



**Utility Regulation Versus BOT Schemes
An Assessment of Electricity Sector Reforms
in Arab Countries**

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Working Paper No. 63

November 2001

This paper was presented at the Arab Fund For Economic And Social Development Conference: "The Financial and Social Impact of Private Sector Participation in Financing Physical and Social Infrastructure Projects", which was held in Kuwait, September 23-24, 2001. I would like to thank Galal Amin, Sahar Tohamy and Clemencia Trorres for very useful comments. I would also like to acknowledge the feedback I received from the conference participants, especially from Sultan Abu Ali, Mervat Badawi, Nasser El Saidi, Gasem El Manna, Ahmed Ezz, Hazem Biblawi, Heba Handoussa, Rima Khalaf and Taher Kanān. Last, but not least, I would like to thank Nada Massoud for excellent research assistance. The usual caveats apply.

Abstract

This paper assesses two alternative approaches to private sector engagement in utilities, namely the Build Operate Transfer (BOT) and sector-wide reforms. The assessment draws on the new theory of regulatory contracts. The paper first evaluates the two approaches in terms of their effectiveness in dealing with the problems of information asymmetry, incentive compatibility and commitment. It then reviews the evidence on the economic impact of both approaches. Finally, it applies this analysis to the electricity sector in four Arab countries, namely, Egypt, Jordan, Morocco and Syria. The paper concludes that sector reforms may not be as effective in attracting private investment in the short run as BOTs. However, the sector approach is more beneficial to society in the medium term.

ملخص

تحاول هذه الورقة تقييم أسلوبين بديلين لمشاركة القطاع الخاص في مشروعات البنية الأساسية. يتمثل الأسلوب الأول في نظام البناء والتشغيل ونقل الملكية (BOT) أما الثاني فيشتمل على القيام بإصلاحات قطاعية شاملة. ويستند هذا التقييم إلى النظرية الجديدة للعقود التنظيمية. وتقوم الورقة بتقييم كفاءة كلا البديلين، خاصة فيما يتعلق بشفافية المعلومات وتنظيم الحوافز ومصداقية اتباع القواعد الموضوعية. كما تستعرض الورقة الدلائل على الأثر الاقتصادي لكلا الأسلوبين. وفي إطار ما سبق يتم تطبيق هذا التحليل على قطاع الكهرباء في أربع دول عربية وهي مصر والأردن والمغرب وسوريا. وتخلص الورقة في النهاية إلى أنه بالرغم من أن نظام الـ(BOT) قد يكون قادراً على اجتذاب الاستثمارات الخاصة في المدى القصير مقارنة بالإصلاح القطاعي الشامل، إلا أن مردود الإصلاح القطاعي أعلى منه في المدى المتوسط.

I. Introduction

The recent wave of private sector participation in infrastructure is not new. In the late 19th century and during much of the first half of the 20th century, the private sector took the lead in the supply of electricity, telecommunications, railways and water. A major shift took place around WWII, when governments became the primary owners, operators and regulators of infrastructure activities. This shift was caused by several factors, including a strong faith in the ability of the state to cater for the needs of the population, the failure of the private sector to mobilize large investments, and the intellectual emphasis on market failure in producing optimal outcomes in decreasing cost industries. In the last couple of decades, however, the role of the private sector has been growing again. Faith in the government as rational and benevolent has diminished, especially after the collapse of the socialist regimes. The macroeconomic cost of large fiscal deficits is being appreciated. International private capital flows have increased massively. Perhaps more importantly, there has been a revolution in technology and the theory of regulation of monopolies. Although the networks of electricity, telecommunication, and railways remain natural monopolies, competition is now possible in many parts of infrastructure activities (e.g., electricity generation, long-distance calls, and gas supply). Similarly, the new theory of regulation is now better able to address important problems, such as information asymmetry, imperfect contracts, and regulatory capture.

While there is a growing convergence on the merits of private sector participation in utilities, there is a sharp divergence on the appropriate approach to bring about that participation. Developed countries opt for reforms of the entire sector by setting the rules of the game, creating independent regulatory bodies, and allowing private sector participation. In contrast, there are two camps in the developing world. One camp (most notably in East Asia and the Middle East) relies on multiple and discrete contracts (of the Build-Operate-Transfer variety, or BOTs).¹ The other camp (most notably in Latin America) relies on a sector-wide approach to reform. A decade ago, the two forms of private sector engagement did not seem to matter much, as governments were relieved from the pressure to spend scarce public funds. However, the East Asian crisis uncovered the cost of government commitment to purchase all power generated by the independent power producers (IPPs) at a pre-specified price and to cover commercial risk, especially that of the exchange rate. At the same time, there is

¹ There are various forms of this approach, including Build-Operate-Transfer (BOT), Build-Own-Operate-Transfer (BOOT), or Build-Operate (BO). In this paper, BOT is used as a proxy for all forms.

increasing evidence in support of the merits of sector-wide reforms in Latin America.²

Notwithstanding these revelations, most Arab countries are following the East Asian model. Is this approach the most beneficial to these countries? This is the question addressed in this paper, with a particular focus on the electricity sector in Egypt, Jordan, Morocco and Syria.

To answer the above question, the paper draws on the new theory of regulation to assess the two approaches. The rationale for drawing on this literature is that it offers a useful framework for analyzing regulatory contracts, which is what the two approaches are fundamentally about. The key difference between both is that the sector-wide approach is a contract between the government and all market participants under common rules of the game. Under the BOT approach, the government strikes individual (often customized) contracts with each firm participating in the sector. This difference has important implications for the development and efficiency of utilities, as will be elaborated below.

Organizationally, the rest of the paper moves from the general to the specific. The next section summarizes optimal regulatory design according to the new theory of regulation, followed by a brief account of the relevant policy instruments. In light of this discussion, section 3 evaluates the sector and BOT approaches in terms of their effectiveness in dealing with the problems of information asymmetry, incentive compatibility, and commitment. Section 4 applies the above analysis to the electricity sector in four Arab countries: Egypt, Jordan, Morocco and Syria. Section 5 offers some concluding remarks.

II. Regulatory Design

This section is not intended to be a comprehensive review of the vast literature on the new theory of regulation. Rather, the aim is to outline the framework within which the two approaches of private sector participation (sector reform and BOTs) will be assessed in the next section. It is organized under two headings: regulatory design and policy instruments.

The New Theory of Regulation

The new theory of regulation views the relationship between the regulator and the regulated firm as a principal-agent problem.³ The principal (the regulator) knows less about the agent's (the firm's) true marginal cost and managerial effort than the firm itself. Although cost is

² See, for example, Chisari, Estache and Romero, (undated), and Galal et al. (1994).

³ For a formal exposition of this literature, see Laffont and Tirole (1993). For two reviews of the literature, see Caillaud, Guesnerie, Rey, and Tirole (1988), and Benasko and Sappington (1987).

observable ex post, monitoring is imperfect and it is difficult for the regulator to verify whether high observed cost is legitimate or due to technical inefficiency and low level of effort. Coupled with the assumption that management utility decreases with greater effort, firms are expected to attempt to extract some information rent (or above normal profit). Cost padding can also be expected, whereby management adds unjustified charges to reimbursable costs.

Faced with this problem, a social welfare-maximizing regulator attempts to reduce the information rent in an incentive compatible way (i.e., in a way that is consistent with the interests of the firm). At the same time, prices are set to maximize consumer surplus. In other words, the regulator determines two rules: the cost reimbursement rule and the pricing rule. Full payment of cost (or rate of return regulation) does not offer the firm incentives to minimize cost. Fixed payment, independent of cost (or price-cap regulation) induces cost minimization, but leaves the firm with large rents. With respect to the second rule, optimal pricing amounts to the inverse elasticity rule. This rule states that deviations of prices from marginal costs should be inversely related to the elasticity of demand of the relevant goods.

So far, it has been assumed that the regulator is rational and benevolent, acting in the interest of the population at large. This may not be so. The regulated firm may in fact be able to capture the regulator. Capture is likely to take place when the payoff from colluding is high, when it is not too costly to bribe the regulator, and when the regulator is poorly compensated. Capture is likely if the stakes are low, if the regulator is well compensated, and if measures are taken to make it costly to exchange the bribe and go undetected.

The final key complication arises because contracts, including regulatory contracts, are incomplete and thus are inevitably re-negotiated ex post.⁴ If the firm believes that the government is likely to behave opportunistically or fail to uphold the terms of the contract in the future, more information rent will be demanded. This point is particularly important in infrastructure because these activities are characterized by asset specificity, which means that assets cannot be redeployed to alternative uses without a significant loss of value.⁵ Measures to strengthen the credibility of government commitment are therefore important for the success of regulatory contracts, either through external bindings or domestic legal restraints.

⁴ See Hart and Moore (1988) and Hart and Holmstrom (1987) for a discussion of this concept.

⁵ See Williamson (1989) for an elaboration of this point.

Policy Instruments

Equipped with this framework, it is not too difficult to define the policy directions for optimal regulation. In principle, policymakers need to: (1) make the information asymmetry problem go away, where possible, (2) devise incentive-compatible schemes to minimize information rent while accepting some inefficiency, and (3) find appropriate institutional arrangements to enhance the credibility of government commitment. The specific formulation of instruments for a particular country depends on the prevailing institutional set up, including auditing capacity and reputation. Below is a brief discussion of the policy instruments needed to move towards optimal regulatory design.

Making the information asymmetry problem go away

Information asymmetry is not always the product of technology. Vertical-integration and policy-induced restrictions on entry could very well provide fertile conditions for unequal distribution of information between the operator and the regulator. In such cases, *Competition* is the best option to resolve the information asymmetry problem. It forces market participants to reveal their private information without the interference of regulators. The possibility of using this option has increased significantly in recent years, thanks to advances in technology. In particular, it is now possible to adopt competition in the provision of long-distance services in telecommunications, as well as in the generation of electricity and the supply of gas.

But competition is not always possible. Natural monopoly elements remain in basic telephone services, electricity transmission, and railway tracks. In such cases, *competition by comparison* can be a useful mechanism to reduce the firm's information advantage. The participation of multiple providers (even if each of them is a regional monopoly) allows the regulator to compare performance across firms. Similarly, where competition in the market is not feasible, *competition for the market* (or auction) is a useful instrument for limiting firm information rent. In their effort to win the bid, firms are likely to cut their demands for information rent as much as possible.

Countries around the world have internalized many of these insights. It is, in particular, worth noting that one of the key features of regulatory reforms is unbundling or vertical disintegration.⁶ In electricity, unbundling has been achieved by the separation of electricity generation from distribution, leaving transmission to a third party (e.g., in the US, the UK,

⁶ Note that the benefits from unbundling are offset at least in part by the loss of some economies of scope.

Argentina and Chile). In telecommunications, vertical disintegration has been achieved by giving long-distance services to entities other than the entity providing the basic telephone services (e.g. in the US and Chile). Further, countries like Argentina have excluded the operator of the grid from participating in electricity generation and distribution to avoid favoritism. For the same reason, the operator of the telecommunications network has been excluded from providing cellular phone services in countries like Chile, at least in the initial stage of reform.

Minimizing firm rent through incentive compatible schemes

Where monopolies are unavoidable, price regulation is necessary to allow the firm a fair rate of return and to protect the consumers. As noted above, prices can be regulated using rate of return regulation or price-cap regulation.⁷ Under *rate of return regulation*, the firm recovers its economic costs. Under *price-cap regulation* (or RPI-X), regulated prices are not allowed to exceed inflation minus a productivity factor.

Although price-cap regulation is increasingly being used, especially in telecom, the choice between the two schemes involves a trade-off between rent extraction and efficiency. At one extreme, price-cap regulation promotes efficiency in the short run because firms can retain the cost savings for the duration of the agreement. Cost padding also diminishes, as firms become the residual claimant. But the scheme typically involves giving the firm large rents. For the same reason, it promotes corruption. At the other extreme, rate of return regulation fails to promote efficiency and motivates cost padding behavior, as firms can shift undue charges to consumers. However, the scheme has the potential of reducing the rent given to the firm, especially if the staff of the regulatory agency has the incentives and capacity to audit the firm effectively.

Which then is the better scheme for developing countries? According to Laffont (2001), countries with strong auditing capacity and independent regulators should use rate of return regulation. Conversely, countries with weak auditing capacity and low levels of regulatory independence should rely on price-cap regulation. He further notes that the historical evolution of the regulation of electricity in the West went through three stages. In the 19th century and the beginning of the 20th century, price-caps were used to regulate electricity with various forms of indexation. In stage two, the US created rate of return regulation, which was

⁷ Chile uses a third option, namely *benchmark regulation*. While prices are set to recover costs, the costs considered are not actual costs but those of an “efficient” firm. Despite the positive features of this scheme, it is demanding. Disagreement could also arise regarding of the definition of the “efficient” firm.

adopted later elsewhere. More recently, there has been a return to price-cap regulation with clauses related to cost observability. Developing countries fall either into stage two or stage three.

Making credible commitment

The credibility of the regulatory regime could suffer if the private sector believes that the government will change or enforce the regulatory rules arbitrarily. Further, the credibility of the regulatory regime could also come into question because the current administration is seen as unable to bind future ones. Coupled with the idea that the new administration is likely to cater for constituencies other than those of the previous one, it is not unreasonable to expect the new administration to redesign the regulatory rules for purposes of redistribution at the expense of efficiency.⁸

One way of dealing with the risk of political influence on the credibility of the regulatory regime is to resort to external bindings. In this case, the government ties its own hands by agreeing to uphold certain commitments vs. such international forums as the WTO or the World Bank. Another way is to devise legal restraints that are grounded in the prevailing political and institutional structure of the country under consideration.⁹ This could be achieved, for example, by instituting the regulatory rules in a law in countries where laws are difficult to change. Further, the appointment of the regulators could be staggered such that their appointment does not coincide with political turnovers. Finally, the regulatory agency could be created as a quasi-judicial entity, with adequate financial resources and skilled staff.

III. Sector Regulation VS. Regulation by Individual Contracts (BOTs)

On the basis of the above framework, this section assesses the effectiveness of sector reforms versus BOTs, especially in terms of how well they resolve the regulatory problems identified above and how well they impact on sector performance. The analysis is illustrated by reference to the electricity sector, in part, because this is one sector in which the government has a clear choice between sector reforms and BOTs. However, the conclusions broadly apply to other utilities.

⁸ Baron (1988), for example, shows using a model of imperfect information and majority rule that the legislators with distributive preferences may prefer a regulatory policy that achieves a desired distribution at the expense of efficiency. See also Baron and Besanko (1987).

⁹ See Levy and Spillor, eds. (1996) for an elaboration of how countries could fit their regulation with existing institutions.

Before delving into the assessment, it may be useful to characterize the two approaches briefly.¹⁰ Take the sector reform first. Under this approach, reforms involve restructuring the sector through unbundling, regulating the prices of the monopoly segments of the market, and encouraging private sector participation (through privatization and new entry). The regulation determines the rules of entry, pricing, access to the transmission network, coordination of operation and technical standards for all market participants equally. The reform package also involves the creation of an independent regulatory agency to oversee the enforcement of regulation and balance the interests of the producers and consumers.

Under the BOT approach, the government typically leaves the existing market structure as vertically-integrated, state-owned monopolies. It attracts private investment through individual contracts, mostly to build new generation plants. The contract specifies the rights and responsibilities of both parties. The provider promises to build-operate (and in some cases own) and transfer the facility to the government at the end of the contract period. In return, the government (or the state-owned monopoly) commits itself to buy all generated electricity at a pre-specified price (purchasing power agreements, or PPAs), with or without adjustment clauses. Further, the government may commit itself to provide key inputs like fuel at an agreed price and carry commercial risk on behalf of the private sector, including that of the exchange rate. This process is repeated, often through a bidding process, until demand is satisfied.

Comparative Analysis of the Two Approaches

In light of this broad characterization of the two contracts, we can now ask: which of them is likely to make the policy induced information asymmetry problem go away? Which is likely to provide incentive compatible regulation to promote efficiency and reduce information rent? And, which is likely to be less demanding in lending credibility to government commitment?

Consider the policy induced information asymmetry problem first. Under sector reforms, unbundling creates instantaneous competitive pressure in the segments of the market where technology permits. Competition is created as the state monopoly is broken into several independent entities with multiple generating companies. New entrants can only reinforce competition, since they operate under the same parameters as existing generating entities. Competition for the market can also be assured by selecting new generating companies

¹⁰ Some countries combine the two approaches, ignoring the inherent inconsistencies discussed below.

through a bidding process.¹¹ The gains in efficiency accrue to the users of electricity (industries and household) because of competition in the spot market and competition among the generating firms to secure long-term contracts with large customers.

In contrast, the creation of multiple independent power producers (IPPs) under individual contracts does not enhance and may, in fact, preclude competition. It leaves the market structure unaffected because the state monopoly continues to dominate the sector. Price competition is also eliminated because IPPs can sell all generated electricity to the government at the pre-specified price. There is no mechanism to ensure that the cost savings by IPPs are passed on to the users of electricity. IPPs could also stifle competition down the road because it is costly for the government to renege on previous commitments. Finally, IPPs could be an obstacle to privatization, especially if the new owners, say of distribution or transmission, are interested in buying electricity freely from the lowest cost provider. Alternatively, they may accept the commitments made by the government towards the IPPs, provided that the government compensates them for the additional cost or is willing to receive lower proceeds from privatization.

Consider next, the problem of incentive compatibility. Here again IPPs are inferior to sector reforms. Because selling prices are fixed under the BOT approach, they involve giving rent away to the firm in return for improved efficiency and new investment. Rent increases the stakes, which creates room for corruption. Of course the bidding process of awarding the contract could ameliorate the problems of information rent and corruption but the competitive process is hardly ever perfect. The number of bidders may not be large enough. The criteria for selecting the bid, no matter how objective, involve some subjective judgments. And the evaluators of the bids may disclose some information about other bidders to their preferred bidders. Over and above, there is no mechanism to pass on to consumers the efficiency gains made by the IPPs.

In contrast, sector reforms involve the provision of a pricing scheme (rate of return or price-cap) to all firms equally. The trade-off between efficiency and rent extraction is sorted out in light of the country's capacity to audit firms and provide regulatory independence. This procedure aligns the interest of firms with that of consumers to some degree. While it does not eliminate the room for regulatory capture altogether, this problem can be reduced if the

¹¹ Coordination of investment is further needed to balance supply and demand over time because the establishment of electricity plants materializes with a long gestation period. Chile assigned the task of investment coordination to the energy commission.

regulatory agency is granted adequate independence and compensation. In addition, a common pricing scheme enables the regulator to pass on to consumers some of the efficiency gains made by firms because tariffs are revised periodically.

Finally, consider commitment. The starting point is that countries that have difficulties making credible commitment to attract private capital will do so whether they adopt sector reforms or BOTs. In both instances, weak reputation and inefficient enforcement mechanisms make the private sector wary of government opportunistic behavior. Countries will therefore be required to offer extra guarantees or high returns on investment to attract private investment. At issue then, is whether the cost of these guarantees or higher returns on investment is equal under the two approaches or not.

The answer to this question also seems to be in favor of sector reforms. Two reasons stand behind this assertion. First, because BOTs are negotiated with each IPP separately, the demands for guarantees against government opportunistic behavior and/or higher returns on investment are repeated with each transaction. Cumulatively, these demands are likely to add up to more than the cost of making a credible commitment only once for all market participants under sector reforms.¹² For the same reason, the financial and human cost of repeated transactions is likely to be higher under BOTs than sector reforms. The second reason for the superiority of sector reforms over IPPs is that one ministry or electricity agency often conducts the latter, while sector reforms are initiated by the executive branch and approved by parliament. The menu of instruments available to the country is certainly richer than the menu available to one ministry or agency. For the country as a whole, the menu includes making external commitments, adopting new laws, and creating new entities. Accordingly, the cost of making a credible commitment under sector reform is likely to be lower than the cost under BOTs.

Available Evidence

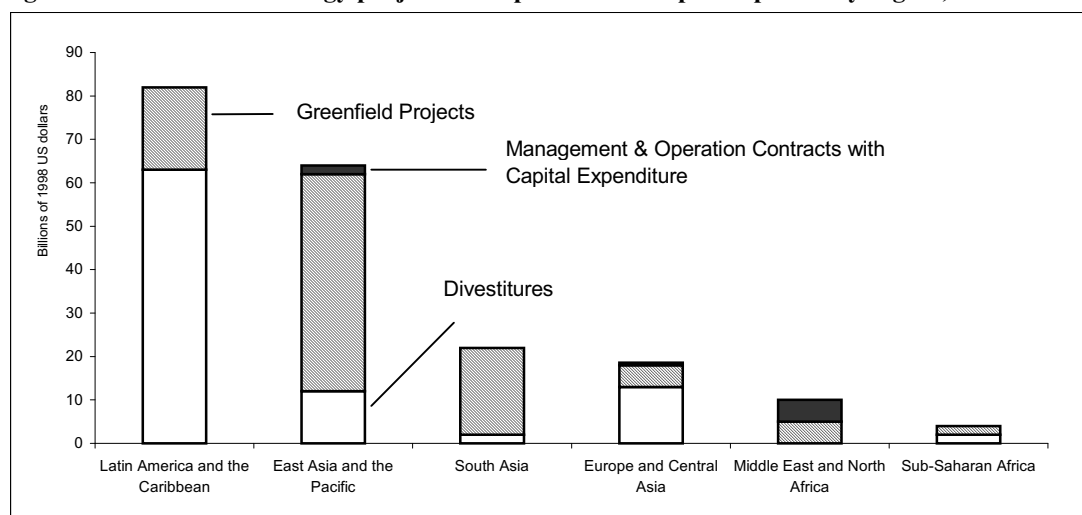
While the case for sector reforms is compelling, the justification for preferring one approach to the other ultimately rests on their impact on the performance of the sector. This subsection reviews the evidence linking reforms by type and outcomes, noting that there is no systematic

¹² That is not to say that all sector reforms are necessarily adopted in one shot; they could take time to design and implement. Furthermore, additional reforms may be necessitated later in response to changes in technology or market conditions.

assessment of the impact of the two approaches on performance across countries to date.¹³ The evidence reviewed below focuses on a comparison between Latin America and East Asia, given that Latin America relied mostly on the sector approach while East Asia is known for having relied extensively on BOTs.

Starting with investment, Figure 1 shows that East Asia was able to attract as much as \$60 billion into the energy sector over the period 1990-99. During the same period, however, Latin America was able to attract \$80 billion. The Middle East and North Africa came a distant fifth, with around \$10 billion only. Most capital inflows to Latin America came through divestiture, which is consistent with the sectoral approach adopted in this region. In East Asia, the bulk of private investment came in the form of Greenfield projects, most of which are BOTs.

Figure 1. Investment in energy projects with private sector participation by region, 1990-99



Source: Private Participation in Energy, Public Policy for the Private Sector, Note No. 208, PPI Project, World Bank

Trends in investment are of course influenced by a host of factors beyond the reform approach adopted in the electricity sector, including the country's policies, politics and economic growth. Moreover, investment is but one indicator of performance. Going beyond investment, there are a number of studies at the level of individual countries. Most of these studies lend support to the conclusion that countries which followed the sector approach fared better than those that followed the BOT approach. For example, Galal, et al. (1994) finds that unbundling, regulation and privatization of the electricity sector in Chile led to expansion of

¹³ The assessment of the two approaches is a prime candidate for further systematic research.

the sector and improved efficiency. Besides the broad analysis of the sector, the study includes an in-depth analysis of one generating company (Chilgener) and one distribution company (Enersis). The results of this analysis show that sector reforms led to substantial benefits, which were shared by the seller (government), the buyers, workers and consumers. Chisari, Estache, and Romero (1997) reach a similar conclusion regarding the impact of sector reform in Argentina. Their study focuses on the macroeconomic and distributional impacts of privatization and regulation of electricity, gas, water and sanitation, and telecommunication services, using a computable general equilibrium model. They find that reforms in these sectors have brought about significant gains to the economy across all income classes, although the results varied from one sector to another.¹⁴ Further, they note that the quality of the regulator makes a big difference for the outcome.

In contrast, studies of BOTs in Asia point out that while this approach has been effective in mobilizing private capital, it has come at great cost to society. A quotation from a study by the Asian Development Bank study (2000, p.2) sums up this conclusion very well:

The BOT approach has played a significant role in attracting private sector investment into the energy sector in the (Asian) region. In using this approach, however, countries have not always adopted competitive and transparent processes... a large number of projects were finalized... on the basis of unsolicited proposals without transparent ICB, and the prices of electricity agreed in many cases were higher than the avoided generation costs of the utility and sometimes even exceeded the average end-user tariffs. In many private power projects, a state-owned electricity utility acted as the single buyer on the basis of a long-term take-or-pay contract for the full output in terms of the capacity (MW) and energy (gigawatt-hours), and the transaction was covered by some form of government assurance of the utility's payment obligations... governments or their agencies provided guarantees to projects to cover various risks such as dispatch risk, market risk, payment risk, and exchange rate risk. Also, projects were provided with assured returns... A net outcome of this rigidity of higher priced contracts has been that many of the countries need to substantially increase consumer tariffs to maintain the financial viability of their power utilities."

The above conclusions are supported by another study (Gray and Schuster, 1998), which traced the impact of the East Asian crisis on the power sector in Indonesia, Malaysia, the Philippines, and Thailand. The four countries concluded several BOTs, while retaining vertically-integrated public utilities that act as the country's single buyer. The study finds variations among these countries, but broadly concludes that the crisis led to increased cost of

¹⁴ Outside the electricity sector, Galal and Nuryal (1994) assessed the regulatory reforms in the telecom sector of 7 developing countries. They concluded that countries, which resolved the regulatory problems identified in this paper, did better than countries, which failed to do so. Chile was the most successful, while the Philippines was the least successful.

power, enhanced the threats of contract default, and contributed to contraction in the market for private power.

In short, both the analytical arguments as well as available evidence suggest that countries are better off adopting sector reforms rather than BOTs. Adopting the wrong approach could lead to significant cost to society, especially where foreign capital is involved¹⁵ It is therefore important to ask whether the above findings have been incorporated in the reforms of the electricity sector in the MENA region.

IV. Reforms of Electricity in Egypt, Jordan, Morocco and Syria

The limited private investment in the Middle East and North Africa compared with Latin America and East Asia, noted above, can be attributed at least in part to the pattern and nature of the reforms adopted to date in the electricity sector in the region. This section first documents the reforms in a sample of four Arab countries: Egypt, Jordan, Morocco, and Syria. Next, these reforms are assessed against recommended reforms in this paper.

Revealed Preferences

Table 2 summarizes the reforms undertaken in the sample countries to date. Comparatively, the four countries differ significantly in how much progress they have made and in the approach they followed. The contrast is sharpest between Jordan and Syria. In Jordan, reforms were started in 1998, when the government divided the public power utility in two steps into independent companies for generation (Central Electricity Generation Company), transmission and dispatch (National Electric Power Company); and two regional distribution companies (IDECO and EDECO). In 1999, a new electricity law was passed, establishing a regulatory commission with the mandate of setting tariffs, issuing licenses, and overseeing the implementation of other regulatory provisions. Prior to these reforms, there were two major private distribution companies (the Jordanian Electric Power Company Ltd. and the Irbid District Electric Power Company), which operated with concessions for decades. The next step for Jordan is to devise and carry out an appropriate privatization strategy, rather than the conclusion of a BOT like the one being considered for Amman.

¹⁵ One of the points often neglected in the discussion of the costs and benefits of alternative policy options is the distinction between domestic and foreign private sector. The importance of the point follows from the fact that excessive returns to national private sector only means a redistribution of income and wealth, whereas excessive returns to foreign capital simply means a loss of national wealth abroad.

Table 2. Reforms of the Electricity Sector in Selected Arab Countries

Country	Unbundling	Regulatory regime	Privatization	BOT	Remarks
Jordan	Yes	Yes	No	No	Major reforms undertaken, but the process is incomplete
Morocco	No	No	Yes/No	Yes	Reforms not well designed, with major progress on BOTs
Egypt	Yes	Yes/No	No	Yes	Progress on BOTs as well as sector reforms
Syria	No	No	No	No	No reforms in sight yet

Source: Based on information about this sample of countries from Muller (2001) and a review of recent reforms in Egypt.

Compared with Jordan, Syria exhibits all the pre-reform features of developing countries. Namely, the government owns, manages and regulates a vertically-integrated public monopoly. The regulatory framework is not based on the principles of the separation of operation from regulation, incentive compatible schemes, and competition where possible. Tariffs are below economic costs and involve substantial cross subsidization. Efficiency is low and private participation is non-existent. In short, the reform process has yet to begin.

The distinction between Egypt and Morocco is not as sharp as that between Jordan and Syria. Both countries have relied primarily on BOTs to release the resource constraint facing the government. However, the two countries differ in two important ways. First, Egypt made more progress on sector reforms than Morocco. Second, Morocco has gone much further than Egypt in concluding BOTs.

Reforms in Egypt began in 1998, when a new law was passed allowing private sector participation, while transferring the eight public distribution companies from the Ministry of Public Enterprises to the Egyptian Electricity Authority (EEA). The restructuring led to the creation of seven regionally integrated generation and distribution companies. Transmission is left to the EEA, along with the responsibility of acting as the wholesale purchaser of electricity from all IPPs and the sole seller to the seven regional power companies.¹⁶ With these reforms, Egypt has effectively moved toward bundling rather than unbundling the sector. This situation was rectified in March 2001, with the decision to create five generating companies, seven distribution companies and one transmission company. Although the newly created companies still belong to the EEHC, their legal independence will make it easier to introduce competition and privatization down the road.

¹⁶ EEA was converted into a holding company in July 2000 and renamed the Egyptian Electricity Holding Company (EEHC).

Determined to fund the bulk of new generation capacity by the private sector, the government awarded its first BOT in February 1998. The package of the Sidi Krir power plant comprised several agreements, including a power purchasing agreement, a fuel supply agreement, and a Central Bank guarantee. With investment of around \$400 million, the project will generate 650 MW. The bidding process was transparent, involving 9 bidders. The winning bid was for 2.6 c/kWh, which is very low by international standards.¹⁷ The success of the deal prompted the EEA to conclude two more 650 MW BOTs in Suez and Port Said. Other tenders are underway, in which the government will not carry the exchange rate risk.

In a departure from conventional wisdom, the EEA considered selling some, or parts of the electricity distribution companies before the adoption of a new regulatory regime and unbundling. However, the privatization initiative faltered away in 1999. The absence of the regulatory framework, lack of interest on the part of anchor investors, and economic slowdown may have led to this outcome. Perhaps as a result, the government has since created a regulatory body (Law 339, 2000) with the broad mandate of protecting the consumers and producers. The next step for Egypt is to adopt a new set of explicit regulatory rules regarding competition, operation, pricing and entry, followed by privatization. Otherwise, the role of the regulatory agency will be limited and BOTs will remain the key instrument for attracting private capital.

Like the EEA, Morocco's Office Nationale de L'Electricite (ONE) operates as a vertically-integrated, state-owned monopoly. It controls the transmission network and acts as the sole purchaser and seller of wholesale power from IPPs to different regions of the country. In addition, ONE has the right to own all assets of electricity generation above 10 MW in Morocco. As such, IPPs basically amount to subcontracting investment and management to the private sector. Morocco has no independent regulator, nor any market competition to speak of.

While short on sector reform, Morocco was able to mobilize significant private capital into the electricity sector through IPPs. The first (in 1997) and most important of these is the Jorf Lasfar BOT. This 30-year project costs about \$1.5 billion, and generates 1,300 MW. It involves the establishment of generating units of 696 MW, as well as the privatization of two

¹⁷ The low price of electricity can be traced at least in part to a government agreement to sell fuel to the IPP at relatively low cost.

existing plants (with a 660 MW capacity) previously owned by ONE. It also involves a concession to operate the coal terminal of the Jorf Lasfar port.

While Morocco did not pursue a rigorous privatization program of the Chilean or Argentinean varieties, some privatization of electricity distribution has been carried out at a decentralized level. In 1997, Casablanca provided foreign investors with a long-term concession to operate the electricity distribution and water/sewerage systems. In 1998, Rabat awarded a similar concession to Spanish and Portuguese investors. The concession included a commitment to invest \$1.3 billion. Tangier and Tentouan followed suit in 2001, with an investment of \$1.0 billion.

Assessment

Motivated by the need to meet growing demand in the region, Egypt, Jordan and Morocco have initiated reforms in the electricity sector. These reforms have increased private investment, which for Morocco reached billions. However, aside from Syria where reforms have not been initiated yet, these reforms suffer from a number of significant shortcomings.

The most important of these is the choice of strategy. Only Jordan has adopted an appropriate package of reforms, including unbundling, a modern regulatory regime, with privatization as the next step. Morocco and Egypt, on the other hand, have opted for BOTs. It is true that Egypt has simultaneously initiated reforms at the sectoral level, but these reforms lacked sufficient emphasis on competition, incentive compatible regulatory rules, and low cost commitments.

The second shortcoming has to do with the sequencing of reform. In particular, Morocco and, to a lesser degree, Egypt did not follow best practice, starting with unbundling, a well-articulated regulatory regime, and ending with privatization. The cost of inappropriate sequencing in Egypt is likely to be lower than that of Morocco, given that Egypt has only concluded a few BOT projects and has recently initiated sector reforms, including unbundling and creating a regulatory body. In Morocco, corrective action is difficult because several BOTs have been concluded. Exacerbating this problem further is the fact that these projects are large in size, complex in nature and longer in duration than BOTs elsewhere. If and when sector reforms are initiated, it will take time to put them into effect.

Third, even where sector reforms were introduced (as in Jordan and more recently in Egypt), their details may not have been conducive to efficiency and rent extraction. Detailed and careful analysis of these regulatory regimes is warranted, to explore the validity of this

proposition. As they say, the devil is in the details. But one example may illustrate this point. The regulatory agency in Jordan is headed by the Minister of Energy and Mineral Resources, so is the regulatory agency recently established in Egypt. Such a formulation poses a conflict of interest because the ministry is also responsible for the operation of the state-owned monopoly.

The final, key shortcoming of adopted reforms concerns the design of the BOTs, especially in terms of who carries the exchange rate risk. Egypt and Morocco did agree to assume this risk in most of the IPPs they have concluded so far. The lesson from East Asia is that this provision could prove costly to the government, especially when the exchange rate is volatile and overvalued. Egypt seems to have internalized this lesson, as new IPPs leave the exchange rate risk to the providers.

V. Concluding Remarks

One of the advantages of lagging behind in the reform process is that it is possible to learn from the mistakes of others. Most Arab countries are in that position. They have the opportunity to capitalize on the lessons learned from other countries to ensure that the power sector is growing sufficiently to meet demand, at the least cost to society, while protecting the interests of the consumers. Provided that they have made a choice in terms of engaging the private sector in the provision of electricity, the analysis of this paper suggests:

- Abandoning the strategy of relying on BOTs and adopting a sector reform strategy. The benefits from sector reforms may not be immediate, but they are likely to be larger and more sustainable.
- Adopting a sequence of reforms that begins with unbundling the electricity sector into generation, transmission and distribution, followed by issuing a new regulatory regime, and then privatization. The wrong sequence is costly to society and could delay and even preclude systemic reforms later.
- Paying attention to the details of the regulatory regimes to ensure that they comprise as much competition as possible, compatible incentives with the interests of the private sector and consumers, and low cost of making credible commitment against opportunistic behavior. Inappropriate design and too much discretion defeat many of the purposes of reform.

- Privatizing existing facilities and encouraging new entrants, while strengthening the role of government as a regulator. Short of careful planning for the sector, problems of delays in investment could lead to shortages and costly blackouts.¹⁸

Of course not all countries can afford to follow the recommended sequence of reforms. In some cases, the pressing needs for generation capacity dictate concluding BOTs until sector reforms are put in place. But even then, it is important to keep in mind that significant and lasting benefits are only likely to follow from sector reforms rather than BOTs. The sooner these reforms are initiated the better.

¹⁸ Recall the recent power shortage debacle in California and Brazil.

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