación: consecuencias legales de las fallas del mercado [Public services and regulation: Legal consequences of market failures]. *Serie Recursos Naturales e Infraestructura*, 2, LC/L.1252-P-E. Santiago de Chile, Comisión Económica para América Latina y el Caribe.
- Stern JP (1997). The British gas market 10 years after privatization: A model or a warning for the rest of Europe? *Energy Policy*, 25(4):387–392.
- Stevens P (1998). Energy privatization: Sensitivities and realities. *Journal of Energy and Development*, 23(1):1–14.
- Sullivan JB (1990). Private power in developing countries: Early experience and a framework for development. *Annual Review of Energy and the Environment*, 15:335–363.
- Thomas S (1997). Overview of the world electricity supply industry. Mimeo. Paper presented at the Seminario Internacional sobre una Visión Global – Gas, Carbon, Electricidad, Petroleo. Bogota, 25–27 August.
- Thomas S (1999). SPRU: The British model: A decade of experience. Paper presented at the Congresso Brasileiro de Energia, 30 November to 2 December.
- Thomas S (2000a). SPRU: British experience of incentive regulation. Paper presented at the ANEEL Conference, Brasilia, 2–3 October.
- Thomas S (2000b). SPRU: Regulation of a privatized, liberalized electricity industry: The British experience. Paper presented at the Conference on Regulation of Public Services, São Paulo, 2–3 August.
- Trillo-Figueroa J (1993). Liberalización, desregulación y privatización del sector eléctrico [Liberalization, deregulation and privatization of the electricity sector]. *Política Exterior*, 31:158–168, Winter.
- UNCTAD (2001a). Energy services in international trade: Development implications – Note by the UNCTAD Secretariat. TD/B/COM.1/EM.16/2. Geneva, UNCTAD, 18 June.
- UNCTAD (2001b). Report of the Expert Meeting on Energy Services in International Trade: Development Implications. TD/B/COM.1/42 – TD/B/COM.1/EM.16/3. Geneva, UNCTAD, 1 November.
- Vickers J and Yarrow G (1989). *Privatization: An Economic Analysis*. Cambridge, MA, MIT Press.
- Von Hirshhausen C and Vincentz V (2000). Energy policy and structural reform. *Eastern European Economics*, 38(1):51–70.
- Wälde T and Gunst AJ (2003). International energy trade and access to energy networks. In: Zarrilli S, *Energy and Environmental Services: Negotiating Objectives and Development Priorities*. UNCTAD/DITC/TNCD/2003/3. Geneva, UNCTAD.
- Weir C (1999). Regulation and the development of competition in the UK gas supply industry. *Review of Industrial Organization*, 15(2):135–147.
- World Bank (2000). *Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors*. World Bank Technical Paper, 474. Washington, DC, World Bank.
- World Development* (2000). Policy directions for the New Economic Model in Latin America. Special issue, September.
- WTO (2003). *Chile: Initial offer on trade in services*. (TN/S/O/CHL, 16 July 2003), Geneva, World Trade Organization.
- Yarrow G (1986). Privatization in theory and practice. *Economic Policy*, 2:327–377, April.
- Yarrow G. and Jsinsky P, eds., (1996). *Privatization: Critical Perspectives on the World Economy*. London and New York, Rutledge.
- Yekhanurov YI (2000). The progress of privatization. *Eastern European Economics*, 38(1):71–93.
- Zarrilli S (2003). *Energy and Environmental Services: Negotiating Objectives and Development Priorities*. UNCTAD/DITC/TNCD/2003/3. Geneva, United Nations Conference on Trade and Development.

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