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Topic: Restructuring of Electricity markets in the UK, US and
Bolivia: Lessons and implications for Vertically Integrated
Electric Utilities in the Caribbean

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The views expressed in this paper are those of the author/presenter and do not necessarily reflect the views or a determination of the Office of Utilities Regulation.

Acronyms

GOJ	Government of Jamaica
IPP	Independent Power Producer
JPS	Jamaica Public Service Company
OUR	Office of Utilities Regulation
T&TEC	Trinidad & Tobago Electricity Commission
T&T	Trinidad and Tobago
RIC	Regulated Industries Commission
GOTT	Government of Trinidad and Tobago
CEGB	Central Electricity Generating Board
ERC	Energy Regulatory Commission

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Abstract

Since the 1980s, governments the world over have sought to restructure their electricity markets through the sale of state-owned operators, competition in generation, and unbundling of the industry into distinct segments. The US, UK and Bolivia were amongst the earliest of countries to restructure their electricity markets. This paper identifies some of the positive outcomes of electricity restructuring in US, UK and Bolivia and examines the lessons that can be learnt. It also identifies key issues that could have an impact on the way in which Electric Utilities in Jamaica and other Caribbean nations operate and are regulated.

1.0 Introduction

A world trend began in the 1980s in both developed and developing countries to restructure their power sectors and reform their regulatory framework. The motivation in developed countries to restructure and reform was mainly to improve efficiency, while in the developing countries, it was to move the sector away from reliance on scarce public resources to more private sector financing.

During this time it was thought that in the electricity supply industry, high-tension transmission and low-tension distribution systems were natural monopolies, but generation was potentially competitive. It was also widely believed that because competition is more effective than regulation in promoting efficiency, separating the potentially competitive parts of the electricity supply industry from the natural monopoly parts was good policy to be emulated.

As the progress and experience of reform evolved beyond the 1980s the restructuring of the electricity industry came to refer to reorganizing electric utilities from vertically-integrated monopolies into separate generation, transmission and distribution entities. This separation or *unbundling* is intended to promote competition between generators and to provide open access to the transmission and distribution systems, eventually increasing competition in the supply and marketing of electricity thus lowering the price. However, In some countries, only generation is being deregulated; *transmission and distribution remain regulated and non-competitive*. Caribbean, utilities largely remain vertically integrated monopolies. However, Jamaica's utility is privatised and both Jamaica and Trinidad and Tobago have begun to deregulate generation.

The US, UK and Bolivia were amongst the earliest of countries to restructure their electricity markets. Yet the restructuring of the electricity markets in these countries remains a work in progress and has not always had the success that was predicted. However, the models of restructuring that have been applied in these countries have produced protocols and practices that have significantly improved the performance of the electricity markets in these countries.

This paper identifies some of the positive outcomes of electricity restructuring in US, UK and Bolivia, examines the likely impact of these outcomes and identify key issues that could have a bearing on the way in which Electric Utilities in Jamaica and other Caribbean nations operate and are regulated. The paper consists of six sections inclusive of the introduction. Section 2 describes the four market models operating in the electricity sector, while section 3 assesses the restructuring and regulatory methods in the Caribbean. Section 4 examines Restructuring and Regulatory reform in the UK, USA and Bolivia, and section 5 identifies key issues of relevance to the Caribbean. Section six summarises the key findings of the paper.

2.0 Market Models operating in the Electricity Sector

Traditionally, it was a commonly accepted view that electricity could be supplied most efficiently by vertically integrated monopolies. The arguments posited was that economies of scale could be achieved by building larger and larger generation plants, in tandem with transmission and distribution networks. Since from an economic standpoint the costs of operation decreases with scale and coordination among different parts of the network, it was considered more efficient when a single producer supplied the entire market. In developed countries, electric utilities were often privately owned and operated. In developing countries, the state assumed the primary responsibility of developing and operating the electricity infrastructure because the state was often the only entity able to raise the required capital for investing in the infrastructure, and there was a widespread view that such a strategic asset must be under the control of government. In the vertically integrated monopoly there is no competition and no consumer choice. The monopoly electric utility owns and operates all generating plants, transmission, and distribution networks. The utility is obliged to supply consumers with electricity, and consumers are captive and have no choice of supplier. The exception is that large electricity consumers usually have the option of installing their own captive power generation capacity.

The vertically integrated monopoly has been modified in some countries, mainly developing countries, to a single-buyer, monopsony framework where there is a degree of competition at the generation level in which the private sector participates. The vertically integrated monopoly still controls the power sector, but private sector

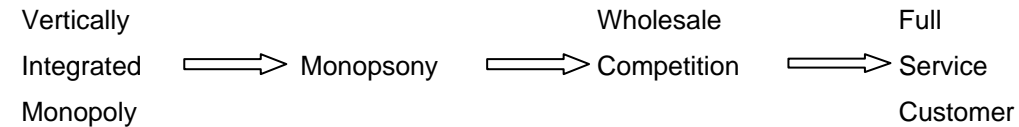
investment is made possible by licensing Independent Power Producers (IPP) to build and own generation capacity. IPPs are created by divesting existing generation capacity to the private sector and/or by new producers who compete to enter the electricity market. Trinidad and Tobago took the decision to separate the Generation assets of Trinidad and Tobago Electric Company (T&TEC) and divest 49% to a partner who could improve generation efficiency and finance new capacity. The introduction of independent power producers has been an attractive option because it relieves government from the burden of financing incremental generation capacity and the privatisation of generating assets is often a lucrative source of revenue.

In the monopsony model, the vertically integrated monopoly, as the single buyer, enters into a long-term contract with the independent power producer. In most cases, the power-purchase agreements are structured to reflect the costs of owning and operating the generating plant (for example, through take-or-pay contracts), so there is little incentive after contract signing to reduce costs and improve efficiency on the part of the independent power producer.

Competition at the generation level may be enhanced by creating distribution companies and allowing them to bid for electricity supply from bulk electricity suppliers in a power pool or wholesale market. Independent generators assume the responsibility to plan new capacity additions based on future demand forecast by the distribution companies, and compete on the basis of price to sell their electricity. As there is no longer a single buyer, market and technology risks are assumed by the generators, who in exchange have open access to the transmission network. Consumers are still captive and have no choice of supplier.

In full customer choice, competition is introduced into all levels of the industry, from the wholesale level to the individual consumer. The key to the full customer choice model is direct (or third party) access to transmission and distribution networks, thus, any electricity consumer may purchase from any retail supplier, who in turn can purchase electricity from a competitive wholesale market. The network functions of transmission and distribution, which are still natural monopolies, are completely separated from the functions of generation and retailing into which there is free entry by competitors.

The four organizational structures described above may be viewed in terms of a continuum of alternative operational models with no competition at one extreme (the vertically integrated monopoly), and full competition at the other (full customer choice), as shown below.



Source:

The regulatory structure associated with each operational model follows a similar pattern (Table 1). The vertically integrated monopoly is normally regulated, usually through the tariff that the electric utility can charge and the investments that it can undertake, with rate-of-return (ROR) regulation being the most common approach in many developed and developing countries.

Table 1
 Market Model and Regulatory Structure

Operational Model	Regulatory Structure
Vertically Integrated Monopoly	<ul style="list-style-type: none"> • Full regulation of generation, transmission, distribution, and retail component
Monopsony	<ul style="list-style-type: none"> • Full regulation of transmission, distribution, and retail components • Competition to enter Generation Level
Wholesale Competition	<ul style="list-style-type: none"> • Full regulation of transmission, distribution, and retail components • Generation regulated by the Market
Full Customer Service	<ul style="list-style-type: none"> • Full regulation of transmission, distribution components • Generation and retail regulated by the Market

A power sector organized along the monopsony model is regulated as in the vertically integrated monopoly case with respect to tariffs and investment, but now regulation is extended to contracts that the vertically integrated monopoly enters into. Price Cap regulation, as is the case in Jamaica, is usually the norm. In the wholesale competition case, competition provides an incentive to improve economic efficiency and the market is, in effect, the regulator. In practice, however, competition is often a matter of degree and the challenge is to attain workable competition, taking into consideration issues such as structural constraints and market power. Thus, the principal role of a regulator is to minimize market imperfections that may arise at the wholesale level and to control abuses of market power. The transmission and distribution components are still monopolies and some form of regulation is still required. In the full customer choice model, as in the wholesale competition model, the role of regulation is to minimize market imperfections that may arise in competitive segments and to control abuses of market power. The regulation of the monopoly transmission and distribution components is also still required.

3.0 Restructuring and Regulatory Methods in the Caribbean

a) *Institutional Framework*¹

Institutional arrangements in the Caribbean can be differentiated between those for smaller islands and those for larger islands. The predominant model on smaller islands is a vertically integrated, privately owned utility. Many of these utilities were private from their creation. Some of the smaller islands, such as St. Vincent & Grenadines, Antigua & Barbuda, and St. Kitts & Nevis, still have state-owned utilities. In the larger Caribbean countries, a variety of models exist. Haiti and Guyana have vertically integrated, state-owned utilities. In Jamaica, the utility is majority privately owned, vertically integrated, with two Independent Power Producers (IPPs). In Trinidad and Tobago, generation was separated into two partially private companies, although a state-owned utility is in charge of transmission and distribution.

The regulatory function has been developed to different levels in different countries. At the forefront is the Office of Utilities Regulation (OUR) in Jamaica, a well-established independent regulatory agency with an effective price review process. In Barbados, the Fair Trading Commission (FTC) draws on a long history of reliable regulatory practice established by its predecessor, the Public Utilities Board. In Trinidad and Tobago, the Regulated Industries Commission (RIC), created in 2000, has jurisdiction over electricity services. In the Dominican Republic, a regulatory agency was created, but in practice it has been unable to effectively fulfil its role. In Guyana, electricity services are regulated by the Public Utilities Commission (PUC). Most of the remaining Caribbean countries do not have objective and transparent regulatory review processes. Table 2 classifies the current structure of power sectors of some Caribbean Islands.

¹ Source :Electricity sector World Bank Report 2006

Table 2: Industry and Governance Structure²

	Smaller Countries – Vertically Integrated							Larger Countries.			
	Private				Public			Vertically Separated/ Private	Vertically Integrated /Private	Gener- ation Private/ Rest Public	Vertically Integrated Public
	Barbados	St. Lucia	Dominica	Grenada	St. Kitts	St. Vincent	Antigua & Barbuda	Dominican Republic	Jamaica	Trinidad & Tobago	Guyana
Supply Corporatized	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y
Board of Directors Autonomous from Executive Branch	Y	Y	Y	Y	NA	Y	Y	N	Y	Y	N
Transparent Legislation	N	N	N	N	N	N	N	Y	Y	Y	Y
Vertical Unbundling in Power Industry	N	N	N	N	N	N	N	Y	N	Y	N
Horizontal Unbundling in Power Generation	N	N	N	N	N	N	Y	Y	Y	Y	N
Horizontal Unbundling in Power Distribution	N	N	N	N	N	N		Y	N	N	N
Independent Power System Company	NA	NA	NA	NA	N	N		Y	NA	NA	NA
Power Single Buyer	Y	Y		Y	Y	Y		N	Y	Y	N
Power Bilateral Contracting								Y	N	N	N
Power Pool/Wholesale Market	N	N	N	N	N	N	N	**	N	N	N
Private Management of Power Industry (% of total capital)	100	59	100	90	0	0	0	***	80	*	0

* Generation is partially privately owned, not transmission or distribution.

** Wholesale market was institutionalized in 2001, but it is not operational.

*** Distribution and generation companies were capitalized by the sale of a controlling interest to the private sector.

² Source: Electricity sector World Bank report 2006

b) Overview of Restructuring Process in two larger Caribbean Islands

Since the mid -1990s restructuring efforts were undertaken by Governments in the Caribbean and although little progress has been made in the restructuring of the power sector in most Caribbean islands, the two larger economies, Jamaica and Trinidad and Tobago have seen significant progress. The main motive for privatisation was to attract private capital to the sector and improve efficiency. Indeed, in the case of Jamaica, the divestment of the Jamaica Public Service Company (JPS) by the Government of Jamaica (GOJ) met the GOJ objectives of:

1. Providing cash to close the 2000/01 fiscal deficit;
2. relieving the Government of the burden of sourcing capital for new generation capacity; and
3. Price efficiency and reliability of service.

Additionally, the privatization of the electricity sector in Trinidad and Tobago achieved its broad and specific objectives. The sell-off of 49% stake in the Generation assets in 1994 to Southern Electric (now Mirant Energy Corp.) resulted in Macro-economic adjustment and economic efficiency. Specifically the privatization resulted in a clear reduction in transfer from the Treasury, and the overall profitability of the sector improved. Notably the average tariffs increased from US 2.8 cents/kWh just before privatization to US 4.1 cents/kWh in 2000.

Most of the Caribbean Electricity utilities are still organized as vertically integrated monopolies. The Jamaica Public Service Company Limited (JPS) was privatized through negotiated divestment, in 2001, to a single investor, Mirant Energy Corporation. The Government of Jamaica secured capital investment of \$201 million United States Dollars and relinquished 80% of JPS to Mirant Energy Corporation. Regulation of the privately owned vertically integrated monopoly is carried out by the Office of Utilities Regulation (OUR) under the OUR Act 1993 and its 2001 amendment. The OUR regulation focuses on electricity pricing, service quality and review of investments in the sector. This Act and the JPS All-Island Electricity License, 2001 ("The Licence") are the main legal instruments used to regulate the sector. The technical and economic regulation of the

privatized utility is contained in the Licence. Several Eastern Caribbean countries, including St. Lucia, have private providers regulated by license but no effective regulatory body to oversee the license. This is in contrast to the provision for regulation of the electricity sector by independent regulators in Jamaica and Barbados.

4.0 Restructuring and Regulatory Reform in the UK, USA and Bolivia

In contrast with the Caribbean, restructuring and regulatory reform began earlier (mainly in the 1980s) in developed countries and Latin America. The view of the state's role in the economy in developed countries was changing at the time, most notably in Britain, where free and competitive markets were seen as more efficient than public sector intervention. It was thus believed that divestiture of publicly owned assets would lead to improved resource allocation and innovation.

The experience with deregulation in the United States in the late 1970s showed that markets were better at reducing prices and increasing efficiency, thus reinforcing this view. In Latin America, restructuring and regulatory reform was an outgrowth of the Washington Consensus that called for privatization, liberalization, and a greater reliance on market forces. The aim of the reforms was to create a more commercially oriented power sector that was more efficient and less politicized.

It was also expected that private sector investment in the power sector would ease the financial burden on the treasury. The following is an examination of three cases of power sector restructuring and the key issues that may bear significance for the restructuring of Electric Utilities in the Caribbean.

Table 3: Market Models and Regulatory Structure in UK, US and Bolivia

Operational Model	Regulatory Structure	Bolivia	United States	United Kingdom (Scotland, Northern Ireland and Wales)
Vertically Integrated Monopoly	<ul style="list-style-type: none"> • Full regulation of generation, transmission, distribution, and retail components 			Scotland
Monopsony	<ul style="list-style-type: none"> • Full regulation of transmission, distribution, and retail components • Competition to enter generation level 			Northern Ireland since 1992
Wholesale Competition	<ul style="list-style-type: none"> • Full regulation of transmission, distribution, and retail components • Generation regulated by the market 	1994 Electricity law provide the framework for open access to the Transmission grid and wholesale market determined by merit order dispatch.	1978, Public Utility Regulation Policies Act and the Energy Policy Act of 1992 paved the way for utilities to interconnect and to provide opened access to transmission network	Northern Ireland since 1993
Full customer Choice	<ul style="list-style-type: none"> • Full regulation of transmission, distribution, and retail components • Generation and Retail regulated by the market 		Some regions of the States	England in 1998 and Wales

a) United Kingdom

Prior to 1990, the power sector in the United Kingdom was under public ownership. In England and Wales, the Central Electricity Generating Board (CEGB) owned and operated the generation and transmission parts of the industry while 12 area boards acted as regional distribution monopolies. In Scotland, the power sector comprised two vertically integrated, geographically distinct electric utilities, combining generation, transmission, and distribution, one serving the north and the other the south. Northern Ireland was served by a single vertically integrated monopoly.

The restructuring of the power sector in the United Kingdom was part of a more general trend in the 1980s to move away from government intervention in the economy (blamed for the United Kingdom's economic decline) toward an economy more dependent on free markets. Since the government's fiscal position was in a precarious state, privatization of state assets emerged at the time as an attractive way to raise revenue for the treasury and to restructure simultaneously. The Electricity Act 1989 divided CEGB into four public limited companies: conventional generating capacity was transferred to two companies; one company acquired the nuclear power plants; and one company the transmission assets. The 12 area boards responsible for distribution were also converted to public limited companies. The distribution companies and the two conventional generation companies were completely privatized by 1990 and 1995, respectively. The distribution companies were subject to price cap regulation. The newer nuclear power plants were eventually sold to the private sector while the older ones remained in the public domain because they were not saleable. After privatization, the regional distribution companies began to invest in generation capacity and enter into joint ventures with independent power producers because electricity from new generating plants cost less than purchases from existing generating plants. By 1998, the monopoly franchises inherited by the regional distribution companies came to an end with the right of electricity consumers to freely choose their supplier.

In Scotland, the two electric utilities were privatized as vertically integrated regulated companies in 1991 after ownership of the nuclear power plants was transferred to a state-owned company. These electric utilities are free to sell to the English market and use the English wholesale price as a reference price for Scottish trading. These utilities

also compete for customers to supply. In Northern Ireland, the generation assets of the state-owned electric utility were sold to three companies in 1992. The rest of the assets (transmission and distribution) was subsequently privatized in 1993 and operates as a regulated franchise monopoly. All electricity produced by the generating companies is sold under long-term contracts for resale to the public.

Reforms in the power sector in England and Wales introduced competition that led to significant efficiency gains at the generation and distribution levels. Plant availability also improved markedly. In contrast, continued vertical integration of the utilities in Scotland appears to have muted incentives to improve efficiency. The price-cost margin widened in England, Northern Ireland, Scotland, and Wales because producers had little incentive to pass on efficiency gains to consumers. The duopolies that were created in England did not bid competitively into electricity pools and limited the extent to which prices would fall when there was excess capacity. It is believed that the lack of price competition in electricity pools also induced excess investment, thus reducing the gains in efficiency of individual investment projects (Newbery 1999).

b) United States

Each state developed its own electricity industry, usually based on private sector ownership, but also municipal and state electric utilities, rural electric cooperatives, and federally owned power systems. The majority of the electric utilities were vertically integrated monopolies. A bulk power system eventually developed into 3 major networks (the interconnected Eastern, Western, and Texas power grids) that consisted of extra-high-voltage connections between individual electric utilities for the transfer of electricity from one part of the country to another.

The power sector is subject to regulation by municipal, state, and federal level authorities to control prices at which electric utilities can sell electricity to retail customers. Price control is normally based on the principle that utilities should be able to recover costs of providing the service and earn a fair rate of return on their investment.

Several factors motivated the introduction of reforms in the power sector. In the early 1980s, electricity consumers became concerned with rapidly rising electricity prices. Conversely, electric utilities believed that electricity prices were not rising fast enough to cover costs. There was also a growing view that protected monopolies that were isolated

from the discipline of the marketplace and regulated prices result in serious inefficiencies. In 1978, the Public Utility Regulation Policies Act was enacted that required electric utilities to interconnect and buy, at the utility's avoided cost, capacity and energy offered by non-utility power generators. This was followed by the Energy Policy Act of 1992 that opened access to transmission networks, thereby establishing wholesale competition. These two pieces of legislation significantly reduced electricity prices at the wholesale level. In the early 1990s, there was also an effort to examine the possibility of retail competition at the state level. By 1998, California made the most progress by establishing a competitive wholesale market and introducing full direct retail access for all consumers.

Despite the reforms, a crisis in the power sector developed in California in 2000. Wholesale electricity prices increased to unprecedented levels and produced enormous profits for generating companies. At the same time, a financial crisis developed in the regulated electric utilities that were required to buy the electricity in the wholesale markets and sell at much lower regulated prices in the retail market. As a result, several of the state's electric utilities declared bankruptcy. Restrictions on the consumption of electricity were introduced and power blackouts were experienced in parts of the state. Two factors are highlighted as the cause for the crisis:

- (i) capping of the retail tariff that did not allow for electricity demand to adjust to changing supply conditions; and
- (ii) the ability of electricity suppliers, even relatively small ones, to exercise significant market power.

Although the California experience is unique to the United States, the experience highlighted two issues. Retail tariffs must recover all costs of supply and should be flexible enough to allow consumers to respond to changes in prices at the wholesale level. Market power needs to be monitored closely and mechanisms established to minimize the potential for any electricity supplier to exercise it.

c) Bolivia

Bolivia is a landlocked country with a Hydro-Thermal generation system. The population is 8.7 million which is three times the population of Jamaica. Bolivia is however the least developed country of the three included in the assessment.

The power sector in Bolivia was relatively small with a total installed capacity of 755MW in 1994. Although the power sector in Bolivia operated efficiently, the sector was restructured and reformed to attract private capital because fiscal difficulties precluded the government from investing in the expansion of the electricity system. Reforms in the power sector began in 1994 and involved the unbundling of the generation and transmission activities of the main state-owned electric utility. Generation capacity was subsequently vested in three separate private companies and the transmission system was established as a common carrier and then privatized in 1997. All publicly owned distribution companies were privatized. The other main generator in the private sector divested its interest in distribution. Thus, the power sector comprised four generating companies, one transmission company, and six distribution companies, along with several small isolated power grids in the outlying areas of the country. All of the generating companies owned less than 200MW of generating capacity.

The method adopted to privatize the publicly owned assets was specified in the 1994 Capitalization Law. Under this Law, 50 percent of each company was sold to the private sector and the other 50 percent was given to private pension funds. The shares sold to the private sector were issued by the respective companies and the funds raised from their sale were kept by the companies for investment purposes. Bolivia is the first country to use the capitalization method and seems to have worked well with substantial new investment in generation, transmission, and distribution capacity.

The 1994 Electricity Law stipulated that no one generator can own more than 35 percent of the country's installed generation capacity and that generators have open access to the transmission grid. Distributors buy power from generators on a wholesale electricity market determined by merit order dispatch. Generators are paid the system marginal price and a capacity payment for firm power. Distribution tariffs are based on price caps that are in force for a 4-year period. Distributors are also required to buy 80 percent of their anticipated demand through 3-year contracts to mitigate price fluctuations. Transmission tariffs are based on the average cost of providing the facility. A government regulator is responsible for granting concessions and licenses, approving international transmission connections, setting prices and retail tariffs, and ensuring the efficient operation of the sector.

The introduction of competition at the wholesale level resulted in wholesale electricity prices falling in the first 4 years after restructuring. However, retail tariffs were not significantly affected because lower wholesale prices were offset by lower electricity subsidies, mainly to households. Despite lower prices on the wholesale market, the restructured power sector attracted new entrants at the generation level and new investment, indicating a potential for good returns on investment.

5.0 Key Issues of Relevance to the Caribbean

The review of regulatory reform and restructuring of power sectors in the United Kingdom, USA and Bolivia undertaken in section 4 highlights a number of issues. Although traditional regulation was largely effective in developed countries, it was felt in the 1980s that regulation of the power sector was inherently inefficient and that competition could improve efficiency, and thus lower costs. In developing countries, regulation of the power sector had generally been weak and led to serious inefficiencies and financial difficulties. The question facing Caribbean countries wishing to restructure is whether competition can effectively substitute for regulation in some segments of the power sector to achieve improvements in efficiency and power sector performance. A second issue involves the best approach to power sector reform given that the size and structure of power systems vary from country to country.

The common approach to reform in developing countries had been to privatize the generation component and introduce some degree of competition at that level. However, smaller power sectors may not have the ideal conditions for competition and the sequence may be an important factor in successful restructuring. Most restructuring efforts in developing and some Caribbean countries involved the privatization of power system assets. Thus, the third issue is concerned with the role privatization plays in the restructuring of a power sector. Lastly, Vertically Integrated Electric Utilities (VIEUs), in many regions in the United States and other part of the globe, have survived the tide of restructuring, and will likely continue to do so. Restructuring has demonstrated protocols and practices that have unequivocally improved market performance and they can be adopted to the Vertically Integrated Electric Utilities (VIEUs) model to improve performance. Each of these key issues is discussed below.

Competition versus Regulation

One can argue that the simplest way of providing electricity is to give the utility a protected franchise monopoly and then regulate the monopoly. This was the usual approach taken in developed countries in Europe and North America and, for the most part, this arrangement worked well, despite some inefficiencies. In developing countries, including the Caribbean, the approach was similar, but with the public sector acquiring the monopoly franchise and the government acting as the regulator. Notwithstanding this however, in most of these cases, electric utilities were unable to satisfy market demand for electricity, provide a reliable supply, or supply at least cost. Certainly in Jamaica the treasury was unable to provide for the high cost of supply. The capacity of regulatory agencies to provide adequate oversight of the power sector in many Caribbean countries was also insufficient. As a result, regulation had been weak and tended to be unduly influenced by political considerations.

The introduction of competition in Bolivia, United Kingdom, and United States resulted in improvements in power sector efficiency in those countries. Electricity prices generally fell, at least at the wholesale level, because competition put pressure on generators to reduce costs. In Bolivia, competition also resulted in reductions in system losses and improvements in revenue collection. Plant availability also rose in many cases by considerable margins. In the United Kingdom, electricity tariffs did not fall substantially. The duopolistic nature of the restructured power sector in the United Kingdom restricted competition at the wholesale level and resulted in excessive profits for the largest participants in the market.

Despite these exceptions, experience appears to suggest that competition provides strong incentives for efficiency improvements and that the trend to competition in the power sector away from regulation of vertically integrated monopolies is justified. Perfect competition should provide the strongest incentives for efficiency and should transfer all gains to consumers. But competition is a matter of degree and the practical question is how competitive markets have to be in order to yield efficiency.

The evidence from the United Kingdom suggests that any amount of competition will result in efficiency gains. Therefore, the lesson for the Caribbean countries appears to

be two fold. First, although improvements in the regulation of vertically integrated monopolies may be achieved, inefficiencies will continue to exist. Second, competition provides the strongest incentives for efficiency improvements and should be introduced into the power sector where feasible. Most Caribbean countries, with the exceptions of Jamaica and Barbados, do not have competition legislation. Whilst competition is more desirable to regulation, Caribbean countries would require legislative amendments to facilitate such reform.

Restructuring the Power Sector

The important issue in restructuring the power sector is the choice of a structure that will maximize competition and limit the need for less efficient regulation. The four distinct components of a power system typically comprise generation; transmission; distribution; and retailing (contracting, metering, billing). Restructuring a previously vertically integrated electric utility to separate the competitive parts requires the identification of those parts of the network that are able to compete and the core natural monopoly parts that need regulation. This usually means that regulation is confined to the transmission and distribution systems, with competition introduced in the remaining parts of the network, that is, generation and the retail component. Experience with power sector reform in developed and developing countries has shown that achieving workable and sustainable reforms is considerably more complicated than previously thought. Successful reforms can improve the efficiency of the sector but, at the same time, flawed restructuring can seriously undermine the benefits of reform. The power crisis of 2000 in California amply demonstrates that restructuring without creating an appropriate market structure at the outset can lead to serious performance problems. It is now generally recognized that restructuring and regulatory reform should take into account the sequencing of reforms and the specific characteristics of the power sector such as size, structure, resource mix, and institutional endowments.

Sequencing Reforms

The order of the main elements of power sector reform has been the following: (a) establishing a legal and institutional framework, (b) restructuring, and (c) privatization. This generally follows the recommendation of most practitioners and academics in the field (Bacon and Besant-Jones ,2001; Jamasb, 2002).

(a) Legal and Institutional Framework.

Power sector reforms must have a clear legal basis. The most important reforms often require new legislation to restructure the sector, permit private sector participation in the sector, and establish regulatory authorities. Legislation may also be required to oblige state-owned electric utilities to operate according to commercial principles, for example, to pay taxes; follow market-based interest rates; earn market rate of returns on equity; and exercise autonomy to manage their own budgets, borrowing, procurement, and employment. The establishment of a legal and institutional framework was the first step taken to initiate restructuring in some Caribbean countries. The most notable is the Office of Utilities Regulation Act 1993 which provided for the establishment of the OUR.. In other Caribbean countries legislation was not necessary. However, reforms in the power sector were underpinned by policies developed specifically for the restructuring of the sector. Although legislation is often required to restructure a power sector, the time required for drafting legislation, introducing it in the legislature, holding debate, and enacting into law may be considerable. For example, in Jamaica the Electricity Act of 1887 which is over two hundred years old is being redrafted for the past five years and is yet to be brought to the legislature.

(b) Restructuring.

Liberalization of the power sector for the most part typically began at the generation level (Table 1) because the cost of generation and its associated financing was often the constraint on electricity supply. Returns on capital invested in generation have usually been guaranteed by power purchase agreements; therefore, it is often easier to attract foreign interests to invest in generation than in the “lines” business. From the government’s perspective, investment in generation is attractive because less regulation is involved and issues involving the public do not arise often. Unbundling at the generation level also gives large electricity consumers an option to purchase directly from generators, thus ensuring a more reliable supply. In the United Kingdom, unbundling and privatization of generation, transmission, and distribution occurred simultaneously. It is suggested that unbundling should first begin with the separation of the distribution component from the generation and transmission components (Tooraj Jamasb, 2002). The main argument is that much of the inefficiencies in the sector originate in the distribution activity because in many developing countries, tariffs are low

and subsidized, and poor bill collection rates weaken the financial health of the distribution segment. Distribution networks also exhibit high technical and non-technical losses and poor quality of service, and therefore there is likely to be considerable scope for efficiency improvements. After the distribution component has been reorganized into one or more independent companies, the transmission system should be separated from generation and open access to the transmission system established.

The final step in the restructuring process is to create several independent generating companies from the existing generation capacity and establish a wholesale electricity market. It is important that sufficient numbers of generators be created with a varied mix of generation to instill effective competition. Too few participants in the wholesale electricity market or generators with dominant positions lead to market power and may discourage new entry into the market. The creation of only two generators in the United Kingdom's power sector restructuring led to excessive profits for these companies and prevented electricity consumers from benefiting from the efficiency gains that restructuring made possible.

Survival of the Vertically Integrated Utilities.

Deregulation resulting in competition and the rule of Market forces have improved efficiencies in many industries. However, the complexity of the physical and commercial aspects of electricity supply have made structuring effective competitive markets challenging. They reflect works in progress, rather than a paradigm. In North America Energy spot markets are constantly being tinkered with to better achieve competitive standards, but at the cost of complexity that makes price discovery more difficult. Some centrally managed markets have adopted or proposed centralizing capacity acquisition, an admission that the original design is insufficient and effectively moving toward the traditional market model. Other regions have slowed down or even derailed restructuring initiatives, preferring to look again at the traditional regulated utility model. Many Caribbean countries because of systemic characteristics of the sectors notably, size, resource mix and social and legacy arrangements fact significant constraint to reforming their traditional vertically integrated monopoly system.

As a consequence, Vertically Integrated Electric Utilities (VIEUs) in many regions of the United States and developing countries have survived and will likely continue to do so. However, there are positive outcomes of restructuring that will change the way VIEUs operate and are regulated. The competitive model has demonstrated protocols and practices that have unequivocally improved market performance and they can and should be adapted to the VIEU model to improve performance.

³Some areas of the U.S are not ready to embrace the competitive electricity market model, at least not as originally envisioned or currently practiced. Some states not satisfied with the performance of the competitive market are reconstituting markets organized around VIEUs. California is the most prominent example. Others that were considering competition are revisiting the value of the regulated monopoly franchise as a means to manage the complexity of electricity market operations. States that were skeptical of the benefits of a competitive market from the beginning are turning their attention to modifying the traditional market structure to achieve superior performance.

Certain elements of the competitive market experience have demonstrated how both supply costs can be reduced and customer needs better served through the adoption of new practices. These aspects of competition should be embraced in the redesign of the VIEU market structure. VIEUs can then be judged on how well they perform relative to the competitive standards that can be achieved, at least to some extent, by organizing and operating differently.

6.0 Summary and Conclusion

Many Caribbean countries displayed the tendency in the past to import institutional reforms without sufficient regard for the unique particulars of local conditions, especially existing institutions, culture, and political traditions. The results has led to success for privatization of electricity in Jamaica, but failed in Guyana. Additionally, similar regulatory bodies have reached widely differing levels of effectiveness and independence in various countries. Competitive electricity markets that worked well in other countries, such as United Kingdom, played a part in the breakdown of the electricity sector in the Dominican Republic.

³ This section is based on information gleaned from IssueAlert written by Bob Bellemere and George Campbell and published by Utilipoint Internationan, August 18, 2006

Caribbean countries will have to restructure technically and financially less efficient electricity sectors than developed countries with more resources and stronger institutions. This paper identifies some of the positive outcomes of electricity restructuring in US, UK and Bolivia, particularly with respect to regulation, privatization, and competition and examines the likely impact of these outcomes on the way in which Electric Utilities in Jamaica and other Caribbean nations operate and are regulated.

The restructuring issues in the Caribbean countries can be divided into systemic and regulatory constraints. The systemic aspect is mostly concerned with the physical size of the systems in these countries. In addition to the systemic issues, the smaller Caribbean countries with small systems are faced with the lack of regulatory resources. In many cases, the economic and political institutions necessary for well functioning of regulatory authorities are weak.

1. Sequence of key reform steps

Experience with restructuring and regulatory reform has shown that the sequence of reforms is important. The recommended process is for the legal and institutional framework to be established first, followed by restructuring, with privatization at the end of the process. The practice in many countries was to begin restructuring with the generation component. However, there is evidence that many of the sector's inefficiencies are found at the distribution level. Unbundling the distribution function first and managing it as a separate profit centre will eliminate many of these inefficiencies and provide a sound footing for restructuring of the generation and transmission components.

2. Competition and Size of market

Restructuring to introduce competition has several requirements. To ensure effective competition, the existing generation resources need to be split into sufficient number of potentially competitive units. The main concerns are to avoid the establishment of dominant units and to ensure a balanced resource mix among the competing generating units. The industry must have a sufficient number of firms with none dominant, allow free entry and exit, and disallow collusion among firms. In developing countries with small power systems, economies of scale hardly exist and the lack of participants is often a

major problem. There is also a trade-off between having a sufficient number of competing generators and economies of scale of the plants. For example, efficient size of a combine cycle gas turbine (CCGT) is about 400 MW (Jamasp, Tooraj, 2002). The issue is whether the efficiency gains from several small competing units out-weights diseconomies of scale and increased transaction costs of an unbundled system.

Collusion will also likely exist, facilitated by entry barriers, market concentration, and capacity constraints. In such cases, significant restructuring and regulatory reform may not be feasible, so Caribbean countries should strive for achieving gradual and less ambitious improvements in efficiency. Consideration may be given to adopting monopsony models, entering into bilateral contracts or management contracts. Regulation of private sector entities has been found to be more effective and efficient than regulating public sector entities. Therefore, efficiency improvements may be achieved from the privatization of the vertically integrated electric utility.

3. Privatisation

There also seems to be some evidence that privatization prompts regulatory reform, and that there may be a higher chance of high-quality regulation under private than public ownership. For Jamaica and Trinidad & Tobago, private sector investment in the power sector relieves the burden of financing power sector projects and enables the government to focus on more socially oriented objectives. Therefore, privatization should be integral to the restructuring and regulatory reform process.

The general experience with restructuring and regulatory reform has been positive with significant gains made in efficiency of operation, improvements in plant availability, and lower retail prices. Investment decisions in new generating capacity and the upgrading and expansion of networks have become more transparent as power sectors become more commercially oriented. Substantial investment in the power sector in the developed and developing countries has been made by the private sector, thus alleviating the public sector from some of this responsibility. The view that is becoming increasingly prevalent is that competition should be preferred to regulation and introduced where possible.

Based on experience over the past two decades it has become clear that restructuring and regulatory reform is more complex than anticipated. There have also been difficulties in restructuring, such as the case of California, which has created a more cautious approach to restructuring and regulatory reform. Since the hurdles to restructuring and reform may be significant, Caribbean governments must make a serious political commitment if progress is to be made.

. Restructuring and regulatory reform is still continuing in these and other countries and should be investigated in greater detail to provide perspectives and lessons. More research on this topic is still needed. As restructuring and regulatory reform progresses, there is also a need to institute monitoring and evaluation mechanisms to keep track of latest developments.

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