Institutions, Performance, and the Financing of Infrastructure Services in the Caribbean

Edited by Abhas Kumar Jha
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Abhas Kumar Jha
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## Acronyms and Abbreviations

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<td>American and Caribbean Power Ltd</td>
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<td>AGG</td>
<td>Aggregate Governance Indicators</td>
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<tr>
<td>AIM</td>
<td>Aggregate Infrastructure Measure</td>
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<td>APORDOM</td>
<td>Port Authority of the Dominican Republic</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>American Telephone and Telegraph</td>
</tr>
<tr>
<td>ATN</td>
<td>Atlantic Tele Network</td>
</tr>
<tr>
<td>BL&amp;P</td>
<td>Barbados Light &amp; Power</td>
</tr>
<tr>
<td>BOT</td>
<td>Build, Own, Transfer</td>
</tr>
<tr>
<td>BOOT</td>
<td>Build Own Operate Transfer—a contract under which a private firm provides and operates an infrastructure facility</td>
</tr>
<tr>
<td>BWIA</td>
<td>a Caribbean airline, formerly called British West Indies Airline</td>
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<tr>
<td>C&amp;W</td>
<td>Cable and Wireless</td>
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<tr>
<td>CAA</td>
<td>Civil Aviation Authority</td>
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<tr>
<td>CANTO</td>
<td>Caribbean Association of National Telecommunications Organizations CARICOM-Caribbean Community</td>
</tr>
<tr>
<td>CARILEC</td>
<td>Caribbean Association of Electricity Utilities</td>
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<tr>
<td>CHCL</td>
<td>Cargo Handling Corporation, a government-owned company operating the Mauritius Port</td>
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<td>CMA-CGM</td>
<td>Compagnie Generale Maritime</td>
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<td>CONCOR</td>
<td>Container Corporation of India</td>
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<td>CSI</td>
<td>Container Security Initiative</td>
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<td>CSXWI</td>
<td>CSX World Terminals</td>
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<td>CTU</td>
<td>Caribbean Telecommunications Union</td>
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<td>DAP</td>
<td>Departamento Aeroportuario</td>
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<td>DGT</td>
<td>Directorate-General of Telecommunications</td>
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<td>DOT</td>
<td>U.S. Department of Transportation</td>
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<tr>
<td>DSL</td>
<td>digital subscriber line</td>
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<tr>
<td>ECTEL</td>
<td>Eastern Caribbean Telecommunication Authority</td>
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<td>EDH</td>
<td>Electricite d’Haiti</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAA</td>
<td>Federal Aviation Authority</td>
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<td>FIRs</td>
<td>Flight Information Regions</td>
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<td>FTC</td>
<td>Fair Trading Commission</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>GPL</td>
<td>Guyana Power &amp; Light</td>
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<td>GTC</td>
<td>Guyana Telecommunications Corporation</td>
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<td>GTE</td>
<td>General Telephone &amp; Electric</td>
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<tr>
<td>GT&amp;T</td>
<td>Guyana Telephone and Telegraph Company</td>
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<td>IADB</td>
<td>Inter-American Development</td>
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<td>IATA</td>
<td>International Air Transport Association</td>
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<td>ICAO</td>
<td>International Civil Aviation Authority</td>
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<td>ICT</td>
<td>Information and Communications Technologies</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>ICTSI</td>
<td>International Container Services</td>
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<td>IFI</td>
<td>International Financial Institutions</td>
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<td>IPP</td>
<td>Independent Power Producer</td>
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<td>ISPS</td>
<td>International Ship and Port Facility Security Code</td>
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<td>ITU</td>
<td>International Telecommunications Union</td>
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<td>JNPT</td>
<td>Jawaharlal Nehru Port</td>
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<tr>
<td>JPS</td>
<td>Jamaican Public Service Company</td>
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<tr>
<td>KWh</td>
<td>kilowatt hours</td>
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<tr>
<td>LNG</td>
<td>liquid natural gas</td>
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<td>MDG</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MOUs</td>
<td>Memoranda of Understanding</td>
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<tr>
<td>MSC</td>
<td>Mediterranean Shipping Company</td>
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<tr>
<td>MW</td>
<td>megawatt</td>
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<tr>
<td>MWh</td>
<td>megawatt hours</td>
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<tr>
<td>NGOs</td>
<td>non-governmental organizations</td>
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<tr>
<td>NTRC</td>
<td>National Telecommunications Regulatory Commission</td>
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<tr>
<td>NWC</td>
<td>National Water Commission</td>
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<td>NWSC</td>
<td>National Water and Sewage Commission</td>
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<td>NYK</td>
<td>Nippon Yusen Kaisha Line</td>
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<td>OBA</td>
<td>output-based aid</td>
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<td>ODA</td>
<td>Official Development Agency</td>
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<td>OECS</td>
<td>Organization of East Caribbean States</td>
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<tr>
<td>OOCUR</td>
<td>Organization of Caribbean utility Regulators</td>
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<td>OUR</td>
<td>Office of Utilities Regulation</td>
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<td>PAJ</td>
<td>Port Authority of Jamaica</td>
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<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
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<td>PPI</td>
<td>Private Participation in Infrastructure</td>
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<td>PSP</td>
<td>Private Sector Participation</td>
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<td>PUC</td>
<td>Public Utilities Commission</td>
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<td>RASOS</td>
<td>Regional Aviation Safety Oversight System</td>
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<td>REDI</td>
<td>Recent Economic Developments in Infrastructure</td>
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<tr>
<td>REP</td>
<td>Rural Electrification Program Ltd</td>
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<tr>
<td>RIC</td>
<td>Regulated Industries Commission</td>
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<td>SLAPSA</td>
<td>St. Lucia Air and Sea Ports Authority</td>
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<td>TEU</td>
<td>Twenty-foot Equivalent Unit</td>
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<tr>
<td>TSA</td>
<td>U.S. Transportation Security Administration</td>
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<td>TSO</td>
<td>Telecommunications Service Obligation</td>
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<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
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<tr>
<td>WASCO</td>
<td>Water and Sewerage Company</td>
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The linkages over the long-term between infrastructure investment and economic growth are well documented. Public investment in basic infrastructure is a necessary requirement for capital accumulation in the private sector. This chapter reviews the performance of infrastructure sectors across the fifteen Caribbean countries covered in this report. It highlights areas in which policy changes might help countries in the Caribbean grow and develop.

The chapter reviews the access to services, investment needs, tariffs, and efficiency of the Caribbean countries across five infrastructure sectors: telecommunications, electricity, water and sanitation, maritime transport and ports, and airports and air services. Benchmarks are established to compare Caribbean countries with each other, and with similar countries. To some extent, differences in performance can be explained by unalterable factors such as a given country’s size and location. For example, economies of scale make it inevitable that the cost of electricity will be higher on smaller islands than on larger ones.

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1. This chapter appears as Chapter 8 in the companion “Caribbean Growth and Competitiveness Report” (World Bank, 2005).
3. This study covers the OECS group—Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines, as well as The Bahamas, Belize, Barbados, Dominican Republic, Guyana, Haiti, Jamaica, Suriname, and Trinidad and Tobago.
Varying income levels also explain much of the difference in access to services. However, we find that, in many cases, differences in performance among countries cannot be completely explained by such factors.

Much of the remaining differences in performance seem to be attributable to institutional and policy factors, such as the level of competition among service providers within a given sector, whether providers are Government or privately-controlled, and the quality of regulatory and subsidy regimes. In conclusion, the chapter highlights several key policy findings and recommends changes that have the potential to help Caribbean governments overcome some their inherent disadvantages of scale to provide better, cheaper infrastructure services.

Levels of Services Vary Across Sectors and Countries

**Telecommunications**

Figure 1.1 shows that some Caribbean countries have a level of access to telecom services that is in excess to what is predicted by income levels, particularly Jamaica and Antigua and Barbuda.

Until the late 1990s, access to telecommunications for most people in the Caribbean was provided through fixed lines for the urban middle class and payphones for lower income and rural communities. Typically, fixed telephone lines were somewhat less extensive than access to electricity. Then the combination of mobile telephone technology and market

![Figure 1.1. Total Fixed and Mobile Lines per 100 People](image-url)
liberalization revolutionized access. Jamaica and the Dominican Republic were the first countries to welcome competitive mobile phone companies, followed by Barbados and most Organization of East Caribbean States (OECS) countries. The rates of mobile phone uptake are illustrated in Figure 1.2.

Because Jamaica was the earliest and most successful country to embrace a competitive telecommunications sector, it is worth focusing on that country’s experience. Since liberalization in 2000, mobile phone use has increased tenfold. Mobile phone ownership per capita in Jamaica is now higher than it is in the United States. Much of this demand has come from people for whom a mobile phone is their first telephone. The economic impact has been significant. For example, it has allowed casual workers and tradespeople to increase their productivity through greatly improved communication with their employers. A similar pattern is now taking place in Barbados and in liberalized OECS countries, such as St. Lucia.

This experience represents a clear opportunity for Haiti, Guyana, Suriname, Trinidad and Tobago, and others that have not yet liberalized their markets to follow the successful examples of the countries that have already introduced competition in telecommunications.

The massive increase in access to telecommunications in countries like Jamaica was not primarily a technological phenomenon. Mobile phone service had been available in most countries for some time, but it took competition from new companies to make available such services as pre-pay phones and calling-party-pays plans that targeted the vast majority of the population.
Traditionally, most Caribbean countries had local calls and access rates that were at or below cost, and international calling rates that were well above costs. Those countries that invited competition in international calling and mobile telephony now have tariffs that compare favorably with competitive, developed countries. At the same time, access and local calling rates have increased to cost-recovery levels. Other countries, including Trinidad and Haiti, still struggle with international rates that are well above cost, which constitute a tax on internationally conducted business.

Internet services are costlier than in countries with comparable income levels. For instance, the cost of 20-hour dial-up access in St. Lucia is US$22.22 compared to US$8.42 in Malaysia. High-speed connection is as high as US$400 per month in places like Antigua, Barbados and Jamaica, while it costs US$40–50 in the United States. As a result of these high prices, Internet density is particularly low in the Dominican Republic, Haiti, Suriname and St Vincent and the Grenadines, at 3.64, 0.96, 4.16, and 5.98 users per 100 inhabitants. Other countries like Jamaica and St. Kitts and Nevis have relatively higher usage rates of more than 20 users per 100 inhabitants. These are all substantially lower than in the United States, Singapore, and New Zealand.

![Figure 1.3. Cost of Cellular Local Call (U.S. dollars per three off-peak minutes)](image)

Electricity

Sustained policy efforts to expand access to electricity in the English-speaking Caribbean have achieved electrification rates above 80 percent for all of them. In contrast, the Dominican Republic and Haiti have achieved rates below 70 percent and 40 percent, respectively. The generation capacity is enough to meet the demand in most English-speaking countries, whereas in Haiti generation capacity is inadequate. In the Dominican Republic, physical capacity is in place, but regulatory and policy failures have put private providers in a position where they cannot cover costs, which has led to “financial blackouts.”

As shown in Figure 1.6, average end-user tariffs in the Caribbean tend to range from around US$0.16 per kilowatt hour (KWh) (in St. Kitts and Jamaica) to around US$0.28 per KWh (in St. Vincent and Dominica). Exceptions include Trinidad, which uses its indigenous gas reserves to supply power at a very low tariff, and Haiti and the Dominican Republic where tariffs are below the cost of supply.

Figure 1.6 shows that some of the differences among countries in tariffs can be explained by the size of the system since unit generation and other costs tend to fall as supplied volume increases.

Smaller systems will always face higher costs, but all systems can reduce costs by increasing efficiency. In particular, the smaller utilities may be able to reduce costs by adding capacity in smaller increments, switching from diesel to heavy fuel oil, and adopting more competitive procurement practices.
“Financial Blackouts” in the Dominican Republic’s Power Sector

The power sector in the Dominican Republic is facing serious financial problems. At an extreme point, in 2002, IPPs, receiving no Government or distributor support, were forced to suspend production, which led distributors to cut power, predominantly in poor neighborhoods. These were the so-called “financial blackouts.”

With continuing higher international fuel prices, the Government decided to freeze tariffs at February 2000 levels. The difference between the true costs of recovery tariffs and the tariff paid by consumers was subsidized by the Government. However this was unsustainable. The subsidies became such a fiscal burden on the Government that it started defaulting on its payments to generators.

At the same time, distribution companies (privatized in 2000) were unable to turn around the losses and collection as they had originally expected. They didn’t have the legal power to cut off supplies for overdue bills. There is also a widespread practice in the country of illegally connecting to the grid. The combination of these factors led distributors to suspend payment to generators.

Faced with no payments from the Government or distributors, the IPPs decided to suspend production. As a result of these supply cuts, distribution companies began to cut power in predominantly poor neighborhoods that had the highest losses and lowest collection ratios. Power cuts led to public riots, which claimed fifteen lives.

The reaction of the Government was to eliminate the generalized subsidy while simultaneously maintaining a targeted subsidy for the poor, renegotiating IPPs to cover stranded costs and payment of arrears, and offering support to fight illegal connections.

However, a sharp increase in the price of fuel in early 2003 led the Government to reconsider this decision. As a result, it reestablished the generalized subsidy and created a so-called stabilization fund to cover its obligation. This was designed as a temporary measure that would phase out as prices stabilized. To further complicate matters, a banking crisis in the country led to a sharp devaluation of the peso in late 2003.

Although the shock was absorbed by the stabilization fund, the distribution companies were hurt. First, they were not paid by the fund. Second, typically there is a two-month lag before increases in generation costs are passed through to the retail rate. As result, the distribution companies stopped paying the generation charges and “financial blackouts” reappeared. To further complicate matters, one of the privatized distribution companies sold two-thirds of its interests back to the Government in late 2003.

The experience of the Dominican Republic demonstrates the importance of having a sound legal and regulatory framework before introducing reforms. Adequate legislation would have provided the distribution companies with the tools to enforce payment. A strong, independent regulatory regime, or regulation-by-contract, would have limited the extent to which the Government could arbitrarily adjust retail rates.


Another way to reduce costs is to reduce transmission and distribution losses. Although Barbados and Trinidad and Tobago do very well on this measure, the other countries have room for improvement, as Figure 1.7 illustrates. The Dominican Republic, Guyana, and Haiti could achieve significant cost reductions by reducing distribution losses. In these countries, much of the losses result from theft and underbilling. Reducing these problems will require increased commercial vigilance with Government support to enforce payment by utility users.

Increasing efficiency may require institutional change to provide the right incentives. For example, several Eastern Caribbean utilities, both public and private, have little in the way of
Figure 1.5. Access to Electricity (% of Population)

Figure 1.6. Average End-User Electricity Price (U.S. cents per KWh)
regulatory incentives to optimize their capacity planning, fuel choices, procurement, and other cost drivers. This contrasts with Barbados and Jamaica, where regulatory agencies effectively supervise the utilities providing incentives for increased efficiency and improved service.

Private ownership of utilities can also help increase efficiency if the profit motive can be used to provide incentives to minimize costs. Figure 1.8 shows how labor productivity varies among electricity utilities in the region in relation to different types of ownership.
**Water and Sanitation**

Access to water is generally reported to be higher than access to electricity. The English-speaking Caribbean has levels in excess of 90 percent; the Dominican Republic and Suriname are between 80 percent and 90 percent; in Haiti, less than 50 percent of the population has access to improved water sources. However, a family can be classified as having access to an “improved” water source even if it’s not a piped connection (for example, if they collect water from a standpipe or a rainwater catchment tank). If the criterion were access to a utility connection (as it is with electricity), then the figures for those with water access would be lower than for those with access to electricity. In most countries, the combination of high losses as a result of leakage, theft and under-billing (in excess of 50 percent) and inadequate investment in production and treatment infrastructure results in water rationing, at least at certain times of the year and in certain districts. Sewage networks are much less extensive than water supply networks, and wastewater is often inadequately treated prior to discharge, which can cause health problems as well as environmental damage (for example, degradation of coral reefs).

In general, water tariffs in the region barely cover operating costs (in Jamaica and St. Lucia), or are below operating costs (in Trinidad and Tobago, and Guyana). This makes it difficult for the water utilities to provide efficient service and invest to meet growing demand.

Many water utilities in the region have unaccounted for water losses (i.e., leaks, theft, and under-billing) of between 50 percent and 70 percent. This inefficiency contributes to high pumping costs and inadequate supply. Labor productivity for a typical Caribbean utility is usually around half of that considered to be best practice in Latin America.

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**Figure 1.9. Access to Improved Water (percent of Population)**

![Graph showing access to improved water by country and GDP per capita](attachment:image.png)
Vanuatu, which had previously been under the rule of a condominium government (French and English), gained its independence in 1980. At that time, the urban water service in Port Vila was operated by the Public Works Department and over the years that followed independence, there was a gradual degradation of the water service in the urban centers. Some of the fundamental problems included:

- The Government was unable to collect sufficient funds to cover operating costs.
- Although water was metered and water charges were adequate, the level of collection was poor.
- As a consequence, the Department of Public Works had little or no funds to spend, not only on new works, but also on basic day-to-day operating needs.
- The network was deteriorating along with the quality of service, which was beginning to affect tourism and other industries.

To address these issues, the Government decided to let a concession contract based on the model adopted in nearby Noumea (New Caledonia). Aware of its weak institutional capabilities, the Government was prepared to delegate all management, operating, and investment functions except for the ownership of assets. To implement this initiative, the Government called a number of specialized companies to submit offers, which later led to a negotiation with UNELCO, a company associated with Lyonnaise des Eaux (now ONDEO).

In 1994, after two years of negotiations, UNELCO signed a concession contract to supply water and electricity in Port Vila. Some of the key terms of the contract include:

- The duration of the contract is for 40 years.
- The concessionaire is responsible for the operations, renewal, upgrades, maintenance, and extension of the network within the geographical limits of the concession area.
- At the end of the contract, all assets are returned to the Government or a new contract is signed.
- The price of the water is adjusted based on formula that reflects increases in the underlying costs.
- The performance of the contract is controlled by the Government; periodical technical and financial reports are provided by the concessionaire.
- The concessionaire is contractually bound to operate and maintain the network and guarantees the sustained quality, quantity, pressure, and continuity of service as specified in the contract.
- Failure to meet service targets would result in penalties to the company.

After close to 10 years of operation, the concession delivered improvements in service. Some of these include:

- Before the contract, water supply was often interrupted; now water is supplied 24 hours a day.
- Unaccounted for water was reduced from 50 to 23 percent.
- The water tariff for the first 50 m3 per month was reduced to US$0.58 per m3 from US$0.75 per m3.
- Annual losses of up to US$440,000 in 1991, have been turned into a reported surplus of US$12,000 in 2000.

Some of the factors that contributed to the success of this case include:

- Initial acceptance by the Government of its own weak institutional state.
- The contract was well designed with good provisions for tariff indexation and clear definition of service targets.

Sources: A Case Study of the Privatization of Port Vila, John Chaniel, UNELCO Vanuatu Ltd.; Beyond Boundaries—Extending Services to the Urban Poor, Asian Development Bank, not dated.
Ports and Airports

Ports and Airports are vital to island nations. Our analysis shows that, with some exceptions, the countries we examined had adequate physical infrastructure capacity for ports and runways.

To benchmark airport and port costs, we made a model of total charges to a typical plane and a typical ship at each location for which we had cost data. As the resulting figures below show, charges in the Caribbean generally are not out of line with efficient international comparators, unlike in the Dominican Republic and Trinidad where they seem high. Surprisingly, the Port of Kingston in Jamaica is rather expensive for a typical ship despite being a relatively efficient and competitive port. The Port Authority of Jamaica (PAJ) is a statutory body, with a semi-autonomous board. It has been appointed by the Government to act in the interests of the port by setting port tariffs and negotiating individual tariffs with shipping lines. PAJ also owns some of superstructure assets, such as the cranes at the transhipment terminal. Concessionaires or contractors operate the assets, cargo handling, and other activities in the port. APM Terminals Ltd., an AP Moller-Maersk international terminal firm, operates the transhipment terminal. This model of structural separation has improved the port’s efficiency. Labor concessions and improved terminal management and equipment have enabled improvements in productivity. For example, negotiations in 1998 reduced the average port gang size from 21 to eight people and introduced flexible staffing hours.

Although airport and port charges are clearly important, they remain a small fraction of the total cost of transporting people and goods to and from Caribbean countries. On average, airport charges are equal to five percent of an economy-class plane ticket to Miami, and three percent of a ticket to London. Similarly, port charges are typically no more than 10 percent of shipping charges.

Figure 1.10 shows typical economy-class airfares from Miami plotted against the distance between Miami and the destination. Interestingly, the Dominican Republic, the only Caribbean country with an open-skies agreement with the United States, has the lowest fares in both total and per kilometer terms.

Most Caribbean airports perform reasonably well on measures like baggage handling time. Performance indicators, such as capacity, baggage handling time, and revenue generation, show that publicly owned airports are capable of performing as well as those that are privately operated. However, six out of the seven publicly owned airports we reviewed in the region fail to cover their full costs; therefore, they ultimately will represent a fiscal burden. In contrast, all of the privately operated airports cover their full costs, including capital costs. This suggests that private participation, through concession, can effectively maintain and expand services while limiting fiscal risk.

Caribbean ports vary widely in efficiency. Some approach world best practice, while others need to reform to increase efficiency, as Figure 1.11 and Figure 1.12 indicate.

In the Dominican Republic, private companies built a new airport at Punta Cana to serve the growing tourist demand, whereas in other countries, financing and building airports are generally a Government responsibility.

Shipping capacity is adequate, and is privately provided in a competitive market. Air transport capacity is also adequate, although liberalization of air services could significantly increase services and reduce costs.
The issues that may require attention include:

- **International safety and security standards.** Governments around the world have tightened safety and security standards since the 9/11 terrorist attacks on the United States, and it is essential that several Caribbean countries make institutional and (relatively minor) infrastructure improvements to ensure that their ports and airports comply in order to continue enjoying trade and travel with the United States.

- **Terminal capacity at airports.** Several airports have inadequate terminal space and facilities. A pleasant, uncrowded arrival and departure experience is vital to sustaining the tourist industries on which many islands depend. This can, in turn, make retail and other airport services highly profitable. Jamaica has addressed this

### Sangster International Airport Privatization Development Project

The privatization of Sangster International Airport was driven by the need to raise private capital to finance the development of the airport. With increased traffic growth, the overcrowded terminal was bad for Jamaica’s tourist image. The Airports Authority of Jamaica prepared a development plan based on traffic projections and sought to finance the development through private capital. The process was drawn out for a number of reasons: uncertainty over the nature of the commercial arrangements, absence of a structured competitive process to select the private party, dispersion of responsibility, and a lack of clarity over the regulatory arrangements. In the end, a consortium of four companies formed a joint venture company, MBJ Airports Ltd., which now operates the airport on a concession basis for 30 years and is currently undertaking the development project along timelines stipulated by the Airports Authority. The total project is to cost approximately US$200 million.

*Source: Castalia.*
Figure 1.11. Containers per Crane-Hour

Figure 1.12. TEUs per Employee
problem at Sangster International Airport (Montego Bay) through a concession with a private company to build additional facilities and operate the airport.

- **Transhipment port capacity.** Several Caribbean ports have developed profitable transhipment businesses by taking advantage of the region’s prime location at the intersection of world shipping routes. Some of these, such as the ports of Port of Spain (Trinidad) and of Kingston (Jamaica), need to make significant investments in additional port facilities to serve the growing demand. However, these investments are risky because the transhipment market is highly mobile and can easily move to another port with lower costs, potentially leaving investors with no way to recoup their investment.

### Critical Investment Requirements

Infrastructure is capital intensive, so if countries are to maintain and improve access to infrastructure services they will need to make significant investments. We make an estimate of investment needs in two critical sectors: electricity and water and sanitation for the Caribbean countries covered by this study.

Nevertheless, great care is needed in interpreting these numbers. Because there is no single “right” level of infrastructure, there can be no definitive statement of the level of infrastructure a country needs, or its estimated costs. The above numbers were derived from the following “targets” for physical provision planned by 2015: halving the part of the population without access to improved water, sanitation, and electricity, and bringing fixed and mobile teledensity up to a developed-country level. The increase in physical provision necessary to accommodate population growth and meet these two targets was then multiplied by the estimated cost per additional person served found in other World Bank studies. The countries’ actual targets may be quite different from these estimates. For example, it could be argued that the targets for Haiti are unrealistically high, given the country’s level of economic development, whereas other estimates, such as for telecommunications in Barbados, may be too low. The estimates are for new investments, and do not include rehabilitation expenditures that may be necessary. No substitute exists for detailed, country-by-country, sector-by-sector analysis; however, the calculations in the report at least provide possible orders of magnitude of investment needs.

### Investment Estimates for the Electricity Sector

Investment requirements in electricity vary widely among Caribbean countries. As expected, countries which offer less access to electricity services, such as Haiti and the Dominican Republic, have the highest investment requirements. Haiti, which has the lowest access levels and lowest electricity intensity, has the highest investment requirements.

Investment requirements differ widely among the three electricity intensity scenarios. Total investment requirements for the selected group of countries for the period between 2004 and 2015 is US$3.9 billion under the assumption that electricity intensity remains unchanged. If electricity intensity increases to 3 or 4 MWh per capita, total investment requirements for these countries increases to around US$26 or 47 billion, respectively.
The three countries in which increases in electricity intensity have the largest impact on investment requirements are Haiti, Guyana, and Dominica. For example, in Haiti, investment requirements under the current electricity intensity scenario are close to US$400 million over the next 11 years. However, under the assumption that electricity intensity increases (that is, the reliability of supply and industrial consumption increase), investment requirements increase substantially to US$14 and US$23 billion for electricity intensities of 3 and 4 MWh per capita.

The difference between investment requirements for the present electricity intensity and for increased electricity intensity is also high in Guyana where electric supply is unreliable. Investment requirements under the current electricity intensity in Guyana are only US$12 million over the 2004 to 2015 period. This low level of investment is explained by a projected decrease in population.

To expand connections while keeping consumption per connection constant (Scenario 1) would require countries like Haiti and the Dominican Republic to invest up to around 1 per cent of GDP per annum in the power sector. The percentages are lower for other countries. To expand connections and also meet an expansion in demand per connection to the level current prevailing in Barbados (Scenario 2) would require an investment of 1 per cent or less of GDP in most countries, but in Dominica and the Dominican Republic would require 3 per cent and 5 per cent respectively of GDP to be invested in the power system. In Guyana and Haiti the figure rises to 10 and 38 percent of GDP respectively.

One obvious conclusion from these figures is that it is not realistic to expect Guyana and Haiti to expand connections and service increased demand at this level, both because the investments required are too large compared to the size of the economy, but more importantly because it is highly unlikely that economic growth in Haiti and Guyana will be sufficient to increase consumption per connection of electricity to the level currently prevailing in Barbados. In other words, the demand will not grow at a rate which would actually require the amount of investment derived in Scenario 2.

A more important conclusion, though, is that as economies grow, demand for electricity will increase, and substantial investment will be required. If it is not provided, growth will falter. This points to the need for electricity providers to have ready access to capital to invest, and tariffs which allow them to cover their costs, including earning a return to remunerate that capital. Governments (especially in highly indebted countries) may struggle to provide the capital required, reinforcing the benefits of private participation in electricity.

**Investment Estimates for the Water and Sanitation Sector**

Investment requirements for a selected group of Caribbean countries have been estimated setting service target levels based on the MDG. This is to halve the percentage of the population without access to improved water supply by 2015. The unit cost of connecting a household to water supply was estimated at US$400. This may be a higher-end figure given
that MDG targets are computed on the basis of increasing access to all forms of improved water supply (for example, household connection, public standpipe, private standpipe, and so forth), and not just household connections.

Investment requirements to increase access to improved water services differ substantially among Caribbean countries. The total investment requirements for the next 11 years for the selected group of Caribbean countries is close to US$650 million, or about US$60 million per year. Haiti and the Dominican Republic stand out as the countries with the highest total and per capita investment requirements. For example, in Haiti, investment requirements for the next 11 years are US$340 million, or close to 50 percent of the total for the selected countries. In the Dominican Republic, investment requirements for the next 10 years are close to US$220 million, or nearly 35 percent of the total for the selected countries. With Haiti and Dominican Republic needing up to 85 percent of the total investment requirements for the selected countries, the remaining countries appear to have substantially lower investment requirements.

These investment requirements estimates do not include replacement of aged assets. With a long history of inadequate investment in asset maintenance, it is likely that replacement and rehabilitation investment requirements are substantial.

Significantly larger investments would be required to achieve comparable targets in sanitation services given that the majority of Caribbean cities have only partial sewerage.

Affordability of Investment Requirements

The overall trend in the figure above shows that wealthier countries tend to require less investment per capita in water supply than those that are less-well off. This follows from the fact that wealthier Caribbean countries already offer improved water services to nearly 100 percent of the population.

Haiti stands out as the country where investment requirements are least affordable. With a GDP per capita of around US$400, Haitians will need to spend close to 10 percent of their GDP to afford expansion of water services. Because it has other important priorities, it is unlikely that on its own, Haiti will be able to meet the MDG. The Dominican Republic and Belize are also on the upper end of investment requirements; however, with a higher GDP per capita, investment requirements in these countries represent only one percent of the total GDP.

The estimates for Guyana show that less than US$4 per capita for the next 10 years is required to meet the MDG. Guyana reports that 94 percent of its population is receiving access to improved water services. The UN Urbanization Prospects indicate that Guyana’s population is expected to remain unchanged over the next 10 years. That is, investment requirements are low because they reflect only the funds needed to increase access from 94 percent to 97 percent. However, this figure is misleading since the quality of water services currently being provided in Guyana falls well below the population’s expectations. To provide reliable, safe drinking water, and sanitary facilities for excreta disposal would require significant expenditures not captured by our estimation methodology.
The Bahamian population is expected to grow 15 percent over the next 10 years. This expected growth explains why the Bahamas appears to have high investment requirements in relation to other countries with similar income level.

Given that Caribbean countries have a wide range of investment requirements, and that less well-off countries tend to have the highest per capita investment requirements, the question that follows is how much countries would need to change their historic investment rates to reach the MDG targets. Data on total investment flows to the water sector of each country are hard to find. Most Caribbean countries rely on three sources to fund capital investments: public funds, ODA, and private investment. In the absence of data for the first source, the table below presents implied public, and actual ODA and private investment, flows as well as investment requirements.

The Costs of Not Investing are High

It is highly desirable for infrastructure providers to be able to finance expansion as demand grows. When this does not happen, the short- and long-term economic costs can be high. For example:

- A 1999 study in Jamaica found that investments valued at US$500 million—mostly for tourism and housing projects—were being held up by lack of water, yet the capital cost of providing the water would have been only around US$30 million.
Failure by incumbents to invest in expanding mobile communications in Guyana and elsewhere means that these countries are missing out on the productivity gains experienced by Jamaica and other countries that liberalized telecommunications and attracted additional investment.

Lack of power, water, and other infrastructure makes it difficult for businesses in Haiti to succeed and grow.

The sectors and utilities that perform best tend to be those that can charge a cost-recovery tariff and are privately financed, such as island-based mobile phone companies and electricity companies. These sectors may have significant investment requirements, but a careful assessment of risks and financial structuring can minimize Government intervention and mitigate fiscal risk.

The importance of investment for growth means that it is advisable for Governments to allow service providers to recover their costs through a cost-recovery tariff or, if this proves socially unacceptable, for the Government to provide explicit subsidies to cover the difference between tariffs and costs, possibly using variations of the universal service subsidy models discussed above.

Sectors and countries that can achieve cost recovery and private investment financing need not be daunted by the investment need estimates.

The main areas of concern should be those sectors, such as water, that traditionally have difficulty achieving cost-reflective tariffs and privately-financed investments, and those countries like Haiti, Suriname, and Guyana where low incomes and low institutional capacity make both cost recovery and attracting investment difficult.

*However High Debt Overhang Limits Options for Investment*

One must also be mindful of the Caribbean debt context. Many Caribbean Governments have debts which are at or approaching unsustainable levels. Debt to GDP ratios are illustrated in Figure 1.14, which shows that 14 Caribbean countries would rank among the 30 most indebted emerging market countries.

High debt levels mean that traditional Government borrowing to finance infrastructure is no longer sustainable for highly indebted countries like St Kitts, Jamaica, Antigua, Dominica, and Grenada. Most infrastructure investments will need to be either self-financing, or, to the extent that it is not, generate rapid and significant economic growth which can generate increased tax revenues to allow the debt to be serviced.

This is not how infrastructure investment is generally analyzed. Normally roads, bridges, ports, and the like generate returns over decades, and the cost benefit calculus is one of economic cost and benefits, not fiscal costs and benefits. Unfortunately, in many Caribbean countries the fiscal situation means that this approach is no longer possible. If we assume that the costs of default on debt are such that strenuous efforts are needed to avoid defaulting, then Government finance of infrastructure needs to largely pay for itself in fiscal terms.

This has a number of implications:

- Most new infrastructure finance will need to be serviced from user charges or higher taxes.
There should be bias toward financing of infrastructure by private providers, for three main reasons:

- The evidence in the Caribbean is clear that private infrastructure providers are generally able to operate on a cost recovery basis, while government providers generally are not.
- Keeping borrowing off the books will help keep interest rates down, because rating agencies and financial markets find it difficult to assess the likelihood that particular investments will generate returns, and tend to regard all borrowing by a highly indebted country as negative, regardless of the actual financial and economic implications of the borrowing.
- Justifying public investment in infrastructure will require demonstration of higher IRRs and quicker payback periods than usual.

**Recommendations**

Caribbean countries cannot change their size, location, resources, endowments, or the fact that transporting goods and people in and out of most of them can only be done by air or sea. Nor can they quickly change their levels of national income. The above analysis shows that these factors do explain some of the differences in performance in provision of infrastructure services among the countries, and between the region and comparable countries.
Nevertheless, many differences in performance cannot be explained by these external, observable factors. For example, these factors cannot explain why Barbados and Jamaica have much higher cellular access than Trinidad, why people in Guyana have better access to improved water sources than people in Suriname or the Dominican Republic, or why electricity tariffs in St Lucia are below those in Grenada, St. Vincent, and Dominica.

These distinctions can be explained, at least in part, by differences in policies and institutions, that is, by decisions on issues such as regulation, private or public operation and the extent of competition in service provision, and regulation design. As Figure 1.15 shows, there is a strong positive correlation between measures of institutional capacity and measures of infrastructure performance. While the relations between the two are complex, and correlation does not prove causation, it stands to reason that better structures for providing and regulating infrastructure will lead to better results.

This is good news, since policies and institutions are under government control, and so can provide a way for governments to increase access, service, and efficiency in the infrastructure sectors.

In the past, the tendency was to import institutional reforms into Caribbean countries without sufficient regard for the unique particulars of local conditions, especially existing institutions, culture, and political traditions. This has led to disappointments. For example, privatization of electricity is meeting with success in Jamaica, but failed in Guyana. Superficially 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 New Zealand, played a part in the breakdown of the electricity sector in the Dominican Republic.

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**Figure 1.15. Aggregate Infrastructure Measure**

![Graph showing correlation between aggregate infrastructure and governance measures across various Caribbean countries](image-url)

Nevertheless, certain general principles that have been found to work in providing efficient infrastructure, with a number of Caribbean success stories. Combining these principles and experiences with a good understanding of individual country specific issues can point the way to institutional reforms that may improve performance. The rest of this section reviews key issues in each sector, and suggests possible reform strategies.

**Increasing Access to Infrastructure Services**

Governments are concerned that a largely commercial approach to infrastructure could lead to diminished levels of service to poor and rural households. Until recently, the overriding approach to providing widespread service in all sectors has been to require the incumbent monopoly, whether public or private, to expand service to underserved areas. Financing came from cross-subsidies (for telecommunications and electricity) or Government capital subsidies (for water and sanitation). However, as telecommunications liberalization grows, the old model becomes unworkable for that sector. Other sectors may also benefit from considering new approaches to broadening service. Interesting models include:

- **Dominican Republic Telecommunications Development Fund.** As part of the country’s telecommunications sector liberalization, the Government created a fund that was financed by a subscriber levy collected from telecommunications companies. The fund is used to provide communication services to rural areas, community tele-centers, pay phones, e-learning, and tele-medicine. Projects initiated under the fund are awarded through a public bidding process.

- **Jamaica Rural Electrification Program, Ltd.** In 1975, the Government established the Rural Electrification Company separate from the utility to create a vehicle for borrowing from multi-lateral funding agencies to finance line extensions and wiring to low-income houses. Actual installation was contracted out, and the total cost of the wiring was incorporated as a loan to the homeowner to be repaid along with the electric bill in monthly installments over five years. This model allowed the power utility to retain a commercial focus while simultaneously meeting the Government’s social objectives.

**Liberalization**

The liberalization model developed in Jamaica and applied in Barbados and most OECS countries has worked very well. By increasing access and lowering the price of many services, liberalization made a significant contribution to economic efficiency. Countries that have not yet liberalized their telecommunications sectors, including Haiti, Trinidad and Tobago, Guyana, and Suriname, should consider adopting this model.

Part of the reason for successful telecommunications liberalization in the OECS countries was the formation of the Eastern Caribbean Telecommunications Authority (ECTEL), a regional telecom regulatory agency. Such regional regulatory approaches promote effective regulation despite limited national capacity, and could be adapted with positive results to the water and electricity sectors.
ECTEL—Regulatory Cooperation

The Eastern Caribbean Telecommunications Authority (ECTEL) was established as a regional telecommunications regulatory advisory body by the governments of five Eastern Caribbean states (Dominica, Grenada, St. Kitts and Nevis, St. Lucia and St. Vincent, and the Grenadines). Its primary objective is to assist national telecommunications regulators in promoting market liberalization and telecom competition in member countries.

ECTEL’s responsibility is to coordinate the approach to telecommunications regulation in each member state. It works closely with telecommunications regulators and governments in each state, advising them on matters relating to the sector, including regional policy, types of telecommunications services, licensing, fees, pricing, management, and provision of universal service. The National Telecommunications Regulatory Commission (NTRC) comprises the telecommunications regulators in each of the five member states. Each of these Commissions has five commissioners appointed by the Minister as well as varying levels of technical staff. Together, the NTRCs are responsible for formulating national telecommunications policy, planning, and managing the radio frequency spectrum, investigating and resolving interconnection disputes, monitoring anti-competitive practices, and managing the universal services fund. ECTEL advises on policy decisions affecting the member countries but the final policy decision and its implementation falls to the individual NRTCs.

The following diagram illustrates the ECTEL’s structure (left) and its relationship with the NTRCs:

Council of Ministers: This group is made up of the Ministers responsible for telecommunications in the ECTEL states and the Director General of the OECS
Board of Directors: One member from each member state appointed by the Minister for a year
Directorate/Secretariat: Managing Director, Professional, Technical and Support Staff

The Effects of Regional Regulatory Cooperation

ECTEL has had a significant impact on telecom liberalization in the member countries. It has helped to bring about early termination of existing license arrangements and facilitated competition. ECTEL’s inception has helped to bring about procedures for setting cost-based tariffs and interconnections, a significant reduction in tariffs and overseas telephone charges, and increased interest in applying for licenses from international businesses. One of ECTEL’s key achievements has been the role it played in helping member states achieve telecommunications market liberalization. The ECTEL member countries believed it would be beneficial to take a uniform stand in negotiating with C&W West Indies over the liberalization of their respective telecommunications markets. This is an example of the way in which regional cooperation can allow each country to leverage its combined resources to undertake the necessary advisory and reform activities to make significant progress.

Accomplishing the initial task of telecommunications liberalization was a lengthy process. After first threatening to exit the region if the markets were opened to competition, C&W signed a Memorandum of Understanding with ECTEL in April 2001, agreeing to phase-in market liberalization in three steps. Phase 1 allowed the introduction of VSAT-based bi-directional call centers and to award mobile concessions; Phase 2 introduced competition in fixed and international services; Phase 3 was aimed at liberalizing all remaining telecoms services.
The greatest gain to international transport in the region would come through rapid liberalization of air services and the cessation of Government support for national and regional carriers. So far, only the Dominican Republic has an operational “open skies” agreement with the United States. Our benchmark shows it also has the lowest fares from Miami. Jamaica has negotiated an open skies agreement with the United States, but it is not yet operational. Other Caricom countries are negotiating open skies deals with the United States on a regional basis. The international experience is that liberalization can significantly reduce fares and increase volume, providing a major boost to business and tourism. We recommend that all countries reach open skies agreements with the United States and European countries as soon as possible.

The main barrier to liberalization is the government’s desire to protect national and regional flag carriers, such as BWIA and Air Jamaica. An objective analysis shows that

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ECTEL—Regulatory Cooperation (Continued)

As a result of this agreement:

- Each member country agreed to grant appropriate operating license(s) for new entrants to provide the same networks and services that C&W provides.
- OECS states and C&W met within a framework of three joint working groups: Legal and Regulatory, Tariff and Rebalancing, and Communications to review regulations and licenses, determine what data are required to set appropriate tariffs, determine interconnection cost, advise on the cost for provision of telecommunications service, and establish procedures to review rates and proposals for rebalancing.
- ECTEL recognized Marpin Telecoms (a Dominica-based cable TV service provider) as the first new firm offering telephony services in the islands.
- Liberalization for mobile telephony in ECTEL member countries began in 2002. Digicel and AT&T Wireless were awarded mobile licenses in four of the five countries, a French company, Gensat, acquired licenses to operate in three countries, and CariGlobe acquired a license to operate in St. Kitts and Nevis.
- C&W agreed to be designated a dominant provider in monthly line rental, local, and fixed-to-mobile calls, but as liberalization has only recently occurred, a number of services remain in which it still has an almost 100 percent market share. In December 2003, ECTEL agreed with C&W that there would be no rate increase for specific services until March 2005. Discussion on ways to diminish C&W’s dominance in the market is ongoing.
- ECTEL is hosting a series of community meetings in member countries in which members are allowed to question ECTEL officials on their roles and functions as well as on issues resulting from liberalization.

The principle of regional cooperation in regulation has enabled ECTEL member countries to efficiently manage scarce resources and to effectively leverage the inter-member country networks, which has resulted in increased flexibility. ECTEL’s presence has provided the basis for a strong, unified approach to attracting investment and competition to the region. Rates for telecommunications services have begun to fall, applications for operating licenses are being processed, and applications to establish call centers have been received. Where possible, ECTEL endeavors to enact identical regulations in member states and to consistently implement them. This has reduced the burden on individual regulators and has helped attract investment.

Source: Castalia, ECTEL web site.
these carriers, whether in public or private hands, are financial liabilities, not assets. The governments should cease all support to them and allow them to prosper or fail as the market dictates.

The governments are rightly concerned about their ability to ensure reliable and adequate air services, and worry that a purely market-based approach could be too risky. This concern could be addressed by asking airlines to bid on non-exclusive contracts, under which they would commit to provide specific capacities and schedules on key routes in exchange for a subsidy. Competitively awarding such contracts competitively would assure governments that services would be provided while simultaneously engaging lower and more certain subsidies than the alternative of supporting national and regional carriers.

Just as telecommunications liberalization was initially greeted with skepticism by Caribbean governments, and is now seen as an obvious step toward social and economic advancement, we predict that aviation liberalization can overcome initial resistance to deliver significant benefits to small countries that depend so much on the movement of people and goods by air.

**New Models for Public Private Partnerships**

In most Caribbean countries electricity is supplied by private companies. There is some evidence that private provision is more efficient than public provision in the Caribbean, in no small part because private provision can reduce the government’s fiscal risk. For example, Jamaica largely decided to privatize its electricity company in 2001 to stop it from being a drain on the fiscal budget. In contrast, in Guyana, the state-owned power company is incurring losses that will worsen the Government’s fiscal position.

Several Eastern Caribbean countries, including St. Lucia, have private providers regulated by license, but no effective government body to oversee the license. This is in contrast to the effective regulation of the electricity sector by independent regulators in Jamaica and Barbados. We recommend establishing a regional regulator similar to ECTEL to exert additional pressure to come up to efficiency standards on electricity companies that are not currently subject to regulatory oversight.

The Dominican Republic combined privatization with creation of a wholesale electricity market. The electricity sector has now run into serious problems that are not necessarily attributable to the decision to adopt a competitive market. In any case, it seems unlikely that any other country in the region possesses the scale and diversity in electricity generation to benefit from a competitive power market.

A better model may be to subject the incumbent utilities’ generation-capacity expansion plans to public and regulatory scrutiny, and to require them to purchase power from independent providers in cases where it can be shown to lower total system costs. This approach could result in lower tariffs and increased opportunities for co-generation and use of renewable resources. Jamaica is now implementing this approach.

Several countries in the region, including Haiti and Guyana, have poorly performing public utilities. These utilities’ problems can be largely attributed to a lack of commercial discipline in areas such as loss reduction, theft prevention, and procurement. It is difficult to achieve commercial discipline in public utilities in countries where the institutional
structure lacks rigor. Privatizing utility operation may help, although this also is difficult to achieve. In one example, Guyana sold its power company, but the private company was unable to make a financial success of the business, in part because of problems with the regulatory regime, and ended up withdrawing from the business and returning the company to public ownership. For the same reason, few investors would be willing to risk significant capital in Haiti. Management contracts potentially could fail to provide the oversight team with enough power or incentive to effectively improve the company.

It would be worth considering models in which the private company takes on the risk of operating the company, but investment remains a public sector responsibility, perhaps supported by the International Financial Institutions (IFIs). Such models could be adapted from the lease/affermage contracts that are internationally used in the water sector. In these arrangements, the regulatory rules are not written into government or private bylaws but into each individual contract between the company and the government. The contract can also specify precise subsidy and financing terms. IFIs can guarantee the government’s performance under the contract, reducing the private company’s risk to acceptable levels.

Water is the worst performing of the utility sectors reviewed, as is the case in most countries. Access to improved water and sanitation services is generally lower than access to electricity and telecommunications. The water service providers throughout the Caribbean are government-owned and operated. They are generally inefficient, with unaccounted for water losses (from leakage, theft, and under-billing) equal to more than 50 percent of production. They are generally overstaffed, financially marginal, and unable to finance new investment to improve and extend services. Poor performance in the water sector is wholly due to institutional problems. Caribbean countries are not short of engineering know-how, and other utilities, such as electricity and telecommunications, are generally able to provide an adequate level of service and to generate finance to expand the network from the tariff. Water utilities under perform for a variety of reasons. In some countries, the water utility board is a political, instead of a commercial, entity and, as a result, expansion plans, hiring, and tariff decisions are largely dictated by political considerations. In many countries, strong unions have placed labor issues ahead of customer service in the utility’s priorities. Even when utility managers try to adopt a business-like approach, they are stymied by tariffs that are too low to recover costs, and a lack of finance for investment.

Various reforms have been attempted, but there are no success stories. Jamaica’s National Water Commission had a team from Thames Water Company in the U.K. to provide technical assistance to local manager. The Thames team was marginalized. St. Lucia had a similar experience when it contracted with another U.K. water company as technical consultants. Trinidad went a step further and brought in Severn Trent (also a U.K. water company) on a management contract. Although some operational improvements resulted, the Government was dissatisfied with the results and decided to remove the company to public management at the expiration of the contract. Guyana adopted an approach similar to Trinidad’s.

An alternative trend is toward independent regulation of the state-owned water utilities. Jamaica, Barbados, Trinidad, and Guyana are all experimenting with it. Regulatory
oversight may help provide transparency in setting tariffs and stepping up pressure for efficiency, but it is not yet clear whether regulation of state-owned (as opposed to private) utilities can lead to fundamental or lasting improvements.

There is a need for new thinking in this area. Water in the Caribbean is an inherently political issue, and reforms that recognize this fact may ultimately be the ones that become sustainable. Solutions include:

- Private participation through operating (lease/affirmage) type contracts that give private firms true management control; require to meet defined targets; and lock-in well-designed tariff and subsidy regimes.
- Explicit, targeted subsidies paid for provision of outputs, to address social concerns in water pricing, and to expand access.
- Development agency finance of capital expenditure, either directly, or through loans to establish subsidy funds.
- Government responsibility for financing some or all investments, either directly or through paying of output-based subsidies to expand service.

Performance-based contracts for defined elements of the service, such as meter reading, billing and collections, or reduction of water reduction, could also be tried.

New developments that are worth watching are the hybrid lease/concession contract currently under development by the St. Lucia Government, the success of service contracts for specific functions in parts of the Dominican Republic, and Trinidad and Tobago’s proposal to investigate private participation in meter installation and reading.

The transport of goods by sea is clearly vital to island economies. Maritime services are provided by international shipping lines, which are competitive and privately owned and operated.

Most container and general cargo ports in the Caribbean are owned by government corporations. However, in the most successful ports, the ownership and operation of terminals, cranes, and other functions are contracted out to the private sector. This “Landlord Model” has helped the Port of Kingston, Jamaica, become one of the leading ports in the region. The Port of Spain in Trinidad is in the process of transforming itself from a “Public Service” port (in which all functions are carried out in the public sector) into a Landlord port in order to better compete with new private ports in the country.

Trinidad and the Dominican Republic have found that allowing new ports, partially privately-owned, develop and compete with existing ports has succeeded in improving efficiency and reducing costs. Separating regulatory and operational functions and liberalizing entry into the port sector can promote this trend, at least in larger economies.

The Caribbean is at the crossroads of world trades routes, including east-west routes through the Panama Canal and north-south from South America to North America. Several Caribbean ports, including Freeport in the Bahamas and Kingston in Jamaica, have capitalized on this location to develop successful international transhipment businesses whose volumes of traffic far exceed their domestic trade volumes.

Transhipment is a highly competitive business, with shipping lines able to move their transshipment hubs from one port to another in response to changing prices and service levels. Although market demand is growing, governments should be cautious about investing taxpayer funds in long-lived infrastructure that served footloose foreign clients.
A good risk mitigation strategy would be for governments to seek private companies willing to take on the majority of the investment risk of any major additions to transhipment infrastructure. If private investors are unwilling to take such a risk, it is a signal to the government that the expected investment returns are not sufficient to offset the risk.

Most airports in the region are government-owned corporations, with some services within the airports provided by private companies, often on a competitive basis. Although, on the whole, the publicly owned airports have adequate capacity and efficiency most of them operate at a deficit. The experience of Jamaica and the Dominican Republic as well as comparator countries like New Zealand, shows that private operation of, and investment in, airports can deliver service at least at the same level without burdening government

<table>
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<tr>
<th>Mauritius Port</th>
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<tr>
<td>Mauritius is a small island nation similar to many Caribbean states. Its port once had a solely local role, but with Government reform and a goal to increase “non-captive” traffic, it has grown dramatically.</td>
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<td>Mauritius expanded its port at Port Louis through a 1989 development plan. Between 1996–2001, it undertook a project to restructure the port in conjunction with the World Bank. This restricted the role of the Mauritius Port Authority to a Landlord Model port that owned land, buildings, superstructures, and quay cranes, and worked through competitive concession contracts. The major concessionaire is the Cargo Handling Corporation Ltd. (CHCL), which remains a publicly owned body, although the port authority is no longer a shareholder. A private shareholding arrangement is possible in future.</td>
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<td>The CHCL has substantially improved efficiency and costs with fewer staff, new working hours, labor flexibility, and, consequently, increased productivity. Crane productivity has been up to 19 moves per hour, which is a reasonably good figure internationally, although recently it has diminished from congestion.</td>
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<td>There has been significant growth in traffic through the port. It handled 5m tons in 2002–03, and up 11 percent in the previous year. Containers, which make up 38 percent of the traffic, were up 50 percent in the previous year. Transhipment traffic grew even faster, by 625 percent, up from 10,174 TEU to 73,389 in one year. In 2001, it totaled only 3,874 TEU, and it continues. By the end of December 2003, the transhipment traffic was 102,282 TEU. About half of all container throughputs are now transhipment traffic.</td>
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<td>Container traffic, in terms of total TEU handled, is 246,699, but total throughput is 318,553 (counting both in and out legs of transhipment legs). In 1992, before the productivity improvements and the development of transhipment only 80,000 TEU were handled. This growth is such that it is outstripping the capacity of the expansion plan. Vessel waiting time has increased to 24 hours. A new plan is being developed.</td>
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<td>Two new container cranes are being acquired, but by lease rather than purchase in explicit recognition of the volatility and risk involved in the transhipment business.</td>
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<tr>
<td>Improving port productivity has borne fruit: three major shipping lines are now using Port Louis as a transhipment hub: Maersk-Sealand, Mediterranean Shipping Co., and P&amp;O Nedlloyd/Mitsui. Transhipment trade attracts a significant discount on port charges. Some transhipment is for regional ports (i.e., on Madagascar and Reunion), but it is also between intersecting trade lanes among Africa-Mediterranean-Europe services, services to Australia and New Zealand, and among Asia, South Africa, and South America. Mauritius had the foresight to recognize the potential of its location and build an export product around it.</td>
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Source: Castalia.
finances. Private involvement can also make it easier for airports to attract financing for expansion when needed, as Sangster International in Jamaica and Punta Cana in the Dominican Republic were able to do.

Regional Cooperation

In a region where nation states are smaller than a single city in most other parts of the world, it is natural to turn to regional cooperation as a way to overcome the problems of small size and the resulting lack of economies of scale and capacity.

One of the most successful regional approaches has been achieved by C&W’s Caribbean operation. Digicel, a provider of mobile phone services in several islands, has a similar approach. This shows the benefits that can be gained by providing high-level management services on a regional basis. The governments could adopt this approach by also removing barriers to cooperation in other infrastructure services. For example, allowing cross-border mergers of electrical companies, or adopting standardized approaches to private participation in water, ports, and airports could provide private companies with the opportunity to build successful regional businesses, which might achieve economies of scale.

On the other hand, inter-government cooperation in the actual provision of infrastructure services is seldom successful. For example, cooperation attempted to protect regional airlines has slowed liberalization in some countries. Cooperation among transhipment ports is doubtful since it is unlikely that one country would agree to reduce its own port’s role in order to boost another country’s. Although the consolidation of ports and airlines might be desirable, it will generally be accomplished more speedily and effectively if driven by market forces and private businesses than through inter-government arrangements.

Governments may benefit from cooperation in regional approaches to regulatory issues, especially in meeting transport safety and security standards.

ECTEL has shown the benefits of a regional approach to provision of economic regulatory capacity. We have argued that there may well be a role for increased regulatory supervision of water and electricity providers in a number of countries that currently do not have regulators. These countries should evaluate jointly establishing a regional regulatory agency for water and power modeled after ECTEL.

Sharing information on service standards, tariffs, and efficiency can help all Caribbean infrastructure firms improve. There is definitely room for water and electricity utilities, ports, and airports to improve their performance by sharing information. One option is to join existing international benchmarking initiatives. Since all regulators in the region can benefit from comparative performance data, a regional benchmarking coordinated by the Organization of Caribbean Utility Regulators could also be an option.

Local Capital Market Development

True development will entail the Caribbean being able to finance infrastructure from local savings. This should be done on a regional basis, since the region is already well-integrated at a financial markets level, and become more so. Trinidad, in particular, is emerging as a
supplier of capital to the rest of the region, and is well placed to do this since Trinidian financiers understand the conditions and risks in the other Caribbean countries better than would investors from the United States or Europe.

Local capital markets need to develop the interest and capacity to provide long-term finance for infrastructure. This is a long term, multi-faced exercise, requiring work in three inter-locking areas:

- On the demand side, infrastructure service providers need to start to look more to local capital markets for funding, instead of to Governments and development agencies.
- On the supply side, natural investors in infrastructure projects include regional insurance companies and pensions funds, which need long-lived investments with only moderate risk. Caribbean insurance companies and pension funds are interested in infrastructure, but because there are so few investment opportunities they have not invested in the ability to promote or appraise such details.
- Transaction and risk-management eco-systems—in developed markets, infrastructure financing involves a myriad of specialist professionals, institutions and instruments. There are specialist infrastructure funds which invest money pooled from insurance companies and elsewhere, investment banks to promote deals and arrange finance, specialist lawyers, guarantee agencies, tax advisors and the like. In Asia, Hong Kong and Singapore provide such eco-systems of professionals and institutions which serve countries throughout the region. The Caribbean does not yet have this diverse mix of specializations, making any deal much harder to do, since players must be drafted in to perform their roles for the first time.

Initial steps toward a local capital market capable of providing significant infrastructure finance, include:

- **Encouraging the issuance of infrastructure bonds by Governments and Government-owned entities**—these should be similar to the bonds issued by US municipalities and municipally-owned utilities, and employ similar structuring and credit-enhancement techniques.
- **Encourage listing of infrastructure providers on local or regional stock-exchanges**—for example, as part of program to involve the private sector in Guyana’s electricity company or Trinidad’s water utility, some of the equity could be issued on local or regional stock exchanges. Such exercises in popular capitalism where highly successful in the UK and Australia, and would also work in the Caribbean.
- **Encouraging development of local infrastructure investment funds**—these could pool money from insurance companies and other sources to invest in infrastructure. The World Bank or IFC could invest in such funds.
- **Providing World Bank Group credit-enhancement**—this would be done through co-investment with private investors such as an infrastructure investment fund (either subordinated debt or pari passu) or providing guarantees.
- **Involving local financial services companies in structuring and arranging transactions**—regional investment banks are developing a capability in small capital raisings for infrastructure providers. World Bank supported reform programs should use local
firms as well as international specialists in deal structuring and finance-raising, to encourage the development of local capacity in these areas.

Link to initiatives in regional private catastrophe insurance—the vulnerability of Caribbean infrastructure providers to natural disasters, especially hurricanes, makes effective catastrophe insurance vital. The World Bank has previously suggested ways in which capital markets could be developed to offer better value and more effective catastrophe risk cover. It would be worth seeing to what extent these ideas could reduce infrastructure costs in the Caribbean, while perhaps at the same time contributing to the development of deeper capital markets more able to finance infrastructure in the region.

Summary

The complex questions of what constitutes good infrastructure policy design across multiple sectors and countries cannot be reduced to a few pages of bullet points. Nevertheless, there is an understandable desire to see the main themes and conclusions summarized as concisely as possible, which is what we have attempted to do in the following matrix:

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<table>
<thead>
<tr>
<th>Institutions</th>
<th>Regulation</th>
<th>Pricing</th>
<th>Regional Initiatives</th>
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<tbody>
<tr>
<td><strong>Telecommunications</strong></td>
<td>Countries that have not yet liberalized telecommunications should follow the successful examples of Jamaica, Barbados and the OECS.</td>
<td>Independent regulation by a national regulator (like Jamaica’s OUR) or a regional body, like ECTEL, is beneficial.</td>
<td>Liberalize competitive sectors and set cost-based local access charges.</td>
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<td><strong>Electricity</strong></td>
<td>Private provision of electricity is generally more efficient and entails lower risk than public provision. Where systems are now publicly owned and operated, countries should consider switching to private participation.</td>
<td>Countries that have private provision without regulatory oversight would do well to establish regulatory bodies, possibly on a regional basis.</td>
<td>Governments that seek to increase their capacity to regulate electricity and water providers should consider establishing a regional regulatory agency modeled after ECTEL for these sectors.</td>
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<td>In high risk countries with low regulatory capacity, it is worth exploring contracts that:</td>
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<td>— Give a private firm full operating responsibility for electricity supply.</td>
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<td>— Include development agency and public sector support for investment financing and output-based subsidies.</td>
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<td>— Incorporate regulatory rules in the contract.</td>
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<td>— Are backed by IFI risk guarantees.</td>
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<td></td>
<td>Competitive power markets are unlikely to be workable outside the Dominican Republic but obligations to competitively source new generation capacity, as Jamaica has, will probably be helpful in keeping costs down.</td>
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<td><strong>Water and Sanitation</strong></td>
<td>Private involvement in water service provision under contract to the government can help create incentives for efficiency and a sustainable regulatory regime.</td>
<td>Independent regulation, possibly through a regional regulatory agency where</td>
<td>In most Caribbean countries, tariffs are</td>
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<td>Institutions</td>
<td>Regulation</td>
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<td>Twinning and management contracts have not worked well in the region.</td>
<td>in-country capacity is lacking (although this is only now being tested).</td>
<td>below cost recovery. Water utilities need to be able to recover their costs through a mix of tariffs and explicit, reliably provided subsidies.</td>
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<td>New contract models worth considering include:</td>
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<td>—Lease or <em>affermage</em> contracts with accompanying financing structures.</td>
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<td>—Concession contracts with IFI involvement and output-based subsidies.</td>
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<td>—Performance-based service contracts, such as those currently being used in the Dominican Republic.</td>
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<td>Embodying regulatory rules in contracts will help.</td>
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<td>The “Landlord” model has worked well in the Caribbean, and should be considered by those countries that still have a Public Service model. Kingston Port in Jamaica, Point Lisas in Trinidad, Bridgetown Barbados and Rio Haina in the Dominican Republic have successfully adopted this model and Port of Spain in Trinidad and Tobago is moving towards this model. The ports in St Georges, Grenada and Castries, St Lucia are still Public Service Ports.</td>
<td>Regulation of prices and services is not necessary under the Landlord or Public Service model.</td>
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<td>Competition amongst ports within larger countries (Jamaica and the Dominican Republic) and among those in different countries has driven performance. Government policy should facilitate more inter- and intra-country port competition.</td>
<td>Governments need to ensure security standards are met.</td>
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<td>Transhipment presents a natural, potentially lucrative opportunity for Caribbean ports but, given the footloose and competitive quality of the industry, governments should be cautious about investing in dedicated transhipment infrastructure. Private co-investment is a risk-mitigant in these cases.</td>
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<td>Institutions</td>
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<tr>
<td><strong>Water and Sanitation (contd.)</strong></td>
<td>Security infrastructure, management and staff cultures need to be upgraded to comply with new, stricter security measures in order to continue unrestricted trade with the United States.</td>
<td>If concessions for airports are introduced, regulation of tariffs and service standards should be embodied in the contract.</td>
<td>In air services, liberalization should lead to lower prices. Competitively awarded contracts could guarantee minimum capacity and frequency on key routes.</td>
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<tr>
<td><strong>Airports and Aviation</strong></td>
<td>Security upgrades are needed to ensure continued unrestricted air services between Caribbean countries and the United States.</td>
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<td>The private financing and operation of airports, as pioneered in the region by Jamaica and the Dominican Republic, can provide satisfactory services while simultaneously removing the fiscal burden imposed by most publicly owned and operated airports.</td>
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<td>Liberalization of air service through “open skies” agreements has the potential to lower fares and increase service.</td>
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<td>All Caribbean countries should urgently pursue this type of agreement. State-supported national and regional carriers are a barrier to liberalization and a drain on country budgets. Governments should stop protecting and subsidizing them.</td>
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<td>In a liberalized aviation environment without protected national carriers, governments can ensure that vital routes are served with adequate capacity and frequency by letting non-exclusive contracts to service those routes. These contracts should be awarded to the airline which can provide the service for the lowest subsidy.</td>
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CHAPTER 2

Institutions and Infrastructure

This report differs from conventional infrastructure reviews in that it focuses on the connection between the quality of institutions and infrastructure services. The focus is limited to Caribbean countries. A wealth of research and studies has examined the correlation between the quality of institutions and economic growth. For example, the World Bank’s web site on Macroeconomics and Growth has a specific subtopic on Institutions and Governance where numerous papers can be found on the effect of institutions on economic growth. Some papers have considered the effect of institutions on infrastructure in general. Also, several country specific studies have reviewed the performance of infrastructure services in several Caribbean countries. This review selects elements from these sources to present a brief overview of the effect of Caribbean institutions on performance of infrastructure services.

This section of the report analyzes the relationship between institutional quality and infrastructure services. It starts by briefly describing the meaning of institutions in the context of this report and goes on to analyze the connection between the quality of institutions and economic growth as well as its correlation to the level of education. It then analyzes the relationship between the quality of institutions and the performance of infrastructure services. To round out this analysis, the section reviews the impact of corruption on infrastructure. The section concludes by suggesting solutions to deficiencies in institutions that may have a direct effect on infrastructure services.

What Are “Institutions” and Why Are They Important?

“Institutions” are a wide-ranging concept. One simple way to describe institutions is that they set the “rules of the game,” that is, the formal and informal constraints on political, economic, and social interactions. “Good” institutions establish incentives to reduce uncertainty and encourage efficiency. They reduce volatility, boost income and economic growth, and help minimize the adverse impact of shocks.

What factors determine the rules of the game? Some of them include:

*Educations and allocation of talent.* This is perhaps the most important factor in explaining the quality of institutions. The quality of education has a direct influence on the quality of decisions that government officials make, which, in turn, are reflected in the quality of policies, and legal, judicial, and financial systems as well as other fundamental government rules and systems. Good education broadens the knowledge base of policy makers to see beyond traditional methods to new approaches that, if properly implemented, could eventually improve performance. Improving infrastructure services is not simply a matter of setting good policies. Also needed are educated individuals at each level who understand these policies and are capable of implementing them. Figure 2.1 presents evidence on the correlation between the quality of education and quality of institutions.

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10. The definition of institutions and the description of the main factors that define institutions were taken from a lecture on institutions by Professor Andrew Taylor at the London Business School; both were complemented by the author.
Good political decision-making on infrastructure issues is more likely to result from a populace that is educated enough to understand the necessity of tradeoffs and to take a medium-term view. For example, in an informal poll in Barbados, we asked policy makers and randomly queried people on the street on why they thought their country had done better than Jamaica in providing social and economic development for its citizens. Their overwhelming—and unprompted—response was that education was better and more extensive in Barbados, which promotes better overall social organization.

Quality of legal system and judiciary. This refers to the existence of clear, transparent rules and laws—and to the country’s ability to enforce them. In infrastructure services, good legal systems have a specific, clear legal framework for each infrastructure sector that determines the direction of long-term sustainability, including public and private sector roles, and the form regulation or price controls should take. The quality of the legal system and judiciary are particularly important when it comes to private sector participation arrangements to provide a solid legal base.

Regulatory institutions. Regulatory institutions determine the extent to which competition or price controls exist, which, in turn, influence prices paid by end-users. Good infrastructure regulatory institutions foster competition and where this is not possible, control prices to prevent monopolistic exploitations or to ensure that providers are recovering the full cost of services. Government contracts with private investors are credible and enforceable.

Financial institutions. The existence of a capital markets, large numbers of commercial banks, and other financial institutions (such as insurance companies and pension funds) allows for the efficient allocation of capital that is essential to financing infrastructure.

Institutions for macro-economic stabilization. Credible central banks and ministries of finance with stable, long-term economic policies and strong reputations would signal good quality institutions. Solid macro-economic institutions are critical to private infrastructure development, which, in most cases, has substantial foreign currency denominated debt serviced by local currency revenues.

Countries with low quality institutions typically are also hindered by social inequality, monopolistic markets, macro-economic instability, no capital markets, low-level educational institutions, and weak, convoluted legal and judicial systems. In theory, fragile institutions affect the ability of a country’s economy to grow and thrive.

To test this theory, one should analyze the correlation between the quality of institutions and economic growth. However, commonly agreed upon, standardized metric for measuring the quality of institutions does not exist. As a proxy, we developed an Aggregate Governance Measure (AGM) that incorporates the scores of the following World Bank Governance Indicators:11


*Voice and accountability.* Measuring various aspects of the political process, civil liberties, and political rights, including the extent to which citizens of a country are able to participate in the selection of governments.

*Political stability.* Combines several indicators that measure the perception of the likelihood that the government will become destabilized or overthrown by unconstitutional and/or violent means, or terrorism.

*Government effectiveness.* Combines responses on the quality of public service provision, accountability of the bureaucracy, competence of civil servants, independence of the civil service from political pressure, and credibility of the government’s commitment to its policies.

*Regulatory quality.* Focuses on the policies themselves, including measures of the incidence of unfriendly market policies, such as price controls and inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in such areas as foreign trade and business development.

*Rule of law.* Includes several indicators that measure the extent to which people have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of business contracts.

*Control of corruption.* Measures perceptions of corruption, conventionally defined as the exercise of public power for private gain.

The AGM is simply the average of the scores for each indicator. The score for each indicator is given on a scale from 0 to 100, with 0 referring to poor governance and 100 to good governance. Figure 2.1 shows how Caribbean countries rank on this indicator.

Except for Haiti, Caribbean countries could be classified into three groups according to the quality of their institutions. The first group includes the Bahamas and Barbados, whose institutions are on a par with those in Singapore.

The second group includes the eight Caribbean countries included in the center oval in Figure 2.1. With an AGM score between 60 and 72, the institutions in these countries could be considered of relatively good quality. The third group includes Guyana, the Dominican Republic, Suriname, and Jamaica, whose AGM is between 45 and 53. Haiti scores 30 points lower than the lowest in the Below Average group with by far the worst institutions in the region.

It is interesting to note that there is an inverse correlation between the quality of the institutions and the size of the population among Caribbean countries. The Caribbean countries with the largest population—Haiti, the Dominican Republic, and Jamaica—have worse institutions than much smaller countries such as Barbados, Bahamas, and Dominica.

Figure 2.2 tests the well-researched correlation between quality of institutions and economic growth in Caribbean countries.
As expected, effective institutions are associated with higher incomes. The trend line shows the expected wealth of a country given the quality of its institutions. Several differences in income that are not explained by the quality of institutions, include:

- The Bahamas, with a quality of institutions similar to Barbados, has a GDP per capita that is 50 percent higher than that of Barbados. The Bahamas’ GDP is distorted by its role as an offshore financial center.
- Of the group of countries with relatively good institutions, Antigua, St. Kitts, and Trinidad and Tobago have done much better than other Caribbean countries with comparably ranked institutions, namely Dominica, St. Vincent, and Belize.
- Guyana, with a similar governance score to the Dominican Republic, is poorer.

One hypothesis that might explain differences among the quality of institutions in Caribbean countries is the level and quality of education. Figure 2.3 shows the percentage of the labor force with a tertiary education for a selected group of Caribbean countries and comparators.

A clear correlation exists between educational levels and the quality of institutions. Most countries are within the vicinity of the trend line, except for the Dominican Republic, which falls below it.

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12. The trend line was plotted through the 15 Caribbean countries and three comparators.
The Aggregate Infrastructure Measure (AIM) calculated the average percentage of the population in each country with access to electricity, improved water, and sanitation, and telecommunication services. Ports, maritime services, airports and air services were not included in this measure because comparable performance data for these sectors were largely unavailable.

The AIM provides an indication of the quality of infrastructure services and, in particular, utility services, but it is not a perfect measure of quality. For example, some consumers might have to access to services but only receive a few hours worth per day; however, no better measurement criteria is readily available.

Figure 2.4 shows a strong correlation between the quality of institutions and infrastructure services. Caribbean countries that were identified above as having relatively good institutions offer better infrastructure services. The trend line shows the level of infrastructure services that one might expect for a given institutional quality level.

However, this correlation does not necessarily mean that better institutions result in better infrastructure. In reality, it is difficult to determine the causality between these two variables. Figure 2.5 illustrates one possible cause-and-effect relationship among these variables.

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7. Sources of data on access are indicated in Volume II.
Figure 2.4. Effects of Institutions on Infrastructure Services

![Graph showing the relationship between Aggregate Governance Measure and Aggregate Infrastructure Measure for various countries in the Caribbean, with points for each country labeled.](image)

Figure 2.5. Causality among Institutions, Wealth, Infrastructure, and Education

![Diagram illustrating the causal relationships between GDP per capita, quality of institutions, quality of education, and quality of infrastructure.](image)
Impact of Procurement Practices on Infrastructure

Good procurement practices have a direct, positive impact on the cost and quality of infrastructure services, particularly when it comes to minimizing the risk of corruption.

A recent unpublished World Bank study compared basic infrastructure input costs between the OECS and Argentina, and among OECS countries. This comparison is presented in Figure 2.6.

In the study, the World Bank argued that differences between Argentina and the OECS countries could be explained by procurement and contract management practices in the OECS such as:

- Lack of standardized procurement rules,
- Over-design by consultants (designs do not consider budget constraints and actual requirements),
- Lack of strategic management of quarries in some islands (lack of availability, high transport costs),
- Poor contract management (high number of contract variations for which procedures are not followed), and
- Lack of Ministry oversight in the execution of works (lack of available qualified staff).

To complement these views, the box below presents the perspective of a Caribbean infrastructure practitioner as to why OECS input costs are higher.
The Views of Caribbean Infrastructure Practitioner on Infrastructure Construction Costs

The information included on this box represents the opinion of a Caribbean-based infrastructure practitioner who wishes to remain anonymous; it does not reflect the opinion of Castalia or the World Bank.

In cases where funding is sought from Official Development Agencies (ODA), there is a tendency among OECS government agencies to prefer to have contracts awarded to local contractors. To this end, large contracts, which are commonly beyond the capacity of the largest local contractors to finance, are often broken up into smaller contracts. Smaller contracts, however, lead to several problems:

- Smaller contracts tend to be prepared using weaker and less formal contracts than those used by ODAs for larger contracts. As a result, these contracts can lead to complex and difficult disputes.
- Breaking up the contracts often results in severe coordination problems such as in the case of road works, when separate contracts are awarded for drainage works and for preparation, surfacing, or sidewalk construction. Coordinating three or four contractors in the planning and execution of the works can be a daunting task. Delays and claims for extension of time usually result in significant cost overruns.
- Breaking up contracts also gives rise to increased costs resulting from the loss of economies of scale in the contractor’s preliminaries.

Generally, there is reluctance among officials to accept the procurement rules mandated by ODAs since governments often see this as a restriction to their ability to defend their interests. Hence, the recent trend among regional governments to approach private financial institutions that have virtually no procurement rules. Private financial institutions charge significantly higher interest rates and additional commissions, and require sovereign guarantees.

Labor productivity in the OECS is very poor compared to, say, Jamaica. Relatively large wages and salaries (in U.S. dollar terms) are paid to employees for very little work compared with that produced by their Jamaican counterparts. This is true when comparing both public and private sector performance, and is probably due to relatively stronger trade union activity in the public sector in the OECS. This also sets the tone for low private sector labor productivity, which in the opinion of the interviewee, is not perceptibly better than public sector productivity.

Frequent shortages of critical materials imported into the OECS, such as cement, have been known to delay the completion of public works and, in turn, increase costs.

The interviewee agrees with the World Bank that over-design is probably also a factor. For example, a new OECS generation facility, designed by a U.K. firm of engineers, appeared to be “significantly over-designed.” One option to reduce this problem might be to employ engineers to review the designs of others.

Source: Castalia interview with a Caribbean infrastructure practitioner.
Improving Institutions and Infrastructure

The preceding sections examined the importance of institutions to the quality of infrastructure services. Haiti, Guyana, and, to a lesser degree, the Dominican Republic, were identified as countries where weak institutions hinder the improvement of infrastructure services. They are also countries in which the need to improve infrastructure services was most pressing and that cannot wait for their institutions improve to provide infrastructure services. This section outlines two institutional reform initiatives that could lead to improvements in infrastructure:

*Effectively combating corruption:* Caribbean countries would benefit from developing an effective anti-corruption system. This system could involve the following components:

- Creating a clear, powerful legal framework to combat corruption.
- Creating an anti-corruption commission and endowing it with the power to enforce anti-corruption laws. Given the small scale of Caribbean countries, one option would be to outsource this function to a regional body, which would give it autonomy from strong local political pressure against anti-corruption investigations.
- Improving procurement rules and standardizing contracts to avoid costly delays and disputes. This is another area in which Caribbean countries could benefit from regional cooperation. A regional body could help member countries define common procurement rules and prepare standard contracts. Governments could also outsource to this regional body the overall procurement function, including preparing bid documents and selecting contractors, and even contract management and dispute resolution. A regional procurement agency could bring about powerful economies of scale plus provide independence from political interests that could, in turn, lead to less corruption and lower prices.
- Appropriate, competitive salary levels for government officials. This point may seem overly ambitious, but low salaries and truncated careers are key motivations that drive civil servants to bend the rules in order to gain additional income from bribes and ignore kickbacks to political parties.

*Insulating private sector participation contracts from the influence of weak institutions.* In countries like Haiti and Guyana, private investors are unlikely to be willing to put their own capital at risk. It is more likely that, after many failed attempts to catalyze reforms, ODA agencies will seek institutional change as a condition of making infrastructure loans to these governments. Both of these parties have been deterred by the risks arising from weak institutions in these countries. Private firms might have more incentive to become involved in improving management and operations if they are given autonomy to make decisions, and if they are not required to invest their own capital. International development agencies will be willing to lend money to fund major capital investment requirements if they know that their funds will be properly applied to improve services. One option to bring these two interests closer together might be to design a structure that insulates utility operations and investment from inappropriate political pressures. An example of such a design is provided in Chapter 4 on Haiti’s electricity sector.
This structure would involve a concession or *affermage*-type contract. The contract would be prepared in such a way that the concessionaire (the private firm which wins the contract) is clearly instructed on the service levels that it should deliver, and is given autonomy from the sector institutions to make necessary decisions to implement this contract. Even if the contract is well prepared, it will require supervision and monitoring as well as some degree of government regulation. To protect the business against wrongful regulatory intervention from the government, the business would receive a partial risk guarantee from an IFI to cover the possibility of this kind of event. The IFI could encourage the government to comply with the provisions and intentions of the contract.

The IFI would also provide a loan to the government that the businesses can use to pay for necessary investments. The business would be paid on the basis of output (by connections installed or increased hours of supply).

### Institutional Arrangements to Minimize Corruption—The Hong Kong Airport Case

A report by Transparency International cites the construction of Hong Kong airport as an example of how corruption can be minimized in large infrastructure projects. It concludes that four factors have facilitated corruption-free implementation of this project:

- A strict Prevention of Bribery Ordinance and a strong central anti-corruption institution (the Independent Commission Against Corruption) that have enforced legal powers and empowered sufficient staff with the resources to carry them out. Clear rules and effective control mechanisms for selecting and procuring consultant and construction services, and equipment for supervising and monitoring contracts, and enforcing accountability among government staff, consultants, and contractors dispute resolution.

- Special institutions were established, such as the New Airport Project Coordinating Office, which had a dispute resolution team that stepped in whenever issues arose.

- A favorable working environment and appropriate salary levels among civil servants helped create a sense of pride among officials. As a result, businesses caught trying to offer bribes found it difficult to win work elsewhere.

Although a project the size of the Hong Kong airport would be very unlikely in the Caribbean, some elements of this case could be applicable to large projects in the Caribbean.

This chapter starts by outlining the ways the telecommunications sector has traditionally been structured in the Caribbean, and then summarizes recent changes. For most countries, the history up until the mid-1990s consisted of monopoly service provision, often by companies that were at least partially privately owned. Now there is a clear move toward liberalizing markets and inviting competition in what were previously monopolized services. Jamaica and the Dominican Republic have made the greatest strides in this area, whereas Guyana and Suriname are just now taking the first steps toward liberalization; most OECS countries and Barbados fall somewhere between the two.

The chapter then looks at sector performance, benchmarking the Caribbean countries against each other and against relevant comparators in terms of access, quality, and price. Finally, we suggest some policy conclusions, based on an assessment of how well alternative institutional and regulatory arrangements have performed.

Overview of Institutional Arrangements

All the countries of the Caribbean have a history of monopoly provision of telecommunications services. This is not surprising since telecommunications services were provided by monopolies throughout most of the world in the decades before the 1980s.

Both government and private monopolies existed. For example, in the Dominican Republic, CODETEL, a subsidiary of the U.S. firm General Telephone and Electric (GTE), began telephone service in the 1940s, and held a de facto monopoly until the mid-1990s. In contrast, in Guyana, telecommunications was under a government monopoly until 1991,
when it was privatized to Atlantic Tele Network (ATN), a small company owned by U.S.
interests. Haiti still has a government-owned telecommunications provider, which was,
until recently, a monopoly.

Jamaica was served by a private telephone company up to the 1960s, which was
nationalized under the Manley Government of the 1970s. Service deteriorated under the
public ownership. In the late 1980s and early 1990s, successive governments reacted to
fiscal pressure by selling tranches of shares to Cable and Wireless (C&W) Co. In the rest of
the English-speaking Caribbean, C&W typically owned between 49 percent and 100 percent
of the telecommunications companies. Sometimes two companies operated: one for
domestic calling and one for international calling (for example, Bartel and BET in Barbados),
but service was always provided under monopoly conditions.

The typical policy under monopoly provision was to set high international rates to
cross-subsidize local access and call charges. International rates were kept artificially high,
well above cost, through the monopoly agreements that fixed rates with carriers in other
countries. Telephone companies were expected to use the resulting profits to extend local
infrastructure out to rural areas that might not be profitable to serve (e.g., in Jamaica, C&W
agreed to target a specific number of new connections it would install over a pre-determined
period), and to charge below cost for local calls.

Because the focus of this stage of policy development was on expanding fixed line access,
its success can be measured in part by the number of fixed lines per 100 people in each
country. This measurement method is known as “mainline teledensity” and is shown in
relation to the GDP per capita for each country and for the comparators in Figure 3.1. The
numbers in Figure 3.1 are the most recent available (from around 2002 for most countries)

Figure 3.1. Mainline Teledensity vs. GDP per Capita

![Graph showing mainline teledensity vs. GDP per capita for various countries.](image)
and so came after the introduction of competition in some countries. However, since the number of mainlines in service is primarily a product of infrastructure installed over many years, it provides a reasonable indicator of the success of the previous policies.

Generally, one expects telephone access to grow with income, and this is clearly shown in the figure. Figure 3.1 shows that St. Kitts, Barbados, Antigua, and Barbuda have exceptionally high fixed-line penetration, with rates higher than the much richer countries of New Zealand and Singapore. Interestingly, the larger countries do less well. Jamaica, the Dominican Republic, and Trinidad and Tobago have lower mainline penetration than one would expect from their income levels, which may reflect the difficulty of serving a more dispersed population across broader land areas. Guyana and Haiti, both bigger landmasses, have the lowest rates of mainline penetration, but this appears to be largely explained by their lower GDP per capita.

**Liberalization and Competition**

The U.S. telecommunications monopoly, American Telephone and Telegraph (AT&T), was broken up in 1982. The same year the U.K. Government licensed Mercury Co. (largely owned by C&W) to compete with British Telecom. These experiments in telecom competition proved to be successful, and began to be imitated around the world.

The currents of liberalization started washing against the shores of the Caribbean in the early 1990s. In the Caribbean, many countries became dissatisfied with the slow expansion of phone service and long waiting lists for lines. At the same time, the countries recognized that high international calling charges were a barrier to growth. As traditional agricultural exports such as sugar and bananas lost preferential market access and became less competitive, Caribbean countries realized that their future lay in exporting services instead of goods and that service exports require low-cost international telecommunications. Competitive international telecommunications charges are important to tourism and financial services, although these industries can absorb above-cost phone charges, but competitive rates are an absolute prerequisite for new service industries, such as data entry and call centers, which Caribbean entrepreneurs started to develop in the early 1990s. These businesses were being strangled in the cradle by high communications costs, especially for data transmission.

In response to these pressures, Caribbean Governments started finding ways to liberalize. Two of the first movers were the Dominican Republic and Jamaica. The Dominican Republic passed Law 153 in 1998 providing for effective liberalization and improved pro-competitive regulation. Jamaica was the first of the English-speaking Caribbean countries to liberalize its telecommunications sector. This was accomplished under the Telecommunications Act 2000, which became effective on March 1, 2000. In Jamaica, the sector was regulated by the Office of Utilities Regulation (OUR), created in 1995, and the liberalization law followed three years of work by the OUR as well as earlier lobbying by the private sector.

Figures 3.2 and 3.3 compare growth in mainline and cellular access over time in the Caribbean and in comparator countries. In particular, these graphs highlight the impact liberalization has had on mainline and mobile teledensity.
These figures demonstrate the remarkable uptake in cellular services in Jamaica following liberalization, exceeding, by 2002, even U.S. levels (Jamaica is followed by Antigua, the Bahamas, and Barbados). When compared with the mainline teledensity graph, it is interesting to note that at the same time that countries like Jamaica, Barbados, and Antigua experienced this exponential growth in cellular phone use, mainline teledensity began
The liberalization process in Jamaica is worth describing, since it was successful and followed an orthodox, well-organized path. The first telecommunication subsector to be liberalized was Internet service, followed by liberalization of mobile telecommunications. Three new licenses were awarded and an interconnection mobile regime, controlled by the OUR, was established. A three-year rate-rebalancing plan was implemented, which brought down international rates and increased local calling charges, after which international calling was opened to competition.

The Eastern Caribbean countries of Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines joined to form ECTEL, the regulatory body that assists national telecommunications regulators in each of the member countries. Coordinated by ECTEL, the countries are following a liberalization path similar to Jamaica’s. Although they are a few years behind, these countries have already demonstrated a dramatic increase in mobile penetration since competition was introduced to the sector. Barbados is in a similar position, with the new Fair Trading Commission working to liberalize telecommunications. Despite some delays due to legal disputes with Cable & Wireless, mobile penetration has increased substantially since Digicel and AT&T became competing providers.

Laggards in this process include Guyana and Suriname. Both countries want to liberalize, but have not yet put in place an effective legal, regulatory, and interconnection regime to allow this to happen. However, in Guyana, lack of clarity about the legal framework and difficulties in enforcement of existing monopoly powers have allowed competitors to step in to develop some areas, especially Internet service provision. Haiti also lags behind with a poorly performing, state-owned fixed line company and an unclear legal framework for interconnection and competition.

Table 3.1 summarizes institutional arrangements for the Caribbean countries on which we have focused.

### Mobile Uptake in Eastern Caribbean States

<table>
<thead>
<tr>
<th>Country</th>
<th>Subscribers</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Lucia</td>
<td>36,800</td>
</tr>
<tr>
<td>St. Vincent and the Grenadines</td>
<td>33,100</td>
</tr>
<tr>
<td>Grenada</td>
<td>20,300</td>
</tr>
</tbody>
</table>

These figures alone suggest a significantly higher current level of cellular penetration than is shown in the 2002 statistics. Compared with 2003 population levels, Digicel subscribers alone account for more than double the increase in cellular teledensity than existed in 2002 in all three countries.

Source: ECTEL, St. Lucia.
### Telecommunications Reform in Guyana

Guyana’s telecommunications services were provided by Guyana Telecommunications Corporation (GTC), a public monopoly until 1991, when ATN acquired 80 percent of the company. The move from a public to a private monopoly was influenced by the trend toward liberalization in the telecommunications sector in the Caribbean and internationally as well as a desire to increase investment in telecommunications in Guyana.

The Guyana Telephone and Telegraph Company (GT&T) was formed in January 1991 and currently operates almost all telephone services in the country on the basis of a 20-year monopoly. As part of the partial privatization, ATN agreed to absorb a total of US$15.8 million in debt owed to several international carriers to raise the financing required for the expansion program, to guarantee any new GT&T debt, and to prepare and implement an Expansion and Service Investment Plan.

There has been tension between GT&T and the Guyanese Government over the past few years. When ATN became a shareholder in GT&T, there were approximately 13,000 telephone lines in Guyana. The Purchase Agreement called for the installation of 20,000 lines over the first three years of the contract. This was not achieved. GT&T has acknowledged that it did not fully comply with the expansion plan. However, the company noted that this was because local rates are too low to finance the required additional investment.

ATN has been dissatisfied with the low rates it has been permitted to charge for local services, whereas the Government has expressed dissatisfaction with GT&T’s perceived failure to expand the local telecommunications network to meet growing demand.

Despite this logjam, there have been a number of improvements in the telecommunications sector in Guyana since privatization. Major improvements have included introducing digital switching to the majority of the network, the installation of fiber optic cables on key routes, and fixed wireless access in the Essequibo region. There has also been an increase in international circuits; Internet and digital subscriber line (DSL) access has been introduced for ISPs; and cellular telephony has been introduced. A second mobile company (Cel*Star) was licensed in 2001, but by October 2003 had yet to launch commercial services due to legal dispute.

A consultation paper on the Reform of the Guyana Telecommunications Sector (2003) lists the following major issues surrounding service penetration in Guyana:

- A waiting list for telecommunications service equal to the entire installed base of telephones.
- Poor or non-existent service to many small communities in the Guyana interior regions.
- Difficulty calling Guyana from other countries due to a settlement rate dispute with AT&T.
- Relatively low levels of Internet subscribers and low levels of Internet penetration in schools and public access points.
- Comparatively low levels of cellular telecommunications services.

Compared with a number of other Caribbean countries that have managed to negotiate an early end to monopoly provision of basic services and have already begun to benefit from the increased competition, Guyana has fallen behind. In this instance, the move to privatization did not prove to be the panacea for improved telecommunications services that the Government had hoped, making liberalization all the more important.

**Source:** Guyana Telecommunications and Telegraph Company web site.
### Table 3.1. Institutional Indicators in Caribbean Telecommunications

<table>
<thead>
<tr>
<th>ICT</th>
<th>Antigua and Barbuda</th>
<th>Dominica</th>
<th>Grenada</th>
<th>St. Kitts and Nevis</th>
<th>St. Lucia</th>
<th>St. Vincent and the Grenadines</th>
<th>Barbados</th>
<th>Dominican Republic</th>
<th>Guyana</th>
<th>Haiti</th>
<th>Jamaica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Regulator (Y/N)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Private Ownership of the Incumbent Company (% of total capital)</td>
<td></td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Local PSTN Service Competition (Full, Partial, Duopoly, Monopoly)</td>
<td>M</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>P</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Mobile Competition (Full, Partial, Duopoly, Monopoly)</td>
<td></td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Number of mobile providers</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>International Long Distance Competition (Full, Partial, Duopoly, Monopoly)</td>
<td></td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>F</td>
<td>M</td>
<td>P</td>
<td>F</td>
</tr>
<tr>
<td>Leased Lines Competition (Full, Partial, Duopoly, Monopoly)</td>
<td></td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet Service Provider Competition (Full, Partial, Duopoly, Monopoly)</td>
<td></td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>F</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>F</td>
</tr>
<tr>
<td>Number of ISPs</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** “Partial” competition is meant to convey that although licenses had been issued to new firms by the regulatory body, these have not yet been taken up. The effect is that a de facto monopoly remains, although this could change at any time. Therefore, in Grenada, for example, apart from C&W, Global Network Providers has been issued fixed, cellular, and Internet licenses; Trans World Telecoms Caribbean has been issued fixed and cellular licenses; Emerging Technologies and Blue Stream have been issued ISP licenses; and cellular licenses have been issues to Digicel and AT&T; but of these new licensees, only Digicel has begun operation. In Dominica, apart from C&W, Marpin and Sat Telecoms have been issued fixed and Internet licenses; Marpin is offering Internet and fixed line telecommunications services; Orange Caribe has been issued fixed and mobile licenses, and a cellular license has been issued to AT&T.
Summary of Performance

This section reviews the performance of those countries for which data are available, and tries to draw possible conclusions on whether performance is good or poor. It looks in turn at access to telecommunications, price of telecommunications services, and service quality. Within each section we consider both conventional voice telephony (local and international) and data and Internet services.

Access

Teledensity is a traditional measure of access to telecommunications. Recently, mobile phones have moved from a luxury used by people who also have a fixed line to a basic service that many people use as their primary or only telephone service. This is particularly true in countries with low fixed-line penetration; since mobile phone networks can be built more quickly and with lower capital costs than fixed lines can. Therefore, the best measure of access is “total teledensity,” defined as the total number of mobile and fixed lines in service divided by the population, as shown in Figure 3.4. In the figure, the lower part of the bar shows the number of fixed lines per 100 people, and the upper part of the bar shows the number of mobile lines per 100 people.

Figure 3.4. Total Teledensity by Component
Figure 3.5 shows total teledensity plotted against GDP per capita. Jamaica and Antigua are two countries that stand out as having relatively high total teledensity for their level of GDP per capita.

With the exception of Haiti, which has very low total teledensity, most Caribbean countries have at least 20 lines per 100 people; Barbados and Antigua have over 80 lines per 100 people. Developed countries typically have more than 100 combined fixed and mobile lines per 100 people, as shown on by the comparator countries at the right of Figure 3.4.

The breakdown of total lines between fixed and mobile types varies considerably. It is possible to distinguish three groups of countries based on this composition:

- More affluent countries have more than 40 fixed lines per 100 people as well as good mobile uptake (Barbados, Antigua, and the Bahamas). In these countries, mobile phones play the same role that they do in developed countries—as a complement to fixed lines.
- Countries with low fixed line and high mobile teledensity. The exemplar for this group is Jamaica. Belize, the Dominica Republic, and Guyana could also be included. Here it seems that mobile phones act as a substitute for fixed lines in many cases, filling the gaps left by inadequate roll-out of the fixed network.
- Countries with relatively low total teledensity and lower mobile penetration (2002 figures). These include St. Vincent, St. Lucia, Grenada, and Dominica. Until recently, mobile phones in these countries were monopoly priced and marketed as a complement to fixed lines, not a substitute. In the past two years, this situation has radically changed. Competition has been introduced to the mobile market and, as a result, mobile penetration has increased rapidly. (Based on anecdotal evidence of increased levels of mobile penetration, we expect that the Eastern Caribbean countries have moved into the second group).
Figure 3.6 shows the penetration of mobile phones in relation to GDP per capita. Here Jamaica stands out again. Take-up rates and access exploded following liberalization. The total number of mobile phone accounts increased from 144,000 in 1999 to 1.3 million by 2003. Mobile phone penetration in Jamaica has reached a phenomenal level in relation to the comparator countries shown. It has expanded out of all proportion to the GDP per capita to a level where it exceeds all other Caribbean countries and also the United States (although it hasn’t reached the level seen in developed countries with higher mobile take-up like Singapore, New Zealand, and many EU countries). This shows the value of successful liberalization of mobile phone services for countries with relatively poor fixed line access.

In Jamaica, Barbados, and other countries that have liberalized mobile telephony, competition has driven innovation, which has, in turn, driven uptake. In addition to improved coverage and competitive pricing, the key innovation has been the introduction of prepaid phone cards. With this system no monthly access fee is paid, so the system allows users to tailor their mobile telephone call usage to their ability to pay. In Jamaica, more than 90 percent of all mobile telephone customers now receive service under the prepaid plan, which is offered by all service providers. Other innovations include use of the calling-party-pays system (instead of making mobile phone subscribers pay for incoming calls), and a reduction in the price of handsets, including handset subsidies provided by the mobile phone companies to encourage uptake.

In the Dominican Republic, following the passage of Law 153 in 1998, mobile phone penetration increased by a factor of ten, from fewer than two mobile lines per 100 people in 1997, to just over 20 mobile lines per 100. Over the same period, fixed line penetration went from around 9 per 100 to 11 per 100, a much slower rate of growth.

Data and Internet services are now just as important as conventional voice communications. Use of the Internet is desirable in education and essential for export-oriented service
businesses so telecommunications performance needs to be assessed in terms of the access provided for data and Internet services as well as the number of lines in use.

It is difficult to measure Internet usage. One simple and widely available indicator, which provides some insight into the development of non-voice services, is the number of Internet users per 1,000 people. This is shown relative to GDP per capita in Figure 3.7. Here, too, Jamaica stands out for having much greater Internet usage than one would expect for its level of GDP. Guyana also has a surprisingly large proportion of Internet users. Both Jamaica and Guyana have competitive ISP markets. In contrast, countries that perform poorly on Internet usage penetration, such as St. Lucia and Barbados, tend to have only one or two Internet service providers.

**Distribution of Access to Telecommunications**

Equity in access to telecommunications services is also important. Data on access by region or income level for most Caribbean countries is not easily available, although poorer households and those in more remote regions generally are less likely to have access to telecommunications.

The greatest equity and access problems occur in countries that rely on fixed lines services but that do not have effective policies to extend service into rural areas. For example, in the Dominican Republic, less than half the country’s population resides in the capital city and neighboring departments (known collectively as *cinturon de oro*) but they account for 80 percent of the fixed lines in service. Guyana and Haiti suffer from similar problems.

Liberalization of mobile phone services is a good way to overcome these problems, as Jamaica’s experience shows. Mobile providers can extend service rapidly and, by
offering pre-paid cards, cheap handsets, and calling-party-pays plans, make communications more affordable and easier to budget for, thereby helping to extend access to poor households. However, in sparsely populated countries with difficult terrain, mobile coverage may only extend to the main population centers, which doesn’t make it a panacea for rural access.

**Universal Access.** Governments may be concerned that the pattern of access to telecommunications services provided by the market may not be socially optimal. In particular, governments may want to ensure that poor people and people who live in remote areas receive telecommunications service, even if it is not economical or profitable to supply them. Policies to promote such service extension are referred to as Universal Service or Universal Access policies.

The concept of universal service refers to the policy of making telephone service available to all, regardless of the distance from the switch or ability to pay. It is based on the U.S. concept of a “telephone in every home,” which is itself based on the idea that telecommunications is an essential service that contributes to development; universal service targets and policies have been adopted in most countries.

Although this may be a realistic target for developed countries, such is not the case in developing countries. More recently, the term universal access was coined to refer to the more realistic goal of putting a working, affordable telephone within reach of the whole population of a country. The concept of universal access has become an increasingly important objective for telecommunications policy and legislation in developing countries.

Universal service and universal access in telecommunications have recently undergone a further shift in definition. Whereas these terms originally referred to the availability of telephone services, they have been expanded to include mobile communications and, increasingly, Internet access under the banner of Information and Communications Technologies (ICTs). This reflects the growing importance attributed to information technology and the role it plays in development, not just in a commercial sense, but also in the provision of social services, healthcare, and education. The terms universal service and universal access are both used in the Caribbean, but most policies refer to the universal provision of
voice telephony, public pay phones, and Internet access. Because it corresponds more closely with our definition of universal access, this is the term we have selected for discussion in this section.

In the Caribbean, as in many other countries, monopoly corporations were usually charged with a Universal Service Obligation, that is, the obligation to provide a certain number of new connections per year. This approach to expanding service generally relied on cross-subsidizing local charges and connection fees from international charges. Because this is not possible in a liberalized market, countries are developing alternative approaches to universality.

Despite a move to liberalization, in some countries the incumbent firm has retained an obligation to extend telecommunications coverage that is funded through a levy implicit in the interconnection charges. This is sometimes called a Telecommunications Service Obligation (TSO) policy. New Zealand’s “Kiwi Share” obligation is a good example of this. The Kiwi Share is a contractual agreement requiring Telecom New Zealand (New Zealand’s incumbent firm) to make ordinary residential telephone service widely available, charge no more than the standard rate for ordinary residential telephone service, and maintain free local calls for ordinary residential telephone service, fax, and Internet use. All telecommunications service providers are required to contribute to the cost of the TSO through a premium on prices for interconnection with Telecom’s network. This is calculated and monitored by the Telecommunications Commissioner.

A third approach to implementing universal access is through Universal Access Funds (also called Telecommunications Development Funds). These funds implement service expansion through a reverse auction process in which the company that bids the lowest subsidy to extend mainline, mobile, or Internet services into rural or sparsely populated areas wins a contract to do so. The subsidy is financed through direct government contributions, radio license fees, or levies on all major companies.

Some examples of universal access policies and practices adopted in Caribbean countries include:

- One of ECTEL’s key responsibilities is to advise the National Telecommunications Regulatory Commissions of OECS member countries on the provision of universal access. Liberalization in these countries has facilitated increased access to communications in these countries through a huge uptake in the number of cellular users. An estimated 300,000 cellular users exist in the OECS region, up from fewer than 20,000 in 2001. Although the number of fixed lines per 100 population has not increased significantly, the increase in cellular technology has contributed to greatly improved communications access in rural communities and remote areas.

- The Government of Grenada has emphasized the need to develop Community Access Nodes to enable effective access to information and communication technology for every community or parish. Initiatives include the delivery of distance learning modules for adult education and the concept of using post offices to support community development.

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In Jamaica, Cable & Wireless Jamaica has been installing Internet terminals or kiosks in post offices across Jamaica. All parish libraries and the post offices in most parish capitals now provide Internet access to the public.

Trinidad and Tobago’s incumbent firm, Telecommunications Services of Trinidad and Tobago Limited (TSTT), has established Community Communication Centers to address universal access objectives. These centers offer unlimited local calls at US$0.35 per call, free access to emergency services, and directory inquiries and payphones to consumers in rural or geographically isolated areas.

The Dominican Republic is the best example of the way in which a Telecommunications Development Fund has been implemented in the Caribbean, as described in the box below.

Given these approaches to universal access, we can consider what will work best in the Caribbean. A World Bank report (Dymond and Oestmann) reviews the experiences of implementing universal access funds in several countries and lists several key success factors:

- The funds have employed a competitive bidding mechanism.
- In some countries, firms have been allowed to bid for multiple licenses in territorial blocks, enabling them to price their bids more competitively.
- The bids have been designed to offer firms the opportunity to obtain operating licenses, radio frequency licenses, and capital subsidy at the same time.
- Bidders for rural payphone licenses were allowed to serve residential and business customers in the same area, making the opportunity more commercially attractive.
- The regulatory and interconnection environment has been structured to assist start-up ventures. For example, in Chile, businesses were able to charge higher tariffs up to a regulated limit. In addition, the Chilean approach implemented cost-related asymmetric interconnection rates that allowed rural enterprises to charge rural access rates that were higher than urban access rates, enabling them to recover costs and develop the business opportunity.

Not all of these success factors are directly applicable to the Caribbean. The key difference between Caribbean countries and many developing countries in other parts of the world is one of scale. Breaking the country up into territorial blocks in which companies compete to serve is effective in countries the size of Chile or Peru, and could be applied to countries like Guyana, Suriname, or the Dominican Republic, but would be less financially appealing for a small island.

Price

The traditional method of subsidizing service for the poor was for high international rates to fund local charges. As countries liberalize and invite competition, rate rebalancing (in which local charges and monthly connection fees typically increase and international calling charges fall) is required.

Figure 3.8 shows the cost of a three-minute local call. This is only a partial indicator of the cost of local calling since it does not include connection charges, which typically
Universal Access in the Dominican Republic

The Dominican Republic has taken a number of steps toward increased competition in telecommunications services. These initiatives have helped establish an environment in which there are fewer constraints on supply and that provides a strong platform upon which to implement universal access policies.

Although telecommunications services in the Dominican Republic have always been provided by private companies, CODETEL maintained a de facto monopoly until the mid-1990s when sector reforms began. By 1998, new entrants had eroded CODETEL’s predominant position with the incumbent capturing only 50 percent of the international traffic to the United States (accounting for 70 percent of the total international traffic).

In 1998, Telecommunications Law 153 was passed, establishing competitive regulatory principles. This law allows the telecommunication industry to operate based on principles of universal service, unrestricted market entrance, freely negotiated tariffs, freedom of contract, minimum regulation, and a strong autonomous regulatory body. The Dominican Institute of Telecommunications (INDOTEL) was established as an independent regulatory body, replacing the Directorate-General of Telecommunications (DGT) in the Secretariat of Public Works. INDOTEL’s objectives are to promote development of telecommunications in the Dominican Republic, to implement universal service principles as defined in the General Law of Telecommunications 153, and to guarantee the existence of effective competition that will benefit all of people in the country.

Since its inception, INDOTEL has established the Universal Service Policy, a Universal Service Plan (2001–2003) and rules concerning the management of a Telecommunications Development Fund.

Implementing Targeted Financing to Accelerate Universal Access

Despite the sector reforms in the mid-1990s, the provision of telecom services in the Dominican Republic was heavily concentrated in wealthy and urban areas, and progress in the development of local and rural access was slow. The telecommunications law created the Telecommunications Development Fund (the Fund), which is financed by a subscriber levy collected from the telecommunications companies on a per-access-line basis and net international settlements. The Fund is a good example of a rural and universal access policy and financing scheme aimed at achieving increased connectivity in more remote areas of the country.

The Fund includes the provision of communication services, community tele-centers, pay phones, e-learning, and tele-medicine in its portfolio. Projects initiated under the Fund are awarded through a public bidding process. The Biannual Project Plan for Universal Services (2001–2003) outlined the following projects:

- The installation of public telephones in 16 of the country’s poorest provinces. A concession was awarded to CODETEL to install 500 public phones in underserved localities in 13 of the poorest provinces in the country (Phase 1) and 1,000–1,500 public phones in the 18 remaining provinces (Phase 2).
- Installation of 15 community tele-centers in various provinces in two phases in which the users will be able to access communications services such as local, long distance, and international services, and Internet and facsimile services at reasonable prices.
- Pilot projects in tele-medicine and tele-education in coordination with the Ministries of Health and Education, respectively. The tele-medicine project is aimed at linking medical units in remote rural areas with well known medical centers in cities in the Dominican Republic and abroad in an effort to improve the quality of medical assistance provided in these remote areas. The tele-education project consists of the implementation of a digital network offering education and information to children and adults in rural and low-income urban areas in the country.

Source: Castalia, Indotel web sites.
need to be paid each month in addition to the call charges. In fact, in New Zealand and many places in the United States, free local calling is included in the cost of the monthly connection charge.

Of the Caribbean countries, Belize has the most expensive local calls, at US$0.15 for a three-minute call. The Eastern Caribbean countries follow, with charges of between US$0.08 and US$0.10 per three-minute call. Jamaica, the Dominican Republic, Suriname, and Trinidad and Tobago are next in order of cost, with charges of between US$0.03 and US$0.07 for three minutes. GTT in Guyana charges for local calls, but at a rate that is so low as to be essentially notional.

In many countries, mobile phones are a substitute for fixed line phones, and mobile phones primarily are used for local calls. Figure 3.9 shows the cost of a three-minute off-peak mobile call. Here the countries divide into two clear groups. Costs in the Dominican Republic, Guyana, Suriname, Jamaica, and Grenada are between US$0.37 and US$0.56 per three-minute call. This is lower than in New Zealand and Ireland, both of which are developed countries with competitive mobile phone markets. The second group includes the more expensive Caribbean countries, including St. Kitts, St. Vincent, the Bahamas, Belize, and Barbados, which charge around US$1.00 per three-minute call. Charges in these countries have fallen significantly since the introduction of competition in mobile telephony, although this is not yet reflected in the data we have, which are based on statistics to the end of 2002.

International call charges are illustrated in Figure 3.10 for those countries for which data were available. We use the cost of a three-minute call to the United States as a standard indicator. Call charges in much of the Caribbean have come down significantly in the process of liberalization. For example, four years ago calls from Jamaica to the U.S. cost
Figure 3.9. Cost of Three-minute Off-peak Mobile Call

Figure 3.10. Cost of Three-minute Call to the United States
US$0.60 per minute or more, whereas now international calls to the United States and most other countries cost only US$0.30 per minute or less (which is half as much or less than half as much). This is lower than the cost of international calls from New Zealand, which has had fully liberalized telecommunications for more than a decade. In contrast, international calling costs from Haiti still reflect traditional monopoly pricing.

Figure 3.11 summarizes the cost of Internet access by reporting a typical cost for twenty hours of dial-up Internet access over a month. Caribbean countries typically have higher charges than their developed country comparators, but this is probably inevitable given their smaller market sizes. Charges do not differ greatly with the degree of competition. However, Haiti and Belize both have relatively high charges, which seem unlikely to be justified on the basis of efficient costs.

Quality

Figure 3.12 provides a simple measure of the quality of the fixed line infrastructure, that is, the number of faults reported each year for each 100 fixed lines in service. Of the countries for which data are available, St. Vincent and Grenada show very good performance with fewer than 10 faults reported per mainline per year. Jamaica and Suriname have moderately good performance with a fault incidence of around 30 to 40. This is around the same level as New Zealand and probably reflects the dispersed population and relatively old fixed line infrastructure in these countries compared with countries like St. Vincent and Grenada. Belize, Antigua, and Guyana perform very poorly in this respect.
Investment Requirements

In this section we consider what the future telecommunications investment needs are for Caribbean countries, based on a set of assumptions about target teledensity levels. We developed three scenarios based on different target access levels, but Scenario 1 (with target access levels matching those in New Zealand) forms the basis of our investment requirement calculations. The other scenarios are discussed later in this section.

In order to estimate the future mainline telecommunications investment needs, we calculated the current number of mainlines per person by dividing the number of mainlines in operation by the total population.\textsuperscript{14} We multiplied the country’s projected population for 2015 by a target benchmark of 0.466 mainlines per person to calculate the target number of mainlines per person. Finally, we multiplied the total number of additional mainlines required by the average cost of a new mainline, or US$400, and divided this number by 11 (The number of years between now and 2015). We then divided this total figure by the total population to reach the total annual investment per capita required to achieve the target number of mainlines per person. The calculation is as follows:

\textbf{Step 1:} \quad \text{Number of mainlines in operation in 2002 (according to ITU data)}
\[ \text{Total population in 2000 (according to UN population data)} \]
\[ = \text{Current number of mainlines per person} \]

\textsuperscript{14} The mainlines data is from 2002 and the population data is from 2000.
Step 2: Country’s projected population for 2015 \((according\ to\ UN\ population\ projections) \times \) Target benchmark of 0.466 mainlines per person \( (ratio\ of\ mainlines\ per\ person\ in\ comparator\ country\ New\ Zealand)\)^{15}

\[= \text{Target number of mainlines per person}\]

Step 3: \[
\frac{\text{(Number of additional mainlines required} \times \text{US$400})}{\text{11 Total population in 2000 (according to UN population data)}}
\]

\[= \text{Annual investment per capita required to achieve target number of mainlines per person}\]

We used the same method to calculate the investment requirements for cellular services until 2015 using the target benchmark of 0.647 cellular connections per person \( (\text{derived from the New Zealand information}) \) and a total cost per mobile phone connection of US$580.\(^{16}\) The results are illustrated in Figures 3.13 and 3.14 below. St. Kitts, Antigua, and Barbados already exceed the mainline access target and so are excluded from Figure 3.13.

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15. New Zealand is a middle-income country with similar characteristics to many of the Caribbean countries. It also has demonstrated better overall performance in the telecommunications sector, making it a reasonable comparator country.

16. The cost per mainline and cost per cellular phone subscriber were taken from the unit costs for infrastructure investment quoted in Fay and Yepes (2003).
No standard method exists for calculating investment requirements in telecommunications. Two weaknesses can be found in the methodology: First, the target we have selected is based on New Zealand’s levels of access. Although we believe that, as a middle-income country with good telecom performance, New Zealand provides a reasonable target, we realize that other countries could just as easily have been selected. Second, our calculation is based on the unit costs for infrastructure investment cited by the World Bank. Some commentators argue that these costs are too high and that they do not take into account the fact that new technology has lowered costs. However, we have used these costs for the purpose of consistency with other World Bank studies.

Given the arbitrariness of any particular service target in estimating investment needs, we have analyzed the investment requirements for all countries using the following three different scenarios:

- Scenario 1: Investment needs required to achieve a target level of mainline and cellular phones per capita matching that of New Zealand in 2002, and accounting for population growth until 2015.
- Scenario 2: Investment needs required to a target level of halving the percentage of “underserved” people for mainline and cellular phones in 2002 (this assumes an ideal of one mainline and one mobile phone per person and was calculated
Table 3.2. Investment Scenarios in Caribbean Telecommunications

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<td>17.52$</td>
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<td>Dominica</td>
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<td>Guyana</td>
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<td>Haiti</td>
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<tr>
<td>Trinidad &amp; Tobago</td>
<td>24.66$</td>
<td>113%</td>
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by halving the difference between this target level and the existing number of mainlines and mobile phones per person in 2002), and accounting for population growth to 2015.

Scenario 3: Investment needs required to achieve a target level of mainlines and cellular phone connections equivalent to that of Antigua in 2002, and accounting for population growth until 2015.

This comparison is illustrated in the Table 3.2.

The different scenarios provide a consistent picture of each country’s investment needs. Antigua, the Bahamas, Barbados, Jamaica, and Trinidad and Tobago all require less investment to meet mainline and cellular phone targets, whereas Haiti, St. Vincent, and Guyana require the highest levels of investment. This is the case when targets are set at an absolute level (Scenarios 1 and 3) and at a relative level (Scenario 2). However, since in most Caribbean countries telecommunications investment is done by private companies in response to market demand, these numbers do not have any fiscal implications. All governments will need to do is maintain good regulatory policies and investment climates so that private operators continue to invest.

**Economies of Scale**

To analyze the existence of economies of scale in telecommunications services in the Caribbean, we have analyzed the relationship between the cost of a local call and population density and analysed the relationship between the size of a country’s population and the average of:

- Cost per local phone call
- Cost per international phone call to the USA
- Cost per mobile phone call
- Monthly Internet charge.

The results of these comparisons are illustrated in Figures 3.15 to 3.18 below. It would have been better to use costs, rather than tariffs for this analysis, but the data was not available.

The cost of a three-minute local call is higher in more sparsely populated countries; therefore, the greater the number of connections, the lower the overall cost to the telecommunications companies, which is passed on to the customer. This implies that the cost of adding new customers to an already existing network is less than installing new capacity to reach sparsely populated sectors of the community.

Comparing telecommunications costs (local, international, mobile, and Internet) with population numbers indicates that countries with higher populations generally have lower service costs. This is not an exact measure of economies of scale since it doesn’t take into account the level of connectivity in each country or the actual level of traffic. This imperfect method may account for some of the deviations from the trend in these graphs (for example, both Trinidad’s far higher international calling charges and Haiti’s high Internet charges
Figure 3.15. Cost per Local Phone Call: Population

Cost of local phone call (US$ per 3 minute call)

- Dominica
- Antigua
- St. Vincent
- Suriname
- St. Lucia
- Grenada
- Trinidad & Tobago
- Jamaica
- Dominican Republic

Population (000)

Figure 3.16. Cost per International Phone Call: Population

Cost per call to the US (US$ per 3 minute call)

- Trinidad & Tobago
- St. Kitts & Nevis
- Guyana
- Jamaica

Population (000)
The weak relationship may be due to tariff distortions (local calls) or because of the degree of competition (mobile and international).

Figure 3.19 shows that local call charges tend to fall as population density increases. However, the data do not provide any strong evidence of economies of scale in telecommunications. As these effects exist, they seem to be dominated in the data by other factors, such as the level of competition.
Regional Approach

Perhaps the most significant and enduring example of a regional approach to the telecommunications sector in the Caribbean is the pervasive presence of the Cable & Wireless West Indies network. Operating in fifteen countries in the Caribbean, C&W has been the major monopoly telecommunications company in the region.

C&W West Indies has been one of the most profitable units of the C&W group. The success of the unit, and its strength across the region implies that there is some advantage to providing telecommunications services on a regional basis. Economies of scale can be achieved by executing some functions centrally, such as executive management, finance, and procurement.

This regional approach is being adopted by entrants in the mobile sector where companies like Digicel have secured licenses in several Caribbean countries. This type of regional service provision could be a useful model to consider for other sectors.

Apart from this, most regional Caribbean telecom initiatives have focused on sharing information and experiences between governments and regulators to enhance the sector’s development. Some examples of these initiatives include:

The Caribbean Telecommunications Union (CTU) was established by the heads of CARICOM governments to pursue greater connectivity in the region. It is a major telecommunications policy organization and its mandate is to address the international community on telecommunications issues on behalf of member countries, identify and obtain technical assistance from the EEC, ITU, World Bank and donor agencies, and establish links with telecommunications-related agencies like the Caribbean Broadcasting Union (CBU) and the Caribbean Disaster Emergency Response Agency (CDERA).
ECTEL—Regulatory Cooperation

The Eastern Caribbean Telecommunications Authority (ECTEL) was established as a regional telecommunications regulatory advisory body by the governments of five Eastern Caribbean states (Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines). Its primary objective is to assist national telecommunications regulators in promoting market liberalization and telecom competition in member countries.

ECTEL’s responsibility is to coordinate the approach to telecommunications regulation in each member state. It works closely with telecommunications regulators and governments in each state, advising them on matters relating to the sector, including regional policy, types of telecommunications services, licensing, fees, pricing, management, and provision of universal service. The National Telecommunications Regulatory Commission (NTRC) comprises the telecommunications regulators in each of the five member states. Each of these Commissions has five commissioners appointed by the Minister as well as varying levels of technical staff. Together, the NTRCs are responsible for formulating national telecommunications policy, planning, and managing the radio frequency spectrum, investigating and resolving interconnection disputes, monitoring anti-competitive practices, and managing the universal services fund. ECTEL advises on policy decisions affecting the member countries but the final policy decision and its implementation falls to the individual NRTCs.

The following diagram illustrates the ECTEL’s structure (left) and its relationship with the NTRCs.

The Effects of Regional Regulatory Cooperation:

ECTEL has had a significant impact on telecom liberalization in the member countries. It has helped to bring about early termination of existing license arrangements and facilitated competition. ECTEL’s inception has helped to bring about procedures for setting cost-based tariffs and interconnections, a significant reduction in tariffs and overseas telephone charges, and increased interest in applying for licenses from international businesses. One of ECTEL’s key achievements has been the role it played in helping member states achieve telecommunications market liberalization. The ECTEL member countries believed it would be beneficial to take a uniform stand in negotiating with C&W West Indies over the liberalization of their respective telecommunications markets. This is an example of the way in which regional cooperation can allow each country to leverage its combined resources to undertake the necessary advisory and reform activities to make significant progress.

Accomplishing the initial task of telecommunications liberalization was a lengthy process. After first threatening to exit the region if the markets were opened to competition, C&W signed a Memorandum of Understanding with ECTEL in April 2001, agreeing to phase-in market liberalization in three steps. Phase 1 allowed the introduction of VSAT-based bi-directional call centers and to award mobile concessions; Phase 2 introduced competition in fixed and international services; Phase 3 was aimed at liberalizing all remaining telecoms services.

(continued)
ECTEL—Regulatory Cooperation (Continued)

As a result of this agreement:

- Each member country agreed to grant appropriate operating license(s) for new entrants to provide the same networks and services that C&W provides.
- OECS states and C&W met within a framework of three joint working groups: Legal and Regulatory, Tariff and Rebalancing, and Communications to review regulations and licenses, determine what data are required to set appropriate tariffs, determine interconnection cost, advise on the cost for provision of telecommunications service, and establish procedures to review rates and proposals for rebalancing.
- ECTEL recognized Marpin Telecoms (a Dominica-based cable TV service provider) as the first new firm offering telephony services in the islands.
- Liberalization for mobile telephony in ECTEL member countries began in 2002. Digicel and AT&T Wireless were awarded mobile licenses in four of the five countries, a French company, Gensat, acquired licenses to operate in three countries, and CariGlobe acquired a license to operate in St. Kitts and Nevis.
- C&W agreed to be designated a dominant provider in monthly line rental, local, and fixed-to-mobile calls, but as liberalization has only recently occurred, a number of services remain in which it still has an almost 100 percent market share. In December 2003, ECTEL agreed with C&W that there would be no rate increase for specific services until March 2005. Discussion on ways to diminish C&W’s dominance in the market is ongoing.
- ECTEL is hosting a series of community meetings in member countries in which members are allowed to question ECTEL officials on their roles and functions as well as on issues resulting from liberalization.

The principle of regional cooperation in regulation has enabled ECTEL member countries to efficiently manage scarce resources and to effectively leverage the inter-member country networks, which has resulted in increased flexibility. ECTEL’s presence has provided the basis for a strong, unified approach to attracting investment and competition to the region. Rates for telecommunications services have begun to fall, applications for operating licenses are being processed, and applications to establish call centers have been received. Where possible, ECTEL endeavors to enact identical regulations in member states and to consistently implement them. This has reduced the burden on individual regulators and has helped attract investment.

Source: Castalia, ECTEL.
from 28 countries and advocates collaboration among businesses and policy makers on the formulation of policy and technical standards across the Caribbean.

The Eastern Caribbean Telecommunications Authority (ECTEL) is a good example of regional regulatory cooperation that has been instrumental in bringing about telecommunications sector liberalization to the benefit of all member countries (see box).

**Policy Conclusions**

**Liberalization**

The experience of Jamaica, Barbados, and the ECTEL member states dramatically demonstrates the success of a well-formulated and -implemented liberalization process, involving private providers, introduction of competition in all areas, and an effective independent regulator.

This process has allowed these countries to achieve:

- Significantly increased total teledensity,
- Some of the highest cellular penetration and Internet access in the Caribbean, and
- Prices for mobile, local, and international calls that are well below average for the Caribbean, and lower than for some developed countries.

Trinidad and Tobago seems likely to liberalize in a similar way, but the country is proceeding more slowly, and faces some specific challenges. The Government has a majority ownership in TSTT, the incumbent provider, and C&W has less than a controlling stake. This financial arrangement is likely to create a less commercially focused company, which may struggle in a competitive environment. The Government would be advised to consider selling its shares in TSTT as part of the liberalization process. Trinidad and Tobago introduced a law allowing telecom competition as early as 1999, but has moved slowly to create the necessary institutional and regulatory arrangements to make competition effective.

**Regulation**

The Dominican Republic’s reforms differ from Jamaica’s in a number of ways. In the former country, interconnection agreements were negotiated between the entrant and the incumbent, and only in 2002 did the regulator (Indotel) gain the power to settle interconnection disputes. In contrast, the interconnection process in Jamaica was based from the start on a Reference Interconnection Offer approved by the OUR, which had the power to settle interconnection disputes. The Indotel Board is composed of one representative each from the companies, consumers, broadcast and media, and the Secretariat of the Presidency. The Executive Director of Indotel is a non-voting member. All voting members are appointed by the President. In practice, the incumbent, Codetel, has had a representative on the Board, unlike the other companies. Technical and policy staff is changed after each election. In contrast, in Jamaica, the Director and Deputy Director Generals of the OUR have been independent from the Government, industry, and consumers, and the directors and staff are not expected to change with a change of Government.
In summary:

- Countries that are or have already moved to a liberalized telecommunications environment (Jamaica, Barbados, and the OECS countries) are doing well. They should stay focused on enabling competition and fine-tune universal access targets and initiatives.

- The Dominican Republic has enacted a number of reforms required to support a liberalized telecommunications environment and has one of the longest histories of liberalization. Its experience has been positive, but it has not yet managed to match the performance levels of countries like Jamaica and Barbados. There may be a number of reasons for this, including differences in culture and level of income. It also seems likely that part of the explanation could lie in the quality of the policy reforms and regulatory institutions.

- Countries that have not yet moved to a liberalized competitive telecommunications environment, or which have tried to make this change, but have not succeeded (for example, Guyana) should move to this model as soon as possible. Institutional capacity to implement reforms in these countries has traditionally been low and they could benefit from technical assistance in this area.

- In addition to moving to a liberalized environment, there are real benefits to be gained from regional cooperation in the telecommunication sector. Regional cooperation in regulation has proved to be valuable to the ECTEL member states and the experience of C&W West Indies suggests that a regional approach to service provision can result in benefits to companies and customers.
Electricity is an essential input to economic growth and social development. Industries use electricity to manufacture products and provide services. Households use electricity to provide light and run electric appliances that improve the quality of life, literacy, and health. Consequently, how the electricity sector performs can profoundly affect the economic and social well being of a country.

To illustrate the relative importance of electricity services to Caribbean economies, Figure 4.1 compares electric power consumption per capita with GDP per capita.

Electricity shortages are a real barrier to economic growth. For instance, in the Dominican Republic, rapid currency depreciation and inflation in early 2003 led to blackouts because privately owned power generation companies could not afford to import fuel. The country, which once had one of the fastest-growing economies in the region, now faces an untenable fiscal situation coupled with a macroeconomic contraction.

Erratic supply is probably the most significant electricity related constraint on economic growth in Caribbean countries. Most business activities that depend on a constant supply of electricity (including tourist facilities, data-processing and IT facilities, supermarkets, and other industries that depend on refrigeration) must either invest in expensive standby generation or face periodic significant disruption to their operations. Voltage fluctuations damage electrical equipment so customers must either invest in their own power-conditioning and standby equipment or face significant repair or replacement costs.

High electricity prices are another barrier to economic growth in some Caribbean countries (discussed below). Lack of incentives to reduce fuel prices and recurring system losses are the key drivers behind high electricity prices. High fuel prices could be partly explained by reliance on expensive diesel fuel for generation when cheaper alternatives, like heavy fuel oil, could significantly reduce generation costs.
Overview of Institutional Framework

Table 4.1 presents a summary of the structure and governance arrangements for electricity provision in most Caribbean countries.

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, Antigua, and St. Kitts, still have state-owned utilities. On the larger islands, a variety of models exist. Haiti and Guyana have a vertically-integrated, state-owned utility. In Jamaica, the utility is majority privately owned and 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 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 fulfill its role. In Guyana, electricity services are regulated by the Public Utilities Commission (PUC), but personnel, legal and financial restrictions inhibit its effectiveness. Most of the remaining Caribbean countries do not have objective and transparent regulatory review processes.
Table 4.1. Industry and Governance Structure

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<td>Power Single Buyer</td>
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* 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.
Benchmarking

This section compares the performance of each country on key industry indicators. It starts by presenting data on access to electricity services, then compares end-user prices, and analyzes the extent to which price differences are explained by the source of primary energy, and the scale or efficiency of the system (losses and labor productivity). This section also includes a discussion of quality of service and the potential fiscal burden of electricity services.

Although benchmarking can provide an indication of relative performance, it is hard to know how much to expect across countries of an aggregate comparator such as total cost (or price) vs. system output (or installed capacity). Factors that complicate the analysis include:

- Declared costs may have varying treatments of past capital expenditures.
- Success in accessing available scale economies will depend on the history of the rate of system expansion, which will vary widely (across countries) with past rates of population and economic growth as much as with overall size.
- Transmission and distribution unit costs make up half the total costs and depend more on topography and customer density than on total size.

Where possible, these and other factors have been considered in assessing relative performance.

Access to Electricity

Wealthier countries normally offer access to electricity services to a larger share of the population. This reflects the fact that consumers in wealthier countries more ability to pay for services. As a result, sufficient funds can be invested in expansion of assets. Figure 4.2 presents electricity access statistics. Electricity access is defined as the percentage of the population whose residential dwelling is connected to the electric network.

The data in Figure 4.2 confirm that wealthier countries offer a greater percentage of the population access to electricity. Caribbean countries with a GDP per capita of less than US$5,000 vary considerably in the extent to which they provide access to electricity. At one extreme, Haiti stands out as the worst performer, with less than 35 percent of the population connected. The Dominican Republic is also at the lower end, with less than 70 percent access. The countries in the top left of Figure 4.2, with a GDP per capita of fewer than US$5,000, have been able to achieve more than 80 percent access.

Approaches to Providing Universal Services. Some Caribbean countries have been able to achieve almost universal coverage levels with programs to encourage rural electrification. Jamaica is a good example. The Rural Electrification Program, Ltd. (REP) in Jamaica was established in 1975 by the Government as a legally separate entity from the state-owned power utility, to spread electrification. Under this program, the Government negotiated investment loans from multi-lateral funding agencies to finance, not only the line extensions themselves, but also the wiring to low-income houses. REP furnished all the materials needed for wiring the houses and made arrangements with contractors to execute the work. The total
The cost of wiring was incorporated as a loan to the homeowner to be repaid over five years in monthly installments with the electricity bill.

**Prices**

Electricity prices primarily are driven by four factors:\(^\text{17}\)

- The cost of primary energy used to generate electricity. The highest cost tends to be imported fossil fuels. Trinidad and Tobago, which has substantial gas reserves of its own, could be expected to have lower generation costs.
- The underlying costs of the generation, transmission, and distribution assets, which are influenced by the particular technologies utilized, age of the assets, and efficiency with which they are operated.
- The extent to which the government subsidizes electricity supply.
- The efficiency of the generation, transmission, and distribution functions, and, in particular, the utility’s performance in minimizing system losses and maximizing the electricity delivered to consumers from each unit of primary energy input.

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\(^{17}\)This section of the report uses prices as the basis for analysis rather than costs because reliable information about costs was very difficult to obtain. Prices do not necessarily reflect costs, but in absence of cost data, prices are a reasonable proxy. We comment on known subsidies and tariff distortions in the text.
Figure 4.3 presents average end user electricity prices for the Caribbean countries:
The extent to which these prices are explained by the type and cost of primary energy
used, and the scale or efficiency of the system is discussed in the sections that follow.

*Primary Energy Source.* Table 4.2 presents available information on the percentage of
the total generation in each country that uses fossil fuel and hydro energy. The shadowed
cells indicate those countries where the vast majority of fossil fuel inputs are sourced from
domestic reserves.

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<th>Table 4.2. Source of Primary Energy</th>
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<td>Source: Castalia (not all columns add up to 100 percent since other generation technology is used).</td>
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Based on a better understanding of the type of primary energy used by each country, the following differences in prices emerge from Figure 4.3:

- There is a big difference in electricity prices between US$0.03 per KWh to US$0.27 per KWh. The lower prices in Trinidad and Tobago and New Zealand are explained in part by their gas reserves.
- Higher prices in St. Vincent, Dominica, and Guyana are not explained by the source of primary energy. Countries with similar combinations of primary energy to Guyana (Jamaica), or with less hydro energy than St. Vincent and Dominica (St. Lucia) have lower prices.
- Most of the smaller Caribbean islands rely exclusively on diesel fuel to run generators. It is estimated that making use of heavy fuel oil by retrofitting existing prime movers would be economically viable and could reduce the cost of supplying electricity by between US$0.02 and US$0.05 per KWh.
- Some utilities do not have adequate facilities to store their fuel reserves beyond that required for about 48 hours of use. As a result, they have limited bargaining power to negotiate with suppliers.
- It is also possible that the average tariffs charged by those countries in the middle of Figure 4.3 are relatively high compared with best practice. For example, in Jamaica the price of electricity, at an average of more than US$0.16 per KWh, is relatively high for the system size. This is partly a result of the fact that 98 percent of Jamaica’s electricity is generated with imported oil. However, it also reflects the fact that the overall fuel efficiency of the Jamaican Public Service Company (JPS) generating plant is relatively low and the system losses are high. In 2002, 70 percent of the energy fed into the JPS system was generated by relatively old steam plant operating with an average heat rate of about 13,000 BTU per KWh. Twelve percent of net generation was supplied by gas turbines with an average heat rate of 15,000 BTU per KWh when burning expensive diesel oil. The more modern diesel generators put out 36 percent of aggregate net generation at an average heat rate of 8,950 BTU per KWh.

**Economies of Scale.** In theory, the cost of electricity could be expected to benefit from economies of scale. Figure 4.4 shows the relationship between electricity production and price for the Caribbean countries as well as for the comparators. We have excluded from this graph Trinidad and Tobago and New Zealand, whose lower electricity prices are primarily explained by their access to low-cost gas.

The data in Figure 4.4 clearly show that prices tend to decrease as production of electricity increases. That is, differences in price between small Caribbean islands like Dominica, St. Vincent, Grenada, and St. Lucia and larger islands like the Dominican Republic and Jamaica are partly explained by the scale of their systems. However, prices differences are not fully explained by scale. For example:

- Price differences among Grenada, St. Vincent, and Dominica are not fully explained by the scale of their systems. These differences are also not explained by the type of primary energy, because Grenada, with the lowest price of the three, has the largest share of oil-fired capacity.
The Dominican Republic and Jamaica, two systems with similar generation capacity, have slightly different prices. In the Dominican Republic, retail prices are capped, and the difference between the capped tariff and the cost-reflective tariff is paid by the Government (see box in Quality of Service section below). A lower price in the Dominican Republic might push the trend line down, suggesting that Jamaica’s price is closer to expectations based on its size.

Lower prices in Haiti are not explained by the scale or source of primary energy. This implies that Haiti’s prices are heavily subsidized. As discussed in the following section, Haiti has system losses of more than 50 percent. With this high level of losses, Haiti should have one of the highest costs of supply in the region.

Impact of Efficiency on Price. The efficiency of an electricity company should, in theory, be measured by comparing the level of output against the level of inputs. Typically, outputs in the case of electricity could be measured as electricity supplied, and inputs as the total cost of supplying that electricity. Although information on electricity supplied was available, data on the total cost of supply were not readily available. In the absence of these data, and as a proxy to measure the efficiency of an electricity system, industry practitioners use staff per 1,000 connections as an indicator of labor productivity, and transmission and distribution losses as an indicator of distribution efficiency. Data on these indicators are presented in Figures 4.5 and 4.7.
Observing Economies of Scale

Most of the small island states are dependent on diesel engine generators. Diesel generator unit sizes and types vary from about 1 Megawatt (MW) high- or medium-speed units to about 30 MW low-speed units. Above a few MW, there appear to be economies of scale in generation plant:

The unit capital cost for 5 MW is around US$900/kW.

For higher capacities, costs appear to follow a 0.86 power law, up to the limit of the unit sizes available.18

Although expansion is achieved by adding units to an existing site, companies also view buying larger units less often as a way to reduce the disruption created by construction, even if this is minimized by completing the civil works for a few capacity increments at one time.

As shown in the diagram, very small systems do not appear to suffer a large diseconomy of scale because in this size region, small units tend to be high rpm diesel generators that are cheaper than their medium-speed counterparts (although less fuel-efficient). The largest systems can benefit from additional fuel efficiencies achievable through passing heat from the engine exhausts through a heat recovery boiler to a steam turbine even though this will increase capital costs.

The diagram would then suggest that power companies should buy the largest units available. However, optimal matching of new plants to load growth is more complex because larger plants will be more underutilized at the start and will require more backup. The savings depicted above will be offset by:

- The time value of money: larger increments spend capital earlier than necessary (allowing for 𝑛 years of load growth adds about 1/2(𝑛−1) times the cost of capital to the price).
- Reserve requirements: systems need to allow for the failure of the largest unit, so adding increments larger than existing plants increases the margin requirement.

(continued)

18. A plant x times as large will cost x^0.86 times as much (giving a unit cost lower by a factor of x^0.14).
Observing Economies of Scale (Continued)

- Operating efficiency: larger new units increase the period during which some plants must operate below optimum loading—while demand catches up—and, hence, at slightly lower fuel efficiency (although diesel plants are much better in this regard than steam turbines).

The average system size in the Caribbean is 260 MW, and if the typical rate of supply expansion is around 5 percent per annum, then an indicative annual supply increment might be 13 MW.

Balancing the effects above, power companies appear to choose capacity increments that provide for several years of load growth at once. For larger systems, like Jamaica, this will correspond to buying the largest units available that are consistent with system reliability requirements all at one time and achieving the maximum available scale economy. For the smaller systems, like St Lucia (which has load growth of 1.5 MW per year), unit costs of new supply will be unavoidably higher.

Even though one would expect utilities with smaller systems to be keenly aware of this disadvantage, there is some evidence that they may be choosing unit sizes that are too large (that is, giving too much weight to the disruption argument and too little consideration of the disadvantages of larger units). In places where competition is limited, increased regulatory scrutiny of capacity plans may reduce overall costs and prices.

Source: Castalia.

Staff productivity in Jamaica, Barbados, and St. Lucia appears to be relatively high, better, in fact, than in Singapore. These three countries have privately owned utilities. Countries like Antigua, Guyana, and St. Vincent, where a state-owned utility provides electricity, have room for improvement in staff productivity.

Figure 4.5. Staff Productivity
Figure 4.6 presents the impact that different levels of staff productivity have on price. The data show a good correlation among Caribbean countries. Trinidad and Tobago, Haiti, and the Dominican Republic were left out of the graph because lower prices in these countries are explained by other factors. Countries like Dominica and St. Vincent, who have around eight employees per 1,000 connections, have considerably higher prices than Barbados, a country with a similar scale and 4.7 employees for 1,000 connections. Guyana is also among the worst performers on staff productivity, which partly explains its higher price.

As another measure of efficiency, Figure 4.7 presents total system losses. Most Caribbean countries, except for Haiti, Guyana, and the Dominican Republic, perform reasonably well in relation to the comparators; at the same time, most countries, except Barbados and Trinidad and Tobago, are above what could be considered optimal. Trinidad and Tobago’s losses are remarkably low. This is primarily explained by the large proportion of industrial users and by the proximity of generation plants to these users.

The relatively high system losses of 17 percent of net generation experienced by Jamaica are a contributing factor to high supply costs. It is estimated that nine percent of the losses are attributable to technical losses and eight percent to power theft or other commercial factors. JPS is supposedly attempting to reduce loss levels, so far without significant success.

Haiti, Guyana, and the Dominican Republic have the largest systems losses in the region, most of which are commercial losses. High electricity losses are the main cause of EDH’s financial crisis. EDH bills for less than 50 percent of the energy it generates. It is common to find that in some areas, third parties install a transformer to illegally steal electricity from EDH’s high voltage lines and sell it to end users.
In the Dominican Republic, losses in the distribution system are the main factor driving total system losses. Poor service quality, customer dissatisfaction, and relatively high prices have induced theft through illegal connections in poor areas. Reducing losses will involve a combination of enforcement measures and investments in commercial improvements. Distribution companies spent US$42 million in 2002 to buy meters to improve commercial systems, but additional investments in commercial systems are needed. The power crisis in 2003 has delayed substantial investments from distribution companies, and, consequently, reductions in losses are unlikely to materialize (see box in Quality of Service section).

Differences in system losses partly can be explained by the length of the network. In the absence of data on network densities, Figure 4.8 compares system losses against population density.

This graph shows that there is not a strong correlation between population density and system losses. This is not surprising considering that countries with high losses, like Guyana, Haiti, and the Dominican Republic have large commercial losses, which are, for the most part, independent of the length of the network.

Quality of Service

One of the key electricity service quality indicators is the number and duration of electricity outages. Data to measure performance against this indicator were largely unavailable. Data on fluctuations in voltage and frequency of supply were also unavailable. The fact that most
utilities in the region do not collect this data is itself revealing about their attitude to these aspects of quality.

In the Dominican Republic, capacity shortages, which were one of the key problems faced by the sector, have essentially disappeared with the addition of new installed capacity, including merchant plants. The key bottleneck is the overall financial problem confronting the sector. Financial difficulties faced by distribution companies are dragging down the rest of the sector (see box below).

Although Jamaica and most of the eastern Caribbean countries have developed generation capacity to match the growth in demand, service quality problems arise at the distribution level since the network is not always upgraded to meet load growth.

**Investment Needs**

This section presents the investment needs for a selected group of Caribbean countries for which relevant information was available. These investments were estimated using the following logic.

- The amount of installed capacity per customer was calculated.
- The electricity intensity (the amount of power used per person on average) was calculated. Electricity intensity averaged 2 MWh per capita, with substantial variations among countries. At the lower range, Haiti and Guyana have 0.2 and 0.8 MWh per capita, respectively. At the upper end, Trinidad and Tobago and Barbados
have an electricity intensity of 4.4 and 3.2 MWh per capita, respectively. Trinidad’s high-electricity intensity is primarily explained by its large share of industrial users.

To estimate investment requirements, three electricity intensity scenarios were considered. First, we selected a scenario that assumes that electricity intensity remains at the current level. Second, we constructed two additional scenarios that assume that electricity intensity increases to 3 and 4 MWh per capita. These scenarios would reflect two possible changes in the way electricity is supplied and utilized: 1) satisfying unmet demand, and 2) a more intensive use of electricity resulting from growth in industrial consumption and improvement in living standards (air conditioning, refrigeration, and so forth).

"Financial Blackouts" in the Dominican Republic’s Power Sector

The power sector in the Dominican Republic is facing serious financial problems. At an extreme point, in 2002, IPPs, receiving no Government or distributor support, were forced to suspend production, which led distributors to cut power, predominantly in poor neighborhoods. These were the so-called “financial blackouts.”

With continuing higher international fuel prices, the Government decided to freeze tariffs at February 2000 levels. The difference between the true costs of recovery tariffs and the tariff paid by consumers was subsidized by the Government. However this was unsustainable. The subsidies became such a fiscal burden on the Government that it started defaulting on its payments to generators.

At the same time, distribution companies (privatized in 2000) were unable to turn around the losses and improve collection as they had originally expected. They didn’t have the legal power to cut off supplies for overdue bills. There is also a widespread practice in the country of illegally connecting to the grid. The combination of these factors led distributors to suspend payment to generators.

Faced with no payments from the Government or distributors, the IPPs decided to suspend production. As a result of these supply cuts, distribution companies began to cut power in predominantly poor neighborhoods that had the highest losses and lowest collection ratios. Power cuts led to public riots, which claimed fifteen lives.

The reaction of the Government was to eliminate the generalized subsidy while simultaneously maintaining a targeted subsidy for the poor, renegotiating IPPs to cover stranded costs and payment of arrears, and offering support to fight illegal connections.

However, a sharp increase in the price of fuel in early 2003 led the Government to reconsider this decision. As a result, it reestablished the generalized subsidy and created a so-called stabilization fund to cover its obligation. This was designed as a temporary measure that would phase out as prices stabilized. To further complicate matters, a banking crisis in the country led to a sharp devaluation of the peso in late 2003.

Although the shock was absorbed by the stabilization fund, the distribution companies were hurt. First, they were not paid by the fund. Second, typically there is a two-month lag before increases in generation costs are passed through to the retail rate. As result, the distribution companies stopped paying the generation charges and “financial blackouts” reappeared. To further complicate matters, one of the privatized distribution companies sold two-thirds of its interests back to the Government in late 2003.

The required increase in capacity by 2015 was computed using the three different electricity intensity scenarios, the population projections for 2015, and the Millennium Development Goals (MDG) service target. Population projections were obtained from the UN Urbanization Prospects.

The total investment required to deliver the increased capacity was estimated using a US$1,900 per kW investment requirement for generation capacity and the associated network.

Investment requirements vary widely among Caribbean countries. As expected, countries that offer less access to electricity services, such as Haiti and the Dominican Republic, have the highest investment requirements. Haiti, which has the lowest access levels and lowest electricity intensity, has the highest investment requirements.

Investment requirements differ widely among the three electricity intensity scenarios. Total investment requirements for the selected group of countries for the period between 2004 and 2015 is US$3.9 billion under the assumption that electricity intensity remains unchanged. If electricity intensity increases to 3 or 4 MWh per capita, total investment requirements for these countries increases to around US$26 billion or US$47 billion, respectively.

19. In order to make investment requirements among different countries, we opted to use a similar access target to the Millennium Development Goals (MDG) set for water (i.e., to halve by 2015 the population without access to improved water).

20. The unit cost of US$1,900 per Kwh of generating capacity, including associated network cost, was obtained from Fay and Yepes (2003).
The three countries in which increases in electricity intensity have the largest impact on investment requirements are Haiti, Guyana, and Dominica. For example, in Haiti, investment requirements under the current electricity intensity scenario are close to US$400 million over the next 11 years. However, under the assumption that electricity intensity increases (the reliability of supply and industrial consumption increase), investment requirements increase substantially to US$14 and US$23 billion for electricity intensities of 3 and 4 MWh per capita.

The difference between investment requirements for the present electricity intensity and for increased electricity intensity is also high in Guyana where electric supply is unreliable. Investment requirements under the current electricity intensity in Guyana are only US$12 million over the 2004 to 2015 period. This low level of investment is explained by a projected decrease in population.

To expand connections while keeping consumption per connection constant (Scenario 1) would require countries like Haiti and the Dominican Republic to invest up to around 1 per cent of GDP per annum in the power sector. The percentages are lower for other countries, as Figure 4.10 shows. To expand connections and also meet an expansion in demand per connection to the level current prevailing in Barbados (Scenario 2) would require an investment of 1 per cent or less of GDP in most countries, but in Dominica and the Dominican Republic would require 3 per cent and 5 per cent respectively of GDP to be invested in the power system. In Guyana and Haiti the figure rises to 10 and 38 percent of GDP respectively.

One obvious conclusion from these figures is that it is not realistic to expect Guyana and Haiti to expand connections and service increased demand at this level, both because the investments required are too large compared to the size of the economy, but more importantly because it is highly unlikely that economic growth in Haiti and Guyana will
be sufficient to increase consumption per connection of electricity to the level currently prevailing in Barbados. In other words, the demand will not grow at a rate which would actually require the amount of investment derived in Scenario 2.

A more important conclusion, though, is that as economies grow, demand for electricity will increase, and substantial investment will be required. If it is not provided, growth will falter. This points to the need for electricity providers to have ready access to capital to invest, and tariffs which allow them to cover their costs, including earning a return to remunerate that capital. Governments (especially in highly indebted countries) may struggle to provide the capital required, reinforcing the benefits of private participation in electricity. (See Chapter 8 for a discussion of debt levels in Caribbean countries.)
Performance Summary

The above sections reviewed the performance of Caribbean countries regarding electricity services. Some of the key points emerging from this analysis include:

- **Access to electricity in poorer Caribbean countries (GDP per capita less than US$5,000) varies considerably.** At one extreme, Haiti stands out as the worst performer. The Dominican Republic and Guyana are also at the lower end, whereas St. Lucia and Grenada do very well.

- **Electricity prices vary considerably among Caribbean countries.** Differences in prices are mostly explained by three factors:
  - **Source of primary energy.** Most Caribbean countries, except Trinidad and Tobago, rely on imported fuel to generate electricity.
  - **Tariffs below cost recovery.** The data demonstrate that Haiti has below-cost recovery tariffs. The Dominican Republic also has subsidized tariffs.
  - **Staff productivity** can partly explain higher prices in St. Vincent, Dominica, and Guyana.

- **System losses in Haiti, Guyana, and Dominican Republic are a serious problem, reducing the financial viability of the sector.** The majority of these losses are commercial losses (illegal connections or faulty meters). Reducing these losses will require strong support from enforcement agencies.

- **Other Caribbean countries are performing adequately on system losses.** Yet, their heavy reliance on imported fuels would likely justify further investment in loss reduction. Trinidad and Tobago and Barbados are the two best performers on system losses in the region.

- **Electricity prices in some countries could be reduced through better fuel purchasing.** For example, in the case of Dominica, where 55 percent of its electric power is generated from fuel oil plants, the use of diesel, instead of Bunker C oil helps to explain its average price US$0.26 per KWh, the highest in the Caribbean.

- **Substantial capital investments are needed to increase access, improve reliability of supply, and meet the load of more intensive users.** For a selected group of Caribbean countries, total investment requirements for the next 11 years was estimated at US$3.9 billion.

Industry Structure and Regulatory Arrangements

Key elements of the industry structure and governance that are critical to performance include:

- Degree of private sector participation,
- Degree of competition,
- Effectiveness of regulation, and
- Industry governance.

These are described and discussed below.
Private Sector Participation

Caribbean countries have progressed to different degrees in terms of reforms that delegate part of the investment and operation responsibilities to the private sector.

- Some of the smallest countries in the Caribbean, such as Antigua, Barbuda, St. Kitts, and St. Vincent still rely on 100 percent publicly owned systems to provide electricity. Perhaps the scale of their operations might be unattractive to private international investors, although Grenada, with a population of a mere 100,000, has a privately-owned utility.
- The most common form of private sector participation is the IPP that signs a long-term Power Purchase Agreement (PPA) with a buyer. IPPs have been introduced at varying levels in Trinidad and Tobago (two), Jamaica (four), and the Dominican Republic (14).
- Barbados, St. Lucia and Dominica have long-standing histories of private involvement in electricity. Both have vertically integrated privately owned electricity utilities.
- In the Dominican Republic, 100 percent of three distribution companies were sold to Union Fenosa and AES. However, after the profound power crisis in the last three years, Union Fenosa sold back to the Government a controlling stake in the company (see box below on electricity regulation in Jamaica).
- In Jamaica, 80 percent of the shares of the Jamaica Public Services Company were sold to Mirant (see box on Jamaica).
- In Guyana, 50 percent of Guyana Power Light (GPL) was privatized, but the inability of the company to meet its loss reduction targets, among other factors, led to this privatization initiative to fail (see box below).

Level of Competition

The level of competition in Caribbean power markets is very limited. In 2000, the Dominican Republic created a wholesale electricity market. Even though the market is still in a nascent stage, efficient price signals have already increased thermal availability and triggered the entrant of new generators, including merchant IPPs.

The Jamaica Public Service Company (JPS) is required by its licence to seek competitive bids to satisfy its requirements for increased generating capacity, but is also allowed to participate in the bidding process. Under the license, JPS is the single buyer. However, any individual or company may generate electricity for its own exclusive use, without requiring a license for that purpose.

There is no competition at the retail level in the Caribbean.

Effectiveness of Regulation

Some of the Caribbean countries that have introduced private participation reforms have also made progress creating regulatory frameworks. Most countries that have made progress in regulating electricity services have done it by establishing a regulatory agency that has responsibility for setting service standards and tariffs. Regulatory agencies in the Caribbean, except for the Dominican Republic, generally have jurisdiction over several utility services, including telecommunications, water, and electricity.
The two countries whose regulatory agencies stand out as the most developed are Jamaica and Barbados. In Jamaica, the Office of Utilities Regulation (OUR) is a multisector regulatory agency that oversees the provision of services in electricity, telecommunications, transportation, and water. Electricity prices are reset every five years based on a price cap approach and periodically adjusted to reflect changes in inflation and foreign exchange (see box below). In Barbados, the Fair Trading Commission’s (FTC) predecessor agency, the Public Utilities Board, has a long history of effective and stable regulation of the prices charged and services provided by Barbados Light & Power (BL&P).

The Dominican Republic, Trinidad and Tobago, and Guyana still have substantial progress to make. In the Dominican Republic, the regulator (Electricity Superintendence, or SIE) needs to find solutions to improve competitiveness and overall sector performance as well as ways to gain independence from the executive power. In Guyana, the regulator has serious legal, personnel and financial constraints that limit its ability to effectively fulfill its role.

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**Why did the Privatization of Guyana Power and Light Fail?**

Guyana Power and Light (GPL) was established in 1999 as a private company with the Government holding 50 percent of the shares and Americas and Caribbean Power Ltd. (ACP) held the other 50 percent. ACP was a consortium formed by Commonwealth Development Corporation and Electricity Supply Board of Ireland. ACP was authorized to appoint the Chairman and the CEO.

Initially, significant improvements were realized by a capital injection that increased generating capacity and reliability of supply. Sales and cash collections increased. Provisions were made for quarterly adjustments of rates to accommodate changes in the price of fuel oil. However, profits did not increase in accordance with expectations, and additional financing became increasingly difficult to secure. The initial performance improvements were not sustained, and losses increased from about 24 percent of net generation to more than 40 percent. Projected reductions in system losses were expected to shield consumers from the increases in oil prices, but this objective was not realized with increasing losses. Commentators attribute the failure of GPL to:

- The tariff-setting formula was based on actual realized costs, but because they were backward looking, the periodic increases in costs such as employment, administrative, and other overheads caused income to lag behind expenditure.
- Increases in fuel prices were passed on to consumers on a quarterly basis, resulting in a lag in cost recovery at a time when fuel prices were rapidly rising.
- Although cash collections increased in aggregate terms as well as a percentage of billings, the 94 percent collection target on which GPL’s financial forecasts were based was never realized.

A dispute between the Public Utilities Commission (PUC) and GPL also contributed to the failure of the privatization. The PUC ordered GPL to refund US$40 million to consumers, which, arguably was due to the consumers because of GPL’s failure to attain the loss levels stipulated in the license. This decision of the PUC is under judicial review.

Citizens attribute GPL’s financial difficulties to overblown salaries and allowances paid to expatriate staff as well as exorbitant management fees. GPL was allowed to recover actual fuel costs and was not required to meet a specified minimum level of fuel efficiency; therefore, it had no incentive to operate at high fuel efficiencies.

The Government is now preparing to invite submissions from widely held financial institutions to purchase about 50 percent of GPL shares for about US$30 million. The license will be amended to remove the unintended negative effects on GPL’s revenues that were experienced during ACP’s tenure.

Source: Castalia.
Privately owned utilities in smaller islands such as Dominica and St Lucia are typically regulated by license. However, these countries do not have any institution to routinely monitor the utility and enforce the license. Also, the licenses in these and other countries are often badly designed. For example, licenses commonly do not include target heat rates in the fuel surcharge (the extra costs resulting from poor fuel efficiency are passed through to the generation rate). Imposing limits on the heat rates would lead generators to invest in plant maintenance to improve the efficiency of the plant, thereby reducing the amount of fuel input required per unit of output.

Regulatory regimes do not necessarily suggest a need to create an agency that controls prices and sets service standards. Regulating services could also be achieved through

### Electricity Regulation in Jamaica

The provision of electricity services is the only activity in the energy sector that is subject to economic regulation. The Jamaica Public Service Company (JPS) operates under a license that makes it the only legal “person” authorized to commercially transmit and distribute electricity. The company is required to seek competitive bids to satisfy its requirements for increased generating capacity, but is also allowed to participate in the bidding process. Under the license, JPS is the single buyer, since independent power producers are not allowed to sell electricity to any other party. However, any individual or company may generate electricity exclusively for its own use without requiring a license for that purpose.

Between 1975 and 2001, JPS was fully Government owned, but having been once privately owned it retained the structure of a registered limited liability company in which the Government owned almost all of the shares. In the 1990s, the Government decided to sell its majority shares to a private strategic investor, and in March 2001 transferred 80 percent of the shares to Mirant Corporation of Atlanta, Georgia. At the same time, a new license was issued to continue the exclusivity of service provision for an additional 20 years and to address other issues, such as the role of the regulator, quality of service, “step-in” rights of the Government, and others not addressed in the previous license.

In 2000, prior to privatization of the utility, the OUR reviewed the rates and adjusted them to be more cost reflective. As a result, the average KWh cost is now higher for residential consumers than for those in other rate categories. Jamaica is one of the few, and possibly the only Caribbean country, where this situation prevails. However, the price of residential consumption below 100 KWh per month is lower than the calculated cost of supply in order to make electricity more accessible to low income citizens.

The 2001 license stipulated that price revisions in 2004 and subsequent years should be determined by the “price cap” methodology. The OUR and JPS agree to the principles. The reset period will be five years with automatic adjustments made annually to reflect the effects of local and foreign (U.S.) inflation. Adjustments for fluctuations in fuel prices will also be made automatically, however, with a lower limit on the efficiency with which fuel is converted to electricity. The system energy losses for which the fuel costs can be recovered are also subject to a maximum ceiling. The fuel efficiency (“heat rate”) and maximum allowable loss levels are subject to regular review by the OUR and can be reset annually in order to provide efficiency improvement incentives to the utility.

The company’s direct investment (that is, not including IPPs) in the generating plant between 1976 and 2002 has all been in gas turbines. This is the result of inadequate planning and of decisions being postponed until the impending capacity shortage makes the gas turbine the most appropriate short-term solution because of brief installation periods. Gas turbines are not only fuel-inefficient but also burn expensive diesel oil. Insufficient consideration has been given to the potential of fuel diversification to reduce the cost of generation.

Source: Castalia.
contracts that clearly define the rules for setting and adjusting prices, and for the obligations of providers. For example, on the distribution side, the government could sign a 20-year concession contract with a private company to take over all operating and investment responsibilities for a defined area. The contract would include a specific schedule of service targets that the concessionaire will be expected to achieve, and detailed provisions on how tariffs would be adjusted over time to reflect ordinary and extra-ordinary fluctuations in the underlying costs.

The contract would also include provisions to define how tariffs would be subject to periodic resets, or price reviews, to the rates in line with fluctuations in the economics of the contract. Although good contracts commonly include detailed provisions on how to make these adjustments, a certain degree of discretion in the application of these provisions would require the intervention of an independent body. What is needed is a body with the responsibility for monitoring compliance with the regulatory regime, whether it is established by contract, license, or statute. Countries such as St. Lucia and Dominica, which have a private utility operating under contract, but which lack a regulatory or monitoring unit, would be advised to invest in such a capacity. Given the desirability of achieving economies of scale in regulation, a regional regulator along the lines of ECTEL (see Chapter 3) might be a good option. It might be possible to offer membership to countries both within and outside the OECS.

Conclusions

Access to reliable electricity supply is a key element of a country’s competitiveness and economic growth.

Electricity services benefit from economies of scale. Therefore, in analyzing the performance of Caribbean islands it is useful to separate them in two groups: the smaller islands with less than 500,000 population, which include Antigua, the Bahamas, Barbados, Dominica, Grenada, St. Lucia, St. Vincent, and Suriname; and the larger islands, including the Dominican Republic, Haiti, Guyana, Jamaica, and Trinidad and Tobago.

All smaller islands have a single vertically integrated utility. In Barbados, St. Lucia, and Dominica the utility started as a private entity or was privatized many years back. In Grenada electricity supply was privatized in 1994. In the remaining smaller islands the utility is a statutory corporation.

Most countries offer reliable services to more than 90 percent of the population, and rely on imported oil to fuel their generation plants. Electricity prices in these islands vary between US$0.17 and US$0.27 per KWh. The price differences are partly explained by the differences in size, labor productivity, and, to a lesser degree, system losses. Dominica, one of the smallest islands, stands out as having the highest prices, largest losses, and one of the lowest staff productivity levels in this group. The only country with a regulatory agency is Barbados (a multisector regulator); other private utilities operate under a license but without a regulator. With the highest electricity prices in the region, smaller islands should turn their attention to introducing effective regulatory regimes that provide incentives to bring costs and prices down. Barbados stands out as a relatively good performer and a benchmark among this group by offering access to nearly 100 percent of the population, the lowest tariff, lowest system losses, and highest staff productivity.
The group of larger countries shows a wide range of performance and a more complex set of issues that must be resolved. At one extreme, Haiti offers access to electricity to fewer than 40 percent of the population, and for fewer than 12 hours a day. The Dominican Republic, where deep sector reforms have been implemented, has significant progress to make to increase access from its existing level of 70 percent. Guyana is also challenged to improve access and reliability of supply. In order to resolve their access and reliability shortcomings, these three countries will need to invest substantial sums over the next ten years.

Electric utilities in the largest countries are facing major financial problems. In Haiti, EDH is bankrupt; in the Dominican Republic, generators and distributors are in financial distress. Financial difficulties primarily are explained by tariffs which are below cost recovery, large system losses (of which most are commercial losses), and low revenue collection ratios. Reforms that insulate electricity services from the influence of political interference and poor governance are highly desirable in Haiti and Guyana.

In contrast, the other larger islands—Jamaica and Trinidad and Tobago—have done better. Trinidad and Tobago benefits from access to low cost gas to fuel its generation plants, and large industrial users near its generation plants, which serve to limit system losses. In Jamaica, 80 percent of the only electric utility (Jamaica Public Service Company) is owned by private sector. In Trinidad and Tobago, the electric utility (Trinidad and Tobago Electric Commission, or T&TEC) is Government owned, but generation is partially private. Both countries have multisector regulatory agencies with jurisdiction over electricity services. The Regulated Industries Commission (RIC) in Trinidad and Tobago has personnel resource constraints that limit its ability to effectively fulfill its role. In contrast, the OUR in Jamaica played a critical role in designing a tariff regime that provides incentives for efficiency, and was credible enough to allow the utility to be privatized. Although additional reforms in these countries are not urgent, Trinidad and Tobago could benefit from strengthening its regulatory function and possibly introducing private sector participation in distribution.

**Recommendations**

**Smaller Islands**

- Maintain the vertically-integrated system. The size of these systems means that vertical unbundling is uneconomical.
- Where utilities are still state-owned, options should be explored to divest ownership to the private sector.
- Tariffs should be regulated under the existing licenses (with some renegotiation, if necessary, to create a modern, balanced regulatory regime). A good option may be to remove exclusivity over new capacity or to apply an efficient energy and capacity procurement obligation. One model is to apply the all-source bidding concept used in Jamaica. Utilities would be required to seek competitive bids to satisfy their requirements for increased generating capacity, but would also be allowed to participate in the bidding process. This increased market pressure would likely lead to more efficient generation costs. In the interest of maintaining investor confidence
the renegotiated license would guarantee, as far as possible, the same commercial arrangements that currently exist.

- New policies should allow for the development of self-generation where appropriate since significant savings to some enterprises might result if they decided to generate their own power. For example, hotels would have the opportunity to recover waste heat from the generation process for heating water and for steam production for their laundries.

- Those countries without a regulator—all smaller islands except Barbados—should establish a regulatory institution to complement the license. Smaller islands could consider a regional regulatory body similar to that used by ECTEL (see Chapter 3). This model would allow smaller islands to benefit from a more competent regulator than they could justify on their own.

- Given the large impact that fuel prices have on the cost of electricity in these countries, having a regional procurement system for fuel could increase their bargaining power. A regional fuel procurement entity would aggregate orders from all countries and negotiate larger volumes with suppliers. It could also contribute to introducing transparency in procurement. An organization like the Caribbean Association of Electricity Utilities (CARILEC) could promote the formation of such a “buying club” along with other shared services initiatives.
Larger Countries

- There are no apparent near-term gains to be expected from vertical separation or integration of electricity systems on larger islands. The priorities seem to be in improving institutional arrangements and regulatory effectiveness with the aim of reducing system losses, improving service quality and access, and controlling prices.

- Although Trinidad and Tobago seems to be performing relatively well, it could see further gains from improving the effectiveness of the RIC. Private participation in the state-owned transmission and distribution entity could increase labor productivity (which is currently well below levels in Jamaica and Barbados) and reduce fiscal risk. The combination of a partial sale of shares and a strong regulatory regime could deliver improvements. As an alternative, T&TEC could let a concession contract and include most of the regulatory provisions within the terms of the contract (regulation by contract).

- The Dominican Republic would benefit from strengthening the independence, power, and effectiveness of its regulator. Also, high commercial losses and low collection ratios are in need of a creative solution.

- In Haiti, technical assistance and development loans have had little success. Deep institutional problems could explain the failure of traditional programs. One of the options that might be considered would involve introducing private participation through an operating contract, complemented by development agency assistance with investment loans, and regulatory and contract risk coverage instruments. The diagram below depicts this option.

- Such reforms would involve the EDH entering a concession or operating contract with a private company. The contract would be prepared in such a way that the company receives clear instruction on the service levels it should deliver and is given as much autonomy as possible from the sector institutions to make the necessary decisions to implement the contract. To protect the business from wrongful regulatory intervention by the government, it would receive a partial risk guarantee from development agency, which would be in a position to use its leverage from its wider lending program to benefit the country to encourage the government to comply with the provisions and intentions of the contract.

- The World Bank would also provide a loan to the government that the company can use to pay for needed investments. It would be paid on the basis of outputs (connections installed or increased hours of supply).

- In Guyana conventional privatization was tried and failed. The Government is considering a local share offering, which might be a more sustainable model. Alternatively, a structure similar to that suggested for Haiti could be considered.
Water and sanitation services are essential to life. Access to improved water supply and sanitation has a direct impact on good health and living standards. Better health and a higher standard of living, in turn, indirectly affect economic growth.

On the other hand, the inability to expand water and sanitation services to the populations as a whole can constrain business, housing, and tourist development. Unreliable service requires consumers to have back-up tanks or resort to other coping mechanisms. The costs of inadequate water supply are illustrated by Jamaica, where numerous new investments are on hold due to the National Water Commission’s (NWC) inability to supply them with adequate, clean water. The situation became so serious that the Investment Facilitation Council and NWC jointly commissioned a study into the problem in 1999. The study found that investments totaling US$500 million were being delayed due to lack of water. These were predominantly tourism and housing development investments. It was estimated that the capital cost of meeting the demand for water represented by these delayed developments was only around US$30 million.

Institutional Arrangements

Table 5.1 provides a summary of the institutional arrangements for the water and sanitation sector in a selected group of Caribbean countries. Institutional arrangements for policy making, planning, and regulation are confusing and weak, and often lead to overlapping and redundant responsibilities. For instance, it is often unclear which agency is ultimately responsible for setting water service standards, and how they are enforced. The process for approving government contributions to capital investments is characterized by a game of
political forces instead of by economic criteria. Arguing that water and sanitation are essential social services, it is common for politicians and politically influenced regulators to keep tariffs below cost. The fact that many Caribbean water utilities are demonstrably inefficient helps rationalize this decision.

Most water and sanitation utilities in the Caribbean are state-owned statutory corporations. A typical state-owned water utility in the Caribbean is characterized by:

- Overstaffing, with typically around eight employees per 1,000 connections.
- High levels of unaccounted for water, typically more than 50 percent. Commercial losses due to illegal connections, faulty meters, and under billing typically make up about half the unaccounted for water.
- Below cost-recovery revenues, which, in some cases, do not even cover operating and basic maintenance costs.
- Lack of funds to make capital investments to expand the network and replace aged pipes.
- Political involvement in network expansion and recruitment decisions.

The combination of these issues leads utilities into a vicious cycle of value destruction. The inability to invest in network expansion constrains revenue growth; inability to invest

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**Portrait of a Caribbean Water Utility—Jamaica’s National Water Commission**

The National Water Commission (NWC) is the primary provider of public water supplies. The utility is a statutory body and as such is more subject to political direction than the other public utilities. A new "Water Supply and Sewerage Services Act" is being drafted to give the NWC a more corporate structure and remove any ambiguities as to the respective functions of the executive arm of the Government, the regulator, and the NWC itself, and also make the NWC more financially independent of the Government’s budget. The NWC has consistently operated at a deficit.

Throughout the island, the reliability of public water supplies is less than ideal. A major problem is the lack of adequate storage capacity, especially in the capital city and its environs where about one-quarter of the island population resides. That region is primarily dependent on surface waters for its supplies, and the limited storage capacity results in supply limitations or interruptions in times of low rainfall. Financial constraints restrict the NWC’s ability to augment supply availability through increased storage capacity or additional sources. Although the involvement of the private sector in providing additional supplies has been tentatively explored, concrete actions in this direction have been limited.

Water losses (or unaccounted for water) are being gradually reduced, but at an estimated level of about 61 percent, are still unacceptably high. The exact loss figure cannot be correctly determined because the water put into the system is not all accurately measured, and a significant number of consumers are also unmetered.

The sewerage system in Kingston and its environs is in a deplorable state, which results in large volumes of untreated sewage being discharged into the harbor and nearby sea. Although budgetary allocations to improve the sewerage system have been made several times, other operational exigencies have always prevented any significant progress from being realized in this area. Extension of the sewerage system in metropolitan Kingston has also been neglected and, consequently, most of the buildings in the conurbation are not connected to the sewers, but are equipped with absorption pits. A further consequence of this situation is that the aquifers under the city have unacceptably high nitrate levels and cannot be used as sources of increased water supplies.

**Source:** Castalia.
in expansion or rehabilitation of treatment plants and networks leads to higher losses and more service interruptions; lower service quality decreases the willingness of consumers to pay for services and hampers revenue collection; lower revenue collection coupled with higher costs further limits the ability of these utilities to make capital investments.

To break this vicious cycle, some of the Caribbean water utilities have considered various reform options. These reforms have primarily focused on introducing private sector participation or new regulatory regimes. Some of the specific reforms considered in the Caribbean are described below:

**Regulation.** Guyana, Jamaica, Trinidad and Tobago, and Barbados have created regulators with jurisdiction over the water sector.

- In Guyana, the provision of water and sanitation services is regulated by the Public Utilities Commission (PUC); however, personnel and financial constraints inhibit the effectiveness of the PUC.
- In Jamaica, water services are regulated by the OUR, a multisector regulator. The OUR recently completed an impartial, professional review of NWC’s tariffs and awarded a tariff increase. The OUR also imposed specific service and efficiency targets on NWC.
- In Trinidad and Tobago, water services are regulated by the RIC, which is just beginning to discharge its mandate in the sector.
- In Barbados, the Fair Trading Commission (FTC) has jurisdiction over water services, which it is now starting to exercise. The Inter-American Development Bureau (IADB) has a program in place to develop a comprehensive regulatory framework for the water and sanitation sector that includes: 1) specific regulations for the sector, 2) methods and procedures for the implementation of such regulations, and 3) provisions for capacity building for the FTC personnel.
- The Dominican Republic is in the process of preparing legislation that will create a regulatory body.

**Private Sector Participation.** Some countries have attempted to introduce private sector reforms, but there are few success stories as yet.

- Trinidad and Tobago signed a management contract with Severn Trent in 1994. The Government decided not to extend the contract beyond its 1999 expiration date. The utility is now considering service contracts for ancillary activities like meter installation, reading, and billing.
- In 2003, the Guyanese Government entered into a five-year management contract with Severn Trent International for the provision of water services. Tariffs currently do not cover costs. The management contract is expected to provide a gradual reduction in the amount of subsidy required, and transition to a profit-making status within five years. However, 18 months into the contract, performance is behind schedule and relations between the management team and the board have been difficult.
- In 1998, Barbados signed a Build-Own-Operate-Transfer (BOOT) contract for a desalination plant with Ionic Freshwater Co. Barbados is ranked among the top 15 countries in the world in terms of water scarcity with only 390 m³ of fresh water available per capita per year. Further tourist development (e.g., golf courses, hotels, etc.)
is constrained by the scarcity of fresh water, which made the desalination plant look like an option to solve serious water scarcity problems. However, the plant is supplying costly water to a network with losses of more than 50 percent. Deferred infrastructure maintenance, unplanned growth in the network, and inadequacies in the operation of the system partly explain the high system losses.

- The Dominican Republic signed a commercial management improvement contract for water services in the most densely populated, western part of the country. Under this contract, connections are being regularized, meters are being installed, and billing and collection services are being provided. Early success of the contract has opened the way to discussions on extending the contract to a full operations and maintenance contract.

- St. Lucia is currently in the process of reviewing private sector participation options for water services. St. Lucia is considering an arrangement that would involve delegating responsibilities to a private business and arranging for a multilateral agency to provide the majority of investment funds. Such an arrangement builds on the lessons learned in other countries in which major investment needs and insufficient information on the assets and market make pure concession solutions difficult to implement.

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**Trinidad and Tobago—Who Failed?**

Opinions are divided on if and why the management contract in Trinidad and Tobago failed. Some commentators argue that the Government decided against extending the contract because the contractor failed to meet the targets set in the contract, including improving reliability of supply, upgrading the system, and making the utility financially viable.

Defenders of the contract argue that by the contract’s conclusion the private sector had reached all of its targets (PADCO 2002), including turning the utility into a profit-making business. Defenders also argue that a World Bank loan that was expected to pay for capital investments to help improve performance never materialized because the Government failed to increase tariffs, as per the original Bank agreement.

Without access to detailed data on performance before, during, and after the contract it is difficult to make an informed assessment as to who is right. However, some of the relevant lessons that could emerge from this case include:

- A proposed World Bank loan was conditional on tariff increases that were never implemented. One option to avoid the experience of Trinidad is to provide a legally binding commitment to the contractor that the promised funds will be available.

- Lack of clarity as to the powers of the management team and the role of the Board created problems in forging a new direction for the company. Providing a clear and irrevocable delegation of power from the Board to the contractor could resolve this issue.

- Some members of the management team had little or no experience in emerging markets, and had not previously held general utility management positions. Placing increased weight on general management and developing country experience, as well as on the ability to build rapport with other stakeholders, could help reduce this problem in future.

Access to Water

Figures 5.1 and 5.2 present water and sanitation access statistics for Caribbean countries. Most Caribbean countries offer access to improved water supply and sanitation services to more than 90 percent of the population. This statistic includes most Caribbean countries with a GDP per capita of less than US$5,000. Some of the specific countries that are worth highlighting include:

- One of the countries with the lowest GDP per capita (US$940), Guyana offers access to improved water supply to close to 95 percent of the population.
- Haiti, the poorest country in the Caribbean, has the lowest access levels, with less than 50 percent of the population accessing water supply, and 30 percent accessing improved sanitation.
- Trinidad and Tobago and Antigua and Barbuda are two countries with a high GDP per capita and relatively low access to improved water.

Some countries report higher access to improved sanitation than to improved water supply. This would seem unusual considering that water supply services, which are perceived as substantially improving the quality of life, are typically developed before sanitation services. The countries that report higher access to improved sanitation include Antigua and Barbuda, the Bahamas, Grenada, Jamaica, St. Vincent, Suriname, and Trinidad and Tobago.

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Table 5.1 Institutional Arrangements of the Water and Sanitation Sector

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<th>Guyana</th>
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</tbody>
</table>

Note:
1. The regulation is carried out by the National Water and Sewerage Commission (NWSC), which is also in charge of sector-wide policy making. NWSC has undesirable authority to set sector-wide policies and is not independent since commissioners are appointed by the ministry responsible for water.
2. The policy is that tariffs should cover costs, but since the Commission is not yet corporatized, the asset and debt structure of the Commission is not fully defined.
3. A private company provides the publicly owned water utility with supplies of water from a desalination plant.
4. A commercial management improvement contract for most densely populated, western part of the country.

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Figure 5.1. Access to Improved Water Supply

Figure 5.2. Access to Improved Sanitation
Vanuatu: A Small Island with a Success Story in Introducing Private Sector in Water Supply

Vanuatu, which had previously been under the rule of a condominium government (French and English), gained its independence in 1980. At that time, the urban water service in Port Vila was operated by the Public Works Department and over the years that followed independence, there was a gradual degradation of the water service in the urban centers. Some of the fundamental problems included:

- The Government was unable to collect sufficient funds to cover operating costs.
- Although water was metered and water charges were adequate, the level of collection was poor.
- As a consequence, the Department of Public Works had little or no funds to spend, not only on new works, but also on basic day-to-day operating needs.
- The network was deteriorating along with the quality of service, which was beginning to affect tourism and other industries.

To address these issues, the Government decided to let a concession contract based on the model adopted in nearby Noumea (New Caledonia). Aware of its weak institutional capabilities, the Government was prepared to delegate all management, operating, and investment functions except for the ownership of assets. To implement this initiative, the Government called a number of specialized companies to submit offers, which later led to a negotiation with UNELCO, a company associated with Lyonnaise des Eaux (now ONDEO).

In 1994, after two years of negotiations, UNELCO signed a concession contract to supply water and electricity in Port Vila. Some of the key terms of the contract include:

- The duration of the contract is for 40 years.
- The concessionaire is responsible for the operations, renewal, upgrades, maintenance, and extension of the network within the geographical limits of the concession area.
- At the end of the contract, all assets are returned to the Government or a new contract is signed.
- The price of the water is adjusted based on a formula that reflects increases in the underlying costs.
- The performance of the contract is controlled by the Government; periodical technical and financial reports are provided by the concessionaire.
- The concessionaire is contractually bound to operate and maintain the network and guarantees the sustained quality, quantity, pressure, and continuity of service as specified in the contract.
- Failure to meet service targets would result in penalties to the company.

After close to 10 years of operation, the concession delivered improvements in service. Some of these include:

- Before the contract, water supply was often interrupted; now water is supplied 24 hours a day.
- Unaccounted for water was reduced from 50 to 23 percent.
- The water tariff for the first 50 m3 per month was reduced to US$0.58 per m3 from US$0.75 per m3.
- Annual losses of up to US$440,000 in 1991, have been turned into a reported surplus of US$12,000 in 2000.

Some of the factors that contributed to the success of this case include:

- Initial acceptance by the Government of its own weak institutional state.
- The contract was well designed with good provisions for tariff indexation and clear definition of service targets.

Source: A Case Study of the Privatization of Port Vila, John Chaniel; UNELCO Vanuatu Ltd.; Beyond Boundaries—Extending Services to the Urban Poor, Asian Development Bank, not dated; Castalia Research.
Higher sanitation access is partly explained by the definition of “improved” sanitation and “improved” water. Improved sanitation commonly includes non-reticulated sanitation solutions, such as ventilated latrines that require little investment. Improved water, on the other hand, includes various types of reticulated supply such as standpipes, which commonly require investing in network expansion although it may also include solutions such as rainwater catchment tanks.

Efficiency

Caribbean water and sanitation utilities are characterized by chronic inefficiencies. Some of the key issues include:

- **Overstaffing.** A typical utility will have around eight staff per 1,000 connections, compared to industry best practice of fewer than four.
- **Large losses.** Unaccounted for water of around 40 percent to 60 percent is normal in a Caribbean water utility. This is extremely high in comparison with around 20 percent to 30 percent achieved by many emerging market water utilities, and best practice levels of under 20 percent in some countries. Large losses are driven by inadequate investment in pipe replacement and rehabilitation as well as obsolete customer cadastres, lack of metering, and illegal connections. Losses, however, are difficult to measure with accuracy since most systems do not have universal metering.
- **High electricity costs.** The relatively high cost of electricity is a significant issue for most Caribbean water utilities. For example, St. Lucia generates electricity by diesel-fuelled generating stations, which makes the cost of electrical power supplied to the Water and Sewerage Company (WASCO) for water and sewage pumping high. The high cost of pumping water and sewerage in St. Lucia makes it imperative that WASCO, like other water utilities on small Caribbean islands, consider and evaluate the benefit of capital works, where practical, to relieve friction losses and unnecessary energy use.

Quality of Service

Although most countries produce water of acceptable quality, continuity of supply has been a problem. It is normal for some Caribbean cities to be subjected to rotational cuts in supply during several months of the year.

Cuts in water supply are a major problem to hotels and to the tourism industry in general. A recent survey in St. Lucia indicated that large hotels were dissatisfied with the reliability of water supplies. The largest hotel in the sample was of the opinion that disruptions occurred too frequently. Some of the respondents indicated that during disruptions they had had to make alternative arrangements to purchase truck-carried water at a premium price, or about 30 percent higher than the utility rate. At least one large hotel on St. Lucia has already installed a water desalination plant to cope with the shortage of potable water supplies.

A few of the poorer countries, including Guyana, are unable to supply water of drinkable quality, forcing consumers to incur additional costs in treating the water themselves, or obtaining drinking water from other sources.
Sewage and Tourism

Many Caribbean economies depend on beach-based tourism. As beach resorts develop, sewage volumes rise. Not treating the sewage properly prior to discharge could kill the goose that laid the tourism egg. If pollution makes bathing waters unsafe in any part of a country, the resulting health scare may keep tourists away from the entire island for perhaps years to come. The economic damage could be severe. Perhaps even worse, water pollution can destroy the coral reefs which many tourists come to see, and which sustain the ecosystem and even physical existence of the resort environment.

In most Caribbean countries, tourism started to develop before sewerage systems were installed. Typically households in the area would have latrines or septic tanks. Some pollution would enter rivers and the sea, but because volumes were low, it was not a problem. Hotels would often install their own packet treatment plant on their grounds, and discharge the treated effluent discretely to the sea or a lagoon.

As tourist numbers grow and the area develops the pollution load entering the sea increases, and the risk of uncontrolled commercial discharges to water courses and malfunctioning packet plants increases. Several countries have responded to this problem over the last few years by putting in major sewage collection and treatment systems. For example, over the 1990s Jamaica invested in major sewage systems in Montego Bay and Negril. Barbados has also installed significant new sewage schemes.

These new systems are generally handed over to the state-owned water and sewerage utility to operate. This can cause problems. For example, the National Water Commission in Jamaica had proven itself unable to maintain mechanical wastewater treatment plants, so the treatment technology chosen for the new schemes was designed to have almost no moving parts. The disadvantage of this method of treatment is that it takes up a great deal of land, so prime beach front property near Montego Bay is now occupied with sewage aeration ponds. Government utilities also tend not to be innovative on issues such as reuse of the treated effluent. Wastewater systems are also expensive, often more expensive than water systems, and in highly indebted Caribbean countries public finance of such investment may be difficult.

Private participation may help to unlock finance and innovation. When a new Ritz Carlton hotel and golf-course was developed in Jamaica near Montego Bay, a private water and wastewater company investigated the possibility of installing a for-profit sewage treatment works to serve the new hotel and other major resorts in the area. The scheme under consideration would have carried the wastewater inland for treatment, rather than using beachfront property, used little land, and recycled the treated effluent for watering the new golf course. The hope was that the resort operators would be motivated to preserve the aquatic environment, and interested in innovative and lower cost solutions. However, most of the other hotels in the area were focused on the business of running a hotel, and expected the Government to look after wastewater issues. They also already had packet treatment plants, and even if these did not work well were reluctant to change, or to pay any more. This experience raises questions about whether purely private or tourism-financed solutions are possible in wastewater treatment, even in resort areas. Public private partnerships, in which the government is able to require hotels and others to connect and pay tariffs, but the private operator is able to minimize costs and use the most suitable technology, may be a better approach.

Source: Castalia Research.

Major Investment Requirements

Investment requirements for a selected group of Caribbean countries have been estimated following a similar methodology to that used for electricity (see Chapter 4). Service target levels were set based on the MDG. This is to halve the percentage of the population without access to improved water supply by 2015. The unit cost of connecting a household to
water supply was estimated at US$400.21 This may be a higher-end figure given that MDG targets are computed on the basis of increasing access to all forms of improved water supply (household connection, public standpipe, private standpipe, and so forth), and not just household connections.

Investment requirements to increase access to improved water services differ substantially among Caribbean countries. The total investment requirements for the next 11 years for the selected group of Caribbean countries in Figures 5.3 and 5.4 is close to US$650 million, or about US$60 million per year. Haiti and the Dominican Republic stand out as the countries with the highest total and per capita investment requirements. For example, in Haiti, investment requirements for the next 11 years are US$340 million, or close to 50 percent of the total for the selected countries. In the Dominican Republic, investment requirements for the next 10 years are close to US$220 million, or nearly 35 percent of the total for the selected countries. With Haiti and Dominican Republic needing up to 85 percent of the total investment requirements for the selected countries, the remaining countries appear to have substantially lower investment requirements.

These investment requirements estimates do not include replacement of aged assets. With a long history of inadequate investment in asset maintenance, it is likely that replacement and rehabilitation investment requirements are substantial.

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21. The unit cost of US$400 per connection was obtained from Fay and Yepes (2003).
Significantly larger investments would be required to achieve comparable targets in sanitation services given that the majority of Caribbean cities have only partial sewerage.

The overall trend in Figure 5.5 shows that wealthier countries tend to require less investment per capita in water supply than those that are less-well off. This follows from the fact that wealthier Caribbean countries already offer improved water services to nearly 100 percent of the population.

Haiti stands out as the country where investment requirements are least affordable. With a GDP per capita of around US$400, Haitians will need to spend close to 10 percent of their GDP to afford expansion of water services. Because it has other important priorities, it is unlikely that on its own, Haiti will be able to meet the MDG. The Dominican Republic and Belize are also on the upper end of investment requirements; however, with a higher GDP per capita, investment requirements in these countries represent only one percent of the total GDP.

The estimates for Guyana show that less than US$4 per capita for the next 10 years is required to meet the MDG. Guyana reports that 94 percent of its population is receiving access to improved water services. The UN Urbanization Prospects indicate that Guyana’s population is expected to remain unchanged over the next 10 years. That is, investment requirements are low because they reflect only the funds needed to increase access from 94 percent to 97 percent. However, this figure is misleading since the quality of water services currently being provided in Guyana falls well below the population’s expectations. To provide reliable, safe drinking water, and sanitary facilities for excreta disposal would required significant expenditures not captured by our estimation methodology.
The Bahamian population is expected to grow 15 percent over the next 10 years. This expected growth explains why the Bahamas appears to have high investment requirements in relation to other countries with similar income level.

Given that Caribbean countries have a wide range of investment requirements, and that less well-off countries tend to have the highest per capita investment requirements, the question that follows is how much would countries need to change their historic investment rates to reach the MDG targets. Data on total investment flows to the water sector of each country are hard to find. Most Caribbean countries rely on three sources to fund capital investments: public funds, ODA, and private investment. In the absence of data for the first source, the table below presents implied public, and actual ODA and private investment, flows as well as investment requirements.

All of the countries for which investment flows were estimated, Haiti stands out as the country where the rate of investment would need to increase the most. Haiti’s historic
per capita annual investment flows have been around US$3, whereas it would need to invest close to 14 times more to meet the MDGs.

The case of Haiti is complex. As indicated in Chapter 4, it will need to make substantial investments to increase access to electricity. With its perennial governance problems and volatile political environment, Haiti is likely to be a low investment priority for private investors. Support from ODA agencies might be the only way forward.

Deficiencies in quality of service and overall system efficiency described previously are partly explained by insufficient investments in rehabilitation, renewal, or maintenance of water treatment and distribution assets. Lack of funds to invest is the result of water tariffs being below their full cost recovery levels as well as inefficient operating and administrative costs.

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**Note:**
1. OECD Credit Reporting System (CRS).
2. The World Bank Private Participation in Infrastructure Database.
3. Implied public funds were determined by first estimating the implied total historic investment flow for the period 1990–2002, which was estimated by calculating the investment that would have been required during this period to increase access (1990–2002 reports) using a unit investment cost of US$400 per connection. Implied public funds were determined as the difference between the total implied investment requirement and the ODA and private investment flows. Implied investments were only estimated for Jamaica, Dominican Republic, Trinidad and Tobago and Haiti, the only countries for which 1990 access to improved water data were available.
4. Castalia’s calculations.
Most Caribbean water utilities rely on government subsidies to fund capital investment requirements. These subsidies are limited and add up to less than the total investment requirements. Governments traditionally prioritize network expansion investments over network rehabilitation investments. Expanding the network will allow governments to provide water for the first time to areas without access to water and, in turn, to expect more political dividends than investments in network rehabilitation. The result of this investment decision process is a water system with reasonably high coverage (as evidenced by the data in Figure 5.1), but with substantially high losses and frequent service interruptions.

**Regional Cooperation**

A regional approach to the governance or provision of water services has not been tried. This means that no tested models exist that could be used to suggest how Caribbean countries could adopt a regional approach to improve water services. A regional approach would make sense to the extent that it brings benefits to each participant, and these benefits exceed the costs of implementing such an approach. Some of the possible approaches to regional cooperation for water services are briefly described below.

**Regional Regulatory Agency**

There could be merit in setting up a regional regulator to serve countries that do not already have adequate regulatory capacity, according to the following points:

- **Economies of scale.** Significant scales could be achieved at a regional level. The smaller the economy the higher the regulatory cost per unit of output. Multisector regulators like those in Jamaica, Barbados, Trinidad and Tobago, and Guyana can reduce total regulatory costs, but for smaller countries the costs of a multisector regulatory agency might still be prohibitive.
- **Greater independence.** A regional approach toward regulation could also reduce the risk of political interference. An independent regional agency might be in a better position to resist political pressures.
- **Regional standardization** of regulatory practices could create a clustering effect that would make the region more attractive to investors.

At the same time, setting up a regional regulatory body for water services would be difficult to implement in practice. Participant governments will need to renounce their right to set tariffs and instead delegate this right to an international body. The variety of cultures and political systems would further complicate this approach.

One alternative that could be used to overcome some of these issues is a model similar to ECTEL’s for telecommunications. Under the ECTEL model, individual governments have a regulator that has the ultimate power to decide, but use ECTEL to provide regulatory advice. As a regional body, ECTEL has the resources to attract qualified, competent staff who would otherwise not be available or justifiable for each country. A more comprehensive description of ECTEL can be found in Chapter 3.
Regional Contract for Water Services

In the context of introducing private sector participation into the provision of water services in Caribbean countries, a single contract could be developed to provide services to more than one country. For example, a single contract for several OECS countries might be considered. A regional contract would have a scale that would make the deal more attractive to international water companies. Attracting more international business competition would have a positive effect on price. International corporations would be more willing to submit a lower price when bidding for a larger and single contract for several reasons:

- The costs of business development and transaction preparation (lawyers, financial advisors, commissions, and so forth), and any fixed costs associated with the preparation and implementation of the transaction would be spread over a larger market.
- A regional contract would have more visibility. International corporations would be eager to win a large regional contract to supplement their credentials.
- In addition, these businesses would be able to attract their best managers to these regional contracts since they, too, would see it as an opportunity to gain additional visibility and exposure. The best managers would normally be uninterested in being assigned to manage a low profile transaction in a small country. The quality of the management could have a significant impact on the outcome of the contract. A single top-ranked regional manager would have locally based managers in charge of each utility that is part of the contract. This operation would be similar to a regional subsidiary of a larger corporation.

However, structuring a regional contract would require finding solutions to complex questions like: Would governments agree to delegate the right to control the contract to another party? What legal system would be used as the basis for the contract? Who would be the single party to sign the contract with the company? How would participating governments be made accountable for their obligations?

As an alternative to having one single regional contract, Caribbean countries could adopt a model similar to that utilized by C&W for telecommunication services. This model is discussed in Chapter 3. In short, this model would involve a single company having compatible contracts in each country. Properly structured and compatible contracts could achieve the economy of scale benefits described above and could also help to solve some of the implementation issues, such as getting governments to agree to delegate their contract rights, or finding a commonly agreed upon contracting body. Because each contract would be awarded competitively, achieving this structure would depend on a single company making a strategic commitment to the region, and offering the best bid on all the contracts.

In summary, although no regional approaches have been attempted for water services, there are options that could be considered for the water sector in the Caribbean. These options could bring benefits, but the challenges and costs of implementing them could make them less attractive than national approaches.
Conclusions

Given the importance of water and sanitation services to improving living standards, and the indirect impact that better living standards have on economic growth, it is important for Caribbean countries to further increase access and to improve the quality of water and sanitation services.

The performance of water services varies widely among Caribbean countries. The majority report access to improved water and sanitation services to more than 80 percent of the population. Future water and sanitation plans in these countries should focus on further increasing access, and on converting, where appropriate, basic improved forms of access (public or private standpipes or improved latrines) to more conventional forms (household connections). Haiti is well behind other countries and reports that fewer than 50 percent of its population has access to these services. Belize also reports less than 50 percent access to improved sanitation services.

High levels of access to improved water and sanitation services do not mean consistently good or reliable service. Because most water and sanitation utilities are state-owned, investment decisions are influenced by politicians, who prefer using limited investment funds to expand the network instead of to rehabilitate it. Expanding the network brings political dividends, whereas network rehabilitation does not. This explains why it is typical to find water utilities in the Caribbean with technical problems resulting from inadequate investment in asset maintenance and rehabilitation. The most common evidence of under investment is the large level of unaccounted for water (commonly more than 50 percent) and services interruptions in some countries.

To address some of the problems facing water and sanitation, certain Caribbean countries (Trinidad and Tobago, Guyana, Barbados, and the Dominican Republic) have tried, with mixed results, to introduce private sector participation or, in the case of Guyana, Jamaica, and Trinidad and Tobago, to create regulatory agencies with jurisdiction over water. The involvement of private firms largely has been, in the case of Trinidad and Tobago, Guyana, and the Dominican Republic, motivated by a desire to improve management practices that could lead to efficiency and service improvements as well as to financial viability. In Barbados, private company involvement was more driven by a desire to access private capital and a leading-edge desalination technology. Results of these initiatives have been mixed. In Trinidad and Tobago, the management contract was not extended as it was originally envisioned, whereas Guyana’s is still in place, but results have been below expectations. In the Dominican Republic, a commercial management improvement contract has worked relatively well. More comprehensive forms of private sector participation, such as concessions, have not been tried in the Caribbean countries reviewed, although a concession model has worked well on the Pacific island of Vanuatu.

Independent regulation of water utilities is relatively new in the Caribbean. Perhaps at the forefront is Jamaica where the OUR, a truly independent regulator, recently was able to approve a tariff increase that should contribute to improving the financial viability of the sector. In Guyana, Trinidad and Tobago, and Barbados the water regulatory functions are in a nascent stage.

Investment requirements over the next 11 years for a selected group of 11 countries were estimated to total US$650 million. This figure reflects only the investment requirements
to halve by 2015 the part of the population without access to improved water. In reality, the investment requirement could be much larger since major investments would be required to rehabilitate or replace aged and poorly maintained assets, and to covert non-conventional forms of access to conventional ones. Significantly larger sums would be required to achieve comparable improvements in sanitation services.

Recommendations

The model to improve water and sanitation services in each country depends on the performance and individual circumstances of each country. No single model fits all the countries. The recommendations listed below are a set of elements that could be part of a country specific model to improve water and sanitation services. These recommendations are based on the understanding that two common problems underlie the water and sanitation sector in Caribbean countries: first, revenues do not cover the full economic cost of service and, second, poor governance is an issue.

- **Improve cost recovery.** Tariff revenues should be sufficient to cover the full cost of providing services. In most Caribbean countries, tariffs are below cost recovery. In these countries, governments should increase tariffs to recover the full cost of service. In cases where increasing tariffs to full cost recovery for all consumers is not possible because tariffs would be too high for those consumers who are less well off, governments need to fill this gap with subsidies. There are two options for providing these subsidies. First, provide direct subsidies targeted to the poor. A range of mechanisms has been successfully tried in other countries to provide direct subsidies. Chile is perhaps one of the more widely cited examples of a country where direct subsidies for water have worked well. Second, provide cross-subsidies. However, cross-subsidies would only work if the average tariff multiplied by the volume of water sold were equal to the full cost of service, which is not the case in most Caribbean countries. This option would first require increasing the average tariff, and then allocating different tariffs to different classes of customers so that the total revenue covers the full cost of service. This mechanism is successfully used in Colombia. One of its main challenges is finding an efficient and effective way of classifying customers according to their ability to pay.

- **Improve governance.** Most Caribbean water utilities are statutory corporations. This corporate form has not delivered adequate services. As an alternative, governments could consider introducing PSP, which includes a wide range of options that governments might consider from service contracts for discrete functions like the one used for commercial management in the Dominican Republic to concession-type options like the one adopted in Vanuatu.

The optimal model for each country depends on the circumstances of each country and, in particular, the level of cost recovery, the effectiveness of regulation, the current performance of the water utility, the quality of institutions and, in general, the level of risk in the country. Some countries could adopt softer models in which private firms are involved in providing discrete activities such as installing new connections, meter reading, billing, revenue collection, call centers, or overall customer services.
Other countries might choose harder forms of private sector participation that include or catalyze investment funds. Two options that could be considered are a concession contract with output-based aid (OBA) loans from development agencies, or a lease/affermage-type contract in which all investment requirements are funded by a combination of government funds and development agency loans or grants.

The OBA concession would be more appropriate for larger and less risky countries where some level of private investment is reasonable. The lease/affermage option, similar to those commonly used in Africa, would be more appropriate to countries that investors would regard as higher risk.
The ports and maritime transport sectors have undergone major changes over the past three decades. These changes have been driven by globalization, expansion of trade, growth in containerization, alterations in port logistics technology, and evolution of the governance and public and private management structures for the port industry.

This section reviews maritime transport and ports in seven representative countries in the Caribbean: Jamaica, the Dominican Republic, St. Lucia, Grenada, Barbados, Trinidad and Tobago, and Guyana. It opens with a discussion of the importance of ports and maritime services to Caribbean countries and an overview of the main regional shipping patterns. An examination of the institutional arrangements for Caribbean ports, an analysis of efficiency, and a comparison of shipping rates and port charges follow. We also review the importance of transhipment, opportunities for regional cooperation and economies of scale. The section culminates with a set of policy recommendations.

Economic Importance of Ports and Shipping

Ports and maritime services play a vital role in Caribbean countries since most are islands and the vast majority of transfer of goods is by sea. Consequently, ports and maritime services contribute directly to the economic development of Caribbean countries. Lower levels of port efficiency and higher shipping costs result in higher import costs and reduced export returns, which, in turn, have a negative impact on the competitiveness of the economy.

Trade is critical to all Caribbean countries. Figure 6.1 indicates that imported goods account for over 40 percent of GDP for ten Caribbean countries. This is notably higher
than the United States, for example, at around 11 percent. Guyana and Belize have the highest percentages of imported goods at 78 percent and 59 percent, respectively, whereas imports account for less than 20 percent of Haiti’s GDP.

All Caribbean countries import general goods such as building materials, household goods, and groceries. About half of these imports come from the United States, primarily through Miami. Europe provides about 12 percent of general imports. Finally, all countries, except Trinidad, import petroleum products through specialized facilities.
Table 6.1. Intra-regional Trade in the Caribbean (tons)

<table>
<thead>
<tr>
<th>IMPORT COUNTRY</th>
<th>Antigua and Barbuda*</th>
<th>Barbados**</th>
<th>Dominica</th>
<th>Grenada*</th>
<th>Guyana*</th>
<th>Haiti*</th>
<th>Jamaica*</th>
<th>Dominican Republic**</th>
<th>St. Kitts and Nevis*</th>
<th>St. Lucia**</th>
<th>St. Vincent and the Grenadines*</th>
<th>Trinidad and Tobago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua and Barbuda*</td>
<td>5,502</td>
<td>421</td>
<td>nd</td>
<td>nd</td>
<td>7</td>
<td>772</td>
<td>3,245</td>
<td>36</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbados**</td>
<td>nd</td>
<td>11,906</td>
<td>564</td>
<td>6,113</td>
<td>21,791</td>
<td>766</td>
<td>1,877</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominica</td>
<td>20,113</td>
<td>3,217</td>
<td>285</td>
<td>1,311</td>
<td>nd</td>
<td>46</td>
<td>2,648</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grenada*</td>
<td>9,065</td>
<td>3,169</td>
<td>18</td>
<td>104</td>
<td>nd</td>
<td>160</td>
<td>nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guyana*</td>
<td>2,896</td>
<td>1,341</td>
<td>2,310</td>
<td>1,341</td>
<td>1,648</td>
<td>18</td>
<td>nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haiti*</td>
<td>2,101</td>
<td>18</td>
<td>2,747</td>
<td>18</td>
<td>160</td>
<td>104</td>
<td>3,169</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamaica*</td>
<td>20,053</td>
<td>212</td>
<td>9,138</td>
<td>32</td>
<td>6</td>
<td>6</td>
<td>3,396</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominican Republic**</td>
<td>95,616</td>
<td>213,569</td>
<td>35,828</td>
<td>21,731</td>
<td>442</td>
<td>20</td>
<td>1,427,117</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Kitts and Nevis*</td>
<td>2,113</td>
<td>18</td>
<td>1,723</td>
<td>18</td>
<td>6</td>
<td>6</td>
<td>2,914</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Lucia**</td>
<td>213,569</td>
<td>25,618</td>
<td>13,954</td>
<td>3,396</td>
<td>46</td>
<td>2</td>
<td>2,507</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Vincent and the Grenadines*</td>
<td>1,005</td>
<td>6,795</td>
<td>960</td>
<td>38</td>
<td>nd</td>
<td>160</td>
<td>4,618</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>9,065</td>
<td>1,877</td>
<td>1,341</td>
<td>1,648</td>
<td>nd</td>
<td>104</td>
<td>3,169</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * (1998) and ** (1999), nd = no data.
Goods exported from Caribbean countries represent a lower share of the GDP than do imports, with most countries’ export levels falling between 10 percent and 40 percent of the GDP. Trinidad and Tobago and Guyana have the highest share of exported goods in their GDP, at 45 percent and 69 percent, respectively. This reflects the relative importance of tourism and the export of services for most Caribbean countries. Jamaica exports bauxite and alumina from four ports owned by the exporters. Trinidad exports petroleum and liquid natural gas (LNG) through ports owned by the petroleum companies, including the state-owned petroleum company. Trinidad also exports some manufactured goods.

Table 6.1 provides an overview of intra-regional trade in the Caribbean. With the exception of trade in energy from Trinidad, intra-regional trade is not significant.

**Shipping Patterns in the Caribbean**

The Caribbean is a crucial crossroads in world trade. Large global carriers like P&O, Maersk, and Sealand operate from the Pacific to the East Coast North America and Europe through the Panama Canal. These carriers use the Caribbean as an exchange point for intercontinental services. These large carriers interact with smaller specialist carriers that serve most Caribbean destinations. The principal ports for transhipment are:

- Manzanillo, Panama, used by American President Lines, Columbus Shipping, Compagnie Maritime d’Affrêtement and Compagnie Générale Maritime (CMA-CGM), Hapag-Lloyd, Maersk Sealand, Mitsui, Nippon Yusen Kaisha Line (NYK), P&O, and other lines;
- Miami, Port Everglades, and Palm Beach, Florida ports;
- Freeport, Bahamas, used by the Mediterranean Shipping Company (MSC);
- Kingston, Jamaica, used by Zim;
- CSZ World Terminals has built a new hub in the Dominican Republic; and
- Port of Spain in Trinidad is also a competitor in the transhipment business.

Other destinations do not appear to attract direct services due to lower volumes. They are served by specialist regional carriers. The principal Caribbean carriers are:

* **Tropical Shipping.** Operates most of its services out of the Port of Palm Beach, Florida. It is the largest container carrier in the trade and offers direct service to more than 25 islands in the Caribbean.

* **Seaboard Marine.** The single largest carrier at the Port of Miami. Its services include the Dominican Republic, Jamaica, Barbados, Trinidad, and Guyana.

* **Crowley Liner Services.** Has extensive services to key hubs like Jamaica and the Dominican Republic. It has links to Hamburg Sud.

* **Tecmarine.** Based in Port Everglades, Florida, this carrier serves 20 destinations in the Eastern Caribbean, Jamaica, and the Dominican Republic from Florida and close to Philadelphia.

  A number of other carriers serve specific parts of the Caribbean.
Size of Ports

Figure 6.2 and Table 6.2 illustrate the significant variance in throughput and growth rates among selected Caribbean ports from 1999 to 2003. (We also hoped to examine the port of Georgetown, Guyana, but data on this port were unavailable. This may be due to the fact that operations are fragmented among 11 wharves.)

The ports we reviewed can be divided into three distinct groups:

- **Large.** Kingston is the region’s largest port. In 2003, it handled 1,600 vessels and over 1.1m Twenty-foot Equivalent Unit (TEU), up 7 percent from the previous year, and 60 percent from 1999. After San Juan-Puerto Nuevo in Puerto Rico, it is the largest port in the Caribbean in terms of TEU.

![Figure 6.2. TEU Throughput at Selected Ports (1999–2000)](image)

**Source:** ECLAC (2004); 1999 data from Caribbean Shipping Association web site; 2003 data for St. Georges, Grenada; and based on questionnaire responses.

<table>
<thead>
<tr>
<th>Port</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingston, Jamaica</td>
<td>60</td>
</tr>
<tr>
<td>Rio Haina, Dominican Republic</td>
<td>-5</td>
</tr>
<tr>
<td>Port of Spain, Trinidad</td>
<td>7</td>
</tr>
<tr>
<td>Point Lisas, Trinidad</td>
<td>102</td>
</tr>
<tr>
<td>Bridgetown, Barbados</td>
<td>8</td>
</tr>
<tr>
<td>Castries, St. Lucia</td>
<td>-6</td>
</tr>
<tr>
<td>St Georges, Grenada</td>
<td>12 (from 2000)</td>
</tr>
</tbody>
</table>
and among the top five in Latin America. Its closest rivals in the Caribbean are Freeport, in the Bahamas, and San Juan. Freeport was 93 percent of Kingston’s size (in TEU) in 2003; San Juan was 30 percent larger in 2002, but its throughput has been declining. Figure 6.3 shows that Kingston stands out as handling a high number of TEU, despite a GDP per capita that is lower than many other Caribbean countries. This underscores the fact that the role of the port is largely independent of the national economy. Kingston is running at close to capacity, which is causing congestion and delays, and expansion is planned.

- **Medium.** There are two medium-sized ports, Rio Haina and Port of Spain, both of which have a mix of local and foreign traffic. Although TEU throughput is significantly lower than in large ports, Point Lisas could be included in this group given its tremendous growth over a five-year period and its comparable mix of local and foreign traffic.

- **Small.** Three small ports, Bridgetown, Castries, and St. Georges, have minimal transhipment levels and rely on local traffic. The port of St. Georges, Grenada, has no container crane and ships are required to use their own equipment for loading and offloading. The port of Georgetown, Guyana, appears to be comparable since it has no container terminal.

Figure 6.3 compares the TEU throughput per capita in each country for 2000.
Institutional Arrangements

The structure, organization, and management arrangements of a port are influenced by a number of factors, including historical developments, the socio-economic structure of a country, the port’s location, and the type of cargo handled. Figure 6.4 illustrates the four main forms of institutional arrangement that characterize ports today.

Many ports in developing countries are managed under the Public Service Port model. This arrangement often leads to inefficiency due to a lack of internal competition and user- or market-orientation. This structure also leaves the port vulnerable to government interference due to its dependence on the government budget.

Best practice in port infrastructure today is focused on increased service levels, increased operational efficiency, and improved allocation of public funds. Port terminals have become specialized in cargo handling services and are being integrated into global logistics chains, thereby taking on regional and global attributes and approaches.

This has caused the overall role of governments in the port industry to decline in recent years, but full-port privatization has not been widely adopted. Many countries still view some form of government intervention as necessary to manage strategically significant port land and the inherently monopolistic characteristics of port services. Governments still

---

**Figure 6.4. Port Structures**

1. **Public Service Port**
   - Port Authority owns, maintains & operates all assets
   - All cargo handling executed by Port Authority employed labor
   - Controlled by Ministry of Transport

2. **Tool Port**
   - Port Authority owns, develops & maintains infrastructure & superstructure
   - Cargo handling on board vessels, apron & quay done by private agents (sometimes using Port Authority equipment)
   - Port labor mostly private

3. **Landlord Port**
   - Port Authority acts as landlord & regulates port operations carried out by private operators
   - Infrastructure leased to private operators
   - Private operators provide and maintain their own superstructure
   - Port labor employed by private terminal operators

4. **Private Service Port**
   - Port land privately owned
   - Some of these ports are self-regulating
   - Infrastructure, superstructure & labor are majority privately owned and operated

*Source: Adapted from the World Bank Port Reform Toolkit (2001), Module 3.*
Table 6.3. Caribbean Ports—Institutional Features

<table>
<thead>
<tr>
<th>Specific Legislation</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Regulator</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statutory Corporation</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Board</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Private ownership: Infrastructure</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Private ownership: Superstructure</th>
<th>Barbados, Bridgetown</th>
<th>Grenada, St. Georges</th>
<th>St. Lucia, Castries</th>
<th>Jamaica, Kingston</th>
<th>Dominican Republic, Rio Haina</th>
<th>Trinidad, Port of Spain</th>
<th>Trinidad, Point Lisas</th>
<th>Guyana, Georgetown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>N</td>
<td>N^2</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

**Private operation:**

- **Port infrastructure**
  - Barbados, Bridgetown: N
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: N
  - Dominican Republic, Rio Haina: N
  - Trinidad, Port of Spain: N^3
  - Trinidad, Point Lisas: N
  - Guyana, Georgetown: N

- **Superstructure**
  - Barbados, Bridgetown: N^4
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

- **Stevedoring**
  - Barbados, Bridgetown: Y
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

- **Pilotage**
  - Barbados, Bridgetown: N^4
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

- **Towage**
  - Barbados, Bridgetown: N^4
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

- **Dredging**
  - Barbados, Bridgetown: Y
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

- **Other**
  - Barbados, Bridgetown: Y
  - Grenada, St. Georges: N
  - St. Lucia, Castries: N
  - Jamaica, Kingston: Y
  - Dominican Republic, Rio Haina: Y
  - Trinidad, Port of Spain: Y^3
  - Trinidad, Point Lisas: N^3
  - Guyana, Georgetown: N^3

**Competition within port services?**

- Barbados, Bridgetown: Y
- Grenada, St. Georges: N
- St. Lucia, Castries: N
- Jamaica, Kingston: Y
- Dominican Republic, Rio Haina: Y
- Trinidad, Port of Spain: Y^3
- Trinidad, Point Lisas: N^3
- Guyana, Georgetown: N

**Competition among ports**

- Barbados, Bridgetown: N
- Grenada, St. Georges: N
- St. Lucia, Castries: N
- Jamaica, Kingston: Y
- Dominican Republic, Rio Haina: Y
- Trinidad, Port of Spain: Y^3
- Trinidad, Point Lisas: N^3
- Guyana, Georgetown: N

**Is the port profitable?**

- Barbados, Bridgetown: Y
- Grenada, St. Georges: Y
- St. Lucia, Castries: Y
- Jamaica, Kingston: Y
- Dominican Republic, Rio Haina: Y
- Trinidad, Port of Spain: Y^3
- Trinidad, Point Lisas: N^3
- Guyana, Georgetown: Y

**Notes:**
1. 50 percent voting representation from private sector.
2. Cranes at Transhipment Terminal owned by PAJ; equipment at privately owned Kingston Wharves.
3. Carried out by Barbados Port, Inc.”

**Source:** Castalia ports questionnaire.
play an important role in facilitating and managing competitive behavior in port services, creating a contestable market structure through licenses, concessions, and other methods. The Landlord Model, with its mix of public and private services, remains the dominant model for larger and medium-sized ports.

Table 6.3 summarizes the institutional arrangements of ports in the Caribbean.

With the exception of Barbados and Guyana, the ports are owned by statutory corporations, but they vary in the mix of public and private service provision. Figure 6.4 shows that the Caribbean ports generally fall into two structural models: Landlord and Public Service.

**Kingston, Jamaica.** The Port of Kingston follows the landlord model. The Port Authority of Jamaica (PAJ) is a statutory body, with a semi-autonomous board. It has been appointed by the Government to act in the interests of the port by setting port tariffs and negotiating individual tariffs with shipping lines. PAJ also owns some of superstructure assets, such as the cranes at the transhipment terminal. Concessionaires or contractors operate the assets, cargo handling, and other activities in the port. APM Terminals Ltd., an AP Moller-Maersk international terminal firm, operates the transhipment terminal.

![Figure 6.5. Port Structures in the Caribbean](image_url)

*Source: Adapted from the World Bank Port Reform Toolkit (2001), Module 3.*
This model of structural separation has improved the port’s efficiency. Labor concessions and improved terminal management and equipment have enabled improvements in productivity. For example, negotiations in 1998 reduced the average port gang size from 21 to eight people and introduced flexible staffing hours. The exceptions to this agreement are stevedoring labor, which is still run on a pool system by the Shipping Association of Jamaica, and the pilotage service run by a private contractor, composed of former PAJ staff. PAJ owns the port’s tugs, but they are operated by a private company. Finally, private facilities at the Kingston Wharf compete to serve local traffic.

*Rio Haina, Dominican Republic.* The port of Rio Haina in the Dominican Republic was established as a landlord port following the enactment of the Port Law in the 1970s, which was aimed at reforming the sector. The Port Authority of the Dominican Republic (APORDOM) sets overall policies, tariffs, and grants concessions. The governing board is comprised of public and private members, who represent business organizations like the shipping agents association and the National Industrial Association.

The shipping association operates the container crane owned by the APORDOM on the authority-run container terminal on the eastern side of the river. Maersk-Sealand operates a container terminal on the west side.

The reforms effectively boosted the overall levels of traffic handled at the port. Traffic levels increased from around 4 million tons at the opening of the modern port in 1983 to 17 million in 1999. However, TEU levels have declined between 1999 and 2003 due to strong competition from other ports in the Dominican Republic. To recover the volume of traffic, Rio Haina must improve its operating efficiency levels.

Competition for traffic volumes intensified when a new, privately owned terminal was established at Caucedo, despite the fact that that terminal is reported to charge higher tariffs. The private terminal was built in a free-trade zone by CSX World Terminals (CSXWT) and Caucedo Development Corporation on a greenfield site near Santo Domingo. Managed by CSXWT, this port has a first-phase capacity of about one million TEUs per year and boasts modern equipment, including post-panamax cranes. It aims to handle a mix of local and transhipment cargo and has already secured about half the local traffic from Rio Haina, Puerto Plata, and Boca Chico. Transhipment cargo from the main intersecting trade routes is initially targeted at 2 to 300,000 containers a year.

*Bridgetown, Barbados.* The Bridgetown port has recently moved from the Public Service to the Landlord model. The Barbados Port Authority has been replaced by the newly corporatized Barbados Port Inc., and legislation is being drafted to set the framework for port regulation and to grant the company certain rights as a warehouseman and harbor authority. Barbados Port Inc. oversees marine operations, owns the port superstructure, and is also involved in cargo operations. There is no competition for local traffic among ports in the country.

*Port of Spain and Point Lisas, Trinidad.* The Port Authority of Trinidad and Tobago was established in 1961. It has responsibility for operating the main port at Port of Spain and in Tobago, regulating other ports, and controlling their existence and the cargo they handle. It is government owned and has a government-appointed board. Of the approximately 50 ports and wharves in Trinidad and Tobago, the principal international ports are Port of Spain and Point Lisas. Most of the others are private special purpose (for example, bulk) wharves.
The port at Port of Spain faces competition from other local ports, specifically Chaguaramas and Point Lisas. The private port of Chaguaramas has begun competing for port traffic and is fighting a legal battle to reduce the control the Port Authority can exert over it. Point Lisas is 51 percent government owned but falls outside of Port Authority control. It has become the preferred port of many businesses as a result of its more efficient service. For example, its container-handling rate of 18 containers per hour appears to be three times faster than that of Port of Spain. It is anticipated that continued expansion of the energy-based sector and the establishment of industrial estates in La Brea and Point Fortin will result in the need for substantial port facilities in those areas along the lines of those in Point Lisas. Trinidad’s experience with competition in ports mirrors that of Mumbai and the Jawaharlal Nehru Port (see box below).

The Port Authority is breaking itself up into separate, privately operated companies in an effort to improve overall port performance. These include individual companies for cargo handling, marine (tugs), ferry, and cruise wharf services. In June 2003, the Port Authority received proposals for private participation in cargo handling from the Port

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**Jawaharlal Nehru Port**

The Jawaharlal Nehru Port (JNPT), managed by the Port Trust of India under Central Government Jurisdiction, is located within the Mumbai harbor on the west coast of India. The port is ranked as one of the top 30 ports in the world, handling 55–60 percent of all container cargo in India. The total traffic traveling in and out of the port has increased markedly over the past decade, from 3.39 million tons in the years up to March 1994 to 31.18 million tons in the year to March 2004. This recent result exceeded the target set by the Ministry of Shipping, as did the number of TEUs handled (over 2 million). In fact, the volume of container traffic at the port has exceeded projections right from its inception in 1989, with growth expected to continue in the coming years. As part of planned expansion, the JNPT is undertaking a project to redevelop its existing bulk terminal as a container terminal, for which it has recently awarded a contract to a consortium of APM Terminals and CONCOR (Container Corporation of India). Under the contract, the consortium will build, operate, and manage the terminal for 30 years.

JNPT has two dedicated terminals—a Container Terminal designed and equipped to handle large-size container vessels, and a Bulk Terminal for the import of dry bulk cargo from vessels up to 70,000 DWT in size. Around six years ago a separate terminal, Nhava Sheva, was developed with private participation from P&O Ports of Australia. This was India’s first private container terminal, and it has achieved high productivity and faster turnaround time for vessel operations, helping to improve the port’s performance.

JNPT’s ability to adapt to competition and the changing needs of the industry, including adopting new technology, has been identified as an important part of its success. As with Caribbean ports, it is well situated, being in close proximity to important east-west trade routes (the Port Trust’s slogan is “Where India’s Trade Lines Converge with the World’s”) and thus has been able to develop a transhipment business (currently around 20 percent of shipments) with support from the Government.

In contrast to JNPT’s success, the nearby Mumbai Port, for which JNPT was originally commissioned to help ease its congestion, began heading toward a deficit in 2000. At the time, Mumbai was the fourth largest port in the country in terms of volume handled, but, as a result of poor management, the limitations of its facilities, outdated systems, and a large labor surplus, its traffic has decreased in line with the corresponding increase in traffic handled by JNPT.

Source: Castalia.
of Houston (U.S.), International Container Services (ICTSI–Philippines), El Gaumache, and the Port of Cartagena Consortium. Negotiations are currently underway with a preferred bidder. The objective of introducing private sector involvement is to improve the performance of the Port of Spain through leveraging the latest management techniques and technology, gaining easier access to finance, commercial decision making on investments, and improved marketing. The Port of Spain Infrastructure Company, Ltd. will remain as a government-owned, real-estate management and holding company.

The Port Authority will take on a regulatory role for all ports. The restructuring will help to remove the perception of a conflict of interest when it appears to be both regulator and competitor to private ports like Point Lisas.

Castries, St. Lucia and St. Georges, Grenada. These two ports are structured according to the Public Port Service model, in which the government owns and operates all aspects of the port.

In St. Lucia, the ports at Castries and Vieux Fort are administered by the St. Lucia Air and Sea Ports Authority (SLASPA), a government body with a government-appointed board. A subsidiary company, St. Lucia Marine Terminals Ltd., has operated Vieux Fort for SLASPA since 1995. There is little private involvement in any service operation at these ports.

The port at St. Georges in Grenada is run by a statutory body and has a board that is appointed by the Minister of Finance. There is no private ownership or operation of services at this port and no competition for traffic from other local ports.

The ports at Castries and St. Georges could be well positioned for transhipment business although this may require some structural reform to increase levels of efficiency at the ports. In St. Lucia, the role of transhipment business has been given to the separately operated Vieux Fort.

Georgetown, Guyana. We were unable to gather substantial information on this port. The port consists of 11 independently operated wharves. It is government owned, but managed by the Guyana National Shipping Corporation.

Regulation

Throughout the Caribbean, the Port Authorities have typically retained a regulatory function. In many countries, such as in the Dominican Republic and Jamaica, the Port Authority sets the port tariffs. Despite this, many ports do appear to enter into contracts with large users on negotiated terms. Information on these terms was unavailable.

In Trinidad and Tobago, regulation extends to controlling the type of cargo handled. Allocating traffic among ports and wharves is a very traditional form of regulation and is coming under pressure from ports that need to expand but also maintain operational flexibility. Attempting to control ports in a competitive environment can create problems, as evidenced by the legal battle between the Trinidad and Tobago Port Authority and the Chaguaramas port.

In larger ports, the Port Authority typically has also taken the lead role in meeting the new requirements for enhanced security.
Transhipment

The transhipment business helps ports and shipping lines generate economies of scale, which can expand a port’s market and lower its costs. The port of Kingston is a good example of the way in which transhipment adds volume and network scale beyond that which local business would permit.

For those countries astride major trade routes, such as those in the Caribbean, transhipment of foreign cargo can be a major part of operations. This is, in effect, the business of exporting services that generate income for the country by exploiting and maximizing a natural resource (geographic location) that never becomes depleted. This form of transhipment involves consignments or containers with neither origination nor destination within the region.

Ports in the Caribbean sit at the intersection of the major “round the world” east-west trade route linking Asia, America, Europe, and the Middle East, and the important north-south routes between North and South America, and South America and Europe. Shipping lines find it economic to line haul to the Caribbean, and tranship to vessels serving a different main route. Thus, Europe-Far East ships can transfer containers bound for North America, especially for the Gulf and U.S. eastern seaboard, and for South America. Besides Kingston, this takes place in many other locations, such as Freeport, Caucedo, Manzanillo International (Panama), and Miami. All these ports are in competition with each other. Although specific lines may have one port as their key hub, as with the Israeli Zim Line at Kingston, this trade could take place at any of the other ports.

Because the transhipment business has no connection to the country in which the port located, it can readily transfer to another port or country if lower rates elsewhere eliminate existing gains from a present location, even if that location is preferable. The margin between direct and transhipped traffic costs is small and the cost of transhipment needs to be low to make it worthwhile compared to direct shipping. Due to this, only those ports with the most efficient service will survive and grow in the transhipment business. Traditionally, managed ports have found it difficult to establish such a business, but those that have been reformed have been able to achieve strong growth. The Mauritius port provides a good example of growth in the transhipment business (see box below).

It is likely that transhipment traffic in the Caribbean will continue to exhibit strong growth. Port capacity doubled from 1997–2002, to six million TEU per year, and was expected to reach eight million in 2003. But because transhipping can occur at many locations, ports seeking to enter the transhipment trade at this juncture should be advised that the business is uncertain. A new terminal may capture new business arising out of the strong growth forecast, or divert a line from another port, but at some risk to itself from the trade switching location in search of the lowest price. For example, Maersk-Sealand transferred its transhipment business from Port of Spain to Puerto Cabello in Venezuela in 2001. Recently, some business has transferred from Freeport to Caucedo because

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22. Frankel (2002), “Often transhipment costs must be brought down as low as US$40 per container to justify transhipment.”
Dubai Port

Dubai started development of Port Rashid in 1972 and Port Jebel Ali in 1982. These merged to form the Dubai Port Authority in 1991. By that year, they typically handled 1 million TEU, after which they grew rapidly. Traffic grew 14 percent in 2001, 20 percent in 2002, and 23 percent in 2003, as the throughput figures indicate:

- 1991: 1m TEU.
- 1996: 2m TEU.
- 2000: 3m TEU.
- 2003: 5.15m TEU.

The port is currently the 11th largest container port in the world, with 12 berths. It has handled ships over 5000 TEU and has the very largest super post-panamax cranes. The port overall has 106 berths, 71 at Jebel Ali and 35 at Port Rashid. It is serviced by over 100 shipping lines. Plans for development of Jebel Ali port will expand it to 82 berths and 125 quayside cranes, with a capacity of 21m TEU.

Several factors of relevance to the Caribbean underlie this growth:

- The location of the port.
- The development of transhipment business.
- 50 percent of the container trade is transhipped, largely to Arabian Gulf locations.
- The association with a thriving Free Zone at Jebel Ali port.

The port is close to the important east-west trade routes. The location of the port near the mouth of the Persian Gulf gives it an advantage in aggregating and disaggregating trade for other countries in the region as well as to Africa and the Indian subcontinent. It expects to be well placed to handle trade from Iraq as it develops during reconstruction and later.

The adjacent Jebel Ali Free Zone was established in 1985, and contributes substantially to the trade of the port. It is tax free and duty free with no controls on labor/immigration, foreign ownership, currency, or repatriation of capital and profit. These significant concessions have attracted over 2,800 firms from over 100 countries to locate there, including major international firms like Shell, Unilever, and Mitsubishi. The zone provides both light manufacturing, storage, and hub distribution facilities over 100 square km.

The port’s authority is now administered within the zone in the Government-owned Ports, Customs, and Free Zone Corporation. The Ports Authority itself has expanded into port management overseas with operations in Saudi Arabia, India, and Romania.

of congestion. The state-owned Cargo Handling Corporation Ltd (CHCL) in Mauritius is leasing, not buying, new cranes because of the inherent risk in the business.25

Ninety percent of Kingston’s traffic is transhipping traffic. At only 32 miles off the Panama-Europe trade route, it is favorably positioned for through traffic. The size and growth of the port is entirely due to the volume of transhipment business, one that is risky and highly competitive, which means the port attracts the traffic solely based on its efficiency and cost. Like other transhipment ports, it offers cheap rates for transshipment. A container transhipped is charged US$90 (for handling only, excluding marine charges)

compared with US$218 for a local container. It also offers a volume rebate for over 20,000 moves a year. Figure 6.6 shows the centrality of Kingston’s position.

Kingston is a similar port to Dubai, albeit one-fifth the size and with a less developed free zone. Interestingly, the port at Dubai is also a state-owned entity. Apart from any land constraints, and subject to competition, the Dubai case suggests that this type of port, whose essential reason for being is transhipment, has the capacity to grow much larger.

The Port of Spain has benefited from transhipment, which now makes up 50 percent of its business. It is financially competitive with the other main transhipment ports in the Caribbean (i.e., Freeport, Bahamas; Manzanilla, Panama; Kingston, Jamaica; Rio Haina, and Puerto Cabo, the Dominican Republic; Cartagena, Colombia), but in terms of transhipment scale, it is small relative to most of its competitors. The Port Authority has purchased new equipment to allow it to be more competitive in this area, which the Port of Spain is paying for, but it is held back by the need to get government approval on borrowing.

Figure 6.6. Kingston’s Position in Relation to Trade Routes in the Caribbean

Source: APM terminals.
Despite relatively high container volumes, Bridgetown remains a local port. Castries has a minimal transhipment business. Vieux Fort is a smaller port in terms of TEU throughput than Castries, but has a much higher transhipped percentage than Castries (60 percent versus one percent). Grenada has minimal transhipment business.

The example of Mauritius is valuable for smaller ports seeking to develop a transhipment business. Three years ago it hardly had any business in this area, but significant structural and governance changes (all within a government-ownership framework) have produced important efficiencies that have enabled the port to grow the transhipment business. Now it is an important focus for north-south and east-west trade in the Indian Ocean as well as for regional business. Traffic has grown 50 percent in one year, and transhipment traffic has grown by 625 percent in the same period. It now suffers from congestion problems brought about by the rapid success of the port.
Although there is significant upside to the transhipment business, it is a business opportunity that entails risk. The element of risk implies that governments should treat the opportunity with caution. Since private businesses are often better at assessing business risks than governments, private participation in the transhipment business, including in infrastructure investment dedicated to transhipment, may be a good strategy. Particularly if the private partner is connected to an international shipping line and so able to control demand risk. On the other hand, several successful transhipment ports, including those in Kingston, Dubai, and Mauritius, have been largely or entirely government backed.

**Benchmarking**

This section reviews the performance of the port sector in countries for which data were available.\(^\text{26}\) It compares container handling rates (TEU per crane hour) and port charges and discusses possible reasons for relatively good or poor performance compared with each measure.

**Efficiency**

Table 6.4 provides an overview of TEU volumes, average waiting time for ships, percentage of transhipment business, containers handled per crane hour, and ratio of TEUs to employees at each port. This is graphed in Figure 6.7.

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\(^{26}\) We were able to obtain very little data on productivity measures such as TEU handled per crane hour and TEU per staff member despite questionnaires to ports and extensive secondary research. Ports were more forthcoming with charges data.
(*) In extreme cases ships will wait between 2 to 3 hours.

Source: Port questionnaire, ECLAC (2004); the TEU figure for Barbados is as reported from the port rather than from ECLAC; Trinidad figures were obtained via an interview with the Port of Spain.

<table>
<thead>
<tr>
<th></th>
<th>Barbados</th>
<th>Grenada</th>
<th>St. Lucia (Castries)</th>
<th>Jamaica (PA Kingston)</th>
<th>Dominican Republic (Rio Haina)</th>
<th>Trinidad (Port of Spain)</th>
<th>Guyana</th>
<th>Dubai</th>
<th>Mauritius</th>
<th>Tauranga, New Zealand</th>
<th>Singapore</th>
<th>JNPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEU volume</td>
<td>75,000</td>
<td>13,158</td>
<td>25,000</td>
<td>1.1m</td>
<td>395,664</td>
<td>333,146</td>
<td>25,000</td>
<td>5.15m</td>
<td>318,553</td>
<td>349,796</td>
<td>15.9m</td>
<td>2.27m</td>
</tr>
<tr>
<td>Waiting time</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td>0 (*)</td>
<td>6 hrs</td>
<td></td>
<td></td>
<td>Up to 24 hrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mins)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Transhipment</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>45</td>
<td>17</td>
<td>32</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Containers/crane</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>22.6</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEU/employee</td>
<td>2143</td>
<td>263</td>
<td>2350</td>
<td></td>
<td>1841</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Following the attacks on the World Trade Center on 9/11, the U.S. government introduced tighter security policies on a number of borders, including sea borne trade. The International Maritime Organization has also responded by tightening shipping security. As a consequence, three key measures affect ports outside the United States:

- **The U.S. Maritime Transport Security Act** of 2002 provides for a range of measures to improve U.S. port security. This includes assessing the security at foreign ports.
- **The (IMO) International Ship and Port Facility Security Code (ISPS)** requires that certain security measures were in place by 1 July 2004 for ports and ships.
- **The U.S. Customs and Border Protection’s Container Security Initiative (CSI)** provides for export country container security measures.

Under the Act, the Homeland Security Secretary can impose restrictions on, or deny entry to, vessels with cargo from ports in countries that do not have effective anti-terrorism measures in place. This action can take effect immediately if there is a security threat, or after giving notice to the foreign government. The Act also provides for security training for foreign ports that lack effective anti-terrorist measures. The Secretary also has to develop a program to evaluate and certify secure intermodal systems, including screening and evaluating cargo prior to loading, in-transit security, and container seals and locks. The ISPS requires ports to have security plans, exercises, and training, to restrict access to ports and ships, to prevent unauthorized weapons and explosives, to provide a means of raising the alarm on security threats and incidents, to gather and assess information on security, and exchange it among governments, and to establish communication protocols. The requirements are straightforward basic security measures such as better physical access control, training, equipment (such as lighting and closed-circuit TV), and identification systems and procedures. The costs have been assessed at US$4.26 million initially and US$2.25 million annually per U.S. port, including security equipment, which makes up 46 percent of the cost. The remainder of the cost goes to training and salaries. The costs of implementing these requirements at Caribbean ports may be similar. For example, the implementation costs at Port of Spain are estimated at US$3.3 million. Being able to afford to implement security measures has been reported as a problem for half of the 12 countries working under the Caribbean Memorandum on Port Control.

The IMO will publish a list of ports with approved security plans. Ships coming from ports not on this list may risk being denied entry into another port. The U.S. Coast Guard will board every vessel on its first visit to the United States starting on 1 July to ensure vessels are compliant, and officers will visit foreign ports to evaluate anti-terrorism measures. Caribbean ports are actively seeking to comply, but it is likely that some, particularly smaller ports, were not ready by the July deadline. Ships that visit a non-compliant port may face delays in the United States, and ship owners may bypass such ports to avoid being delayed. A long-term delay in implementing security measures could place severe restrictions on international trade for the countries involved.

The CSI has four core elements: identifying and targeting containers that pose a terrorism risk, pre-screening them at the port of departure, using detection technology for this purpose, and using tamper-evident containers. Some of the compliance with these measures will take place outside the port, such as the use of appropriate seals, keeping the container secure, and tracking it from the point of origin to the port. However, final screening will be done at the ports and significant investment in screening technology will be required. For example, at Kingston, the cost has been on the order of US$23 million. Users are being charged US$105.00 per full container for inspection (plus charges per ship).

The United States also enforces a “24-hour” rule requiring declaration of cargo information 24 hours in advance of loading. This enables identification of potentially risky shipments, and may result in containers being denied permission to load. Although this has not yet proved a significant problem.

The CSI is aimed at covering 80 percent of the containers coming into the United States, which will likely include at least the transhipment facilities in the Caribbean. No Caribbean ports are yet registered as CSI ports. The amount of investment required may tend to favor larger ports, thus increasing their competitiveness against smaller ports. Transhipment ports are among these. On the other hand, direct shipments are likely to be easier to control in security terms than movements involving transhipment, which may impact on the strong trend toward transhipment.

**Source:** Castalia.
Both Kingston and Barbados have similar ratios of TEUs per employee and demonstrate a level of efficiency that is comparable with international best practice. Kingston has a high container handling rate; it moves 25 containers (38 TEU) per hour on average, higher than the other Caribbean ports for which we were able to obtain data. Barbados has a handling rate of 31 TEU per crane hour, approximately 21 containers per hour (assuming the same ration as Kingston: 1 container: 1.5 TEU). Employee numbers on Grenada are higher per TEU than at other ports that reported this figure.

During the cruise ship season, competition for berths is steep at Bridgetown, and cargo ships have to wait until evening to berth. The average waiting time is 63 minutes. No other port noted any waiting time, although a competing port reports delays at Freeport, Kingston, and Port of Spain.

Port Charges

We were able to obtain charges information from Barbados, Trinidad and Tobago, St. Lucia, Grenada, Jamaica, and the Dominican Republic, and have compared them with port charges in comparator countries. Table 6.5 and Figure 6.8 compare the fees to discharge 45 full containers and load 45 full containers for a container ship of 24,000 gross registered tons and 525 feet length that calls at each port. The rate per container, based on the 90-container exchange, is also presented. These figures relate to imports and exports (transhipment fees are typically lower). They do not show fees applicable to special deals for particular ship lines or for volume.

Table 6.5. Comparison of Port Charges

<table>
<thead>
<tr>
<th>Country</th>
<th>Port</th>
<th>Charge in US$</th>
<th>Charge per Container (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenada</td>
<td>St George's</td>
<td>*25,000</td>
<td>278</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Rio Haina</td>
<td>17,707</td>
<td>197</td>
</tr>
<tr>
<td>St Lucia</td>
<td>Castries</td>
<td>19,954</td>
<td>222</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Kingston</td>
<td>31,317</td>
<td>348</td>
</tr>
<tr>
<td>Barbados</td>
<td>Bridgetown</td>
<td>*22,500</td>
<td>250</td>
</tr>
<tr>
<td>Trinidad</td>
<td>Port of Spain</td>
<td>13,270</td>
<td>147</td>
</tr>
<tr>
<td>Mauritius</td>
<td>Port Louis</td>
<td>24,741</td>
<td>275</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Tauranga</td>
<td>24,360</td>
<td>271</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Wellington</td>
<td>28,969</td>
<td>322</td>
</tr>
<tr>
<td>India</td>
<td>JN Port</td>
<td>26,502</td>
<td>294</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>Dubai</td>
<td>12,733</td>
<td>142</td>
</tr>
</tbody>
</table>

Source: Information supplied by the ports or calculated from published tariffs. Where charges were not quoted in U.S. dollars, they have been converted at the 1 July 2004 rates of US$1=2.695XCD, 6.145TTD, 1.571NZD, 3.673AED, and (2 July) 45.85INR.

25. Some of the information may not be presented on a consistent basis because of the difficulties in interpreting the various published tariffs.
Table 6.5 above indicates that the charges at Caribbean ports are comparable with other international ports represented here.

- Kingston’s charges for the modeled ship were US$31,317, or USD$348 per container, which were higher than those for Miami and Cartagena (World Bank 2001).
- Barbados’s charges for the modeled ship were US$22,500, or USD$250 per container. This is similar to the charges for Kingston, Miami, and Cartagena.
- At Castries, port charges amounted to US$19,954, or USD$222 per container, which is in the mid-range. On Grenada, port charges are US$25,000 for the modeled ship, or USD$278 per TEU.
- The lowest charges are in Trinidad at US$13,270, or USD$147 per TEU at Port of Spain. At Point Lisas they are nearly 20 percent cheaper still.

**Freight Rates**

The most significant factor influencing trade and shipping to and from Caribbean countries is the freight rates from the United States, followed by the rate from Europe and elsewhere. Freight rates are more important than port charges in terms of the cost of imports to and exports from the Caribbean.

Port charges only represent about 10 percent of the freight rate from Miami. The main driver of freight rates is likely to be volume. Shipping costs, which is the cost of the ship’s
time, plays a large part too. A ship calling to discharge 25 containers incurs costs that are very similar to the costs of calling to discharge 50 containers. This higher cost per container is inevitably reflected in the freight rate. It follows that countries importing lower volumes of goods will tend to incur higher freight rates and, therefore, higher prices for its imports and higher costs for exports.

Figure 6.9. Freight Rates from Miami

Figure 6.10. Freight Rates from Miami by Distance
Figure 6.9 shows the freight rates for building materials and groceries from Miami to Caribbean countries. Figure 6.10 shows the relationship between the freight rate and distance. Rates to Trinidad and Tobago appear lower than might be expected, given the shorter distance, whereas rates to Grenada are higher. In Grenada’s case, this can probably be explained by the need for transhipment, which is largely a product of the small market size and low volumes coming into the country.

We carried out a similar analysis of freight rates from Rotterdam to each Caribbean country, and to Santos, a major port in Brazil. The selected routes are shown in Figure 6.11.
Figure 6.12 compares rates for milk powder (a typical dry product) and cheese (a typical refrigerated product), both of which are shipped in containers. Rates into the Caribbean are high compared to rates to Santos and Miami. Comparing destinations in the region, it seems the dry rate to St. Lucia is particularly low. The rates to Grenada are particularly high for general and refrigerated containers, even though it is served directly. The higher refrigerated rate to the Dominican Republic is a result of the double transhipment. Transshipment does not appear to have a major effect on the freight rates that we were quoted.

**Regional Cooperation**

There are two areas in which increased regional cooperation may be beneficial:

- **Benchmarking.** Although some ports may already be operating efficiently, there is always room for improvement. Benchmarking port services on a regional basis is one way of raising performance and thereby increasing the overall competitiveness of this sector.

- **Safety and security.** Failure to meet U.S. and international security requirements would have a detrimental effect on international trade. This would not only affect individual Caribbean countries, but the region as a whole. A regional approach to implementing and monitoring safety and security regulations would benefit all Caribbean countries.
Further benefits could be achieved through inter-country and inter-port cooperation by registering as CSI ports in a collaborative effort similar to the one employed by competing New Zealand ports.

Economies of Scale

Econometric studies have shown that both infrastructure and cargo handling services have increasing returns to scale.\(^{27}\) Economies of scale are likely to arise in three ways, all of which are relevant to Caribbean ports and, in particular, to the port of Kingston.\(^{28}\)

- Bigger ships have lower costs per container than smaller ships. Bigger ships require bigger ports with deeper channels and berths, faster turnaround, and bigger equipment, such as post-panamax container cranes to span the beam of the ship.
- Larger ports employ larger cranes with greater throughput. They can also make more intensive use of assets like cranes (although more cranes are needed at larger ports), computers, data, support services, and security services. Perhaps most important, larger ports are capable of housing more sophisticated management and systems that major users need to speed turnaround and manage operations such as transhipment.
- Larger ports will have more extensive networks for transhipping among, which will make them attractive to even more lines offering still more connections.

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\(^{28}\) For example, see Hoffman (2000) and (2001a), and Clark, et al (2004).
Although we were unable to obtain the names of the ports reviewed, Figure 6.13 demonstrates that economies of scale exist. The chart shows that the number of TEUs processed per hour increases in direct proportion to the total number of TEUs processed per year.

Figure 6.14 compares the number of TEUs processed per hour, with the total TEU throughput of the port. This chart demonstrates that there are economies of scale in port

Source: Hoffman (2001a), Graph 4.
processes, but due to data scarcity, we were unable to demonstrate this clearly for Caribbean countries. Figure 6.14 shows that the Tauranga in New Zealand has managed to generate higher overall economies of scale, while Trinidad appears relatively inefficient, but these figures alone do not demonstrate a clear relationship.

Figure 6.15 compares port charges with TEU throughput data for 2003, but does not provide any clear evidence of economies of scale.

**Conclusion and Recommendations**

The Caribbean generates relatively little local traffic. Its countries are mostly small islands with small hinterlands with not enough imports and exports to fill containers. What is exported is exported in bulk form. If they relied solely on importing and exporting goods, ports would not be able to achieve a significant size, which is why many have entered the transhipment business. Some ports, located near trade lanes, appear better suited than others to transhipment.

**Recommendations**

- The Landlord Model appears to have benefited those ports that have adopted it, such as Kingston, which has operated very successfully under it. Trinidad and Tobago is moving toward this model in order to improve port efficiency. Those ports that have not yet adopted this model might benefit from doing so.
- Efforts to increase competition within and among ports has been shown to improve overall port performance, which, in turn, attracts increased traffic.
Growth should not be sought for its own sake. Although transhipment can transform the business and size of a port, it is not necessarily the answer for every port and has risks; therefore, governments should exercise caution. All Caribbean ports have the potential to develop a transhipment business. However, while there is room for improving efficiency and growing the ports, there are risks in the transhipment model. Competition is strong, and the trade owes no allegiance to a particular country. Ports wishing to enter or expand in transhipment should seek to do so with specialist private firms, including those linked to major international shipping lines, in order to share and manage risk.

Failure to comply with ISPS rules may have serious cost and trade implications, especially for the smaller nations. Compliance should be pursued as a priority. Smaller countries should explore the concept of a cooperative approach to container security and to the U.S. CSI requirements.

Regional cooperation in the areas of benchmarking, safety and security, and procurement would be beneficial to all Caribbean ports.
In this section we attempt to assess how well government policies are working to provide Caribbean countries with the kind of air services they need to expand their economies. In our view, the key things Caribbean countries need from air services are:

- Increased services to support tourism, specifically, more direct services from more points-of-origin, with efficient airlines offering competitive airfares.
- Infrastructure and systems that meet international safety and security requirements.
- Assurance that major routes will not suffer disruption, which could harm tourism.
- Minimal need for government support, including loans and bailouts.

In this Chapter, we begin by reviewing the institutional arrangements for the airports and air services for seven selected countries: Jamaica, the Dominican Republic, St. Lucia, Grenada, Barbados, Trinidad and Tobago, and Guyana. Next, we draw generalizations about the performance of the airports on the basis of a raft of performance measures. We then examine the links between the institutional arrangements and the level of performance in each country. From this analysis we draw our conclusions on airports. We follow up by carrying out a similar process for air services. We first describe the policies and look at the results, then examine the links between the policies and performance. Finally, we set out our conclusions and recommendations.

**Importance of Airports and Air Services to Economic Growth**

Air services are particularly important to isolated small island countries. Although airfreight can also be important to some countries, in this section we focus on passenger services because of the significance of tourism to the Caribbean countries.
The Caribbean countries in our study usually have a number of airports, including one or more international airports. Jamaica and the Dominican Republic each have a large airport that serves the capital in addition to at least one other major international airport that serves tourist areas. Both countries also have smaller airports for regional or internal travel. Some of the smaller islands have more than one airport, too: one for long-haul flights and others that are used only for regional services.

The governments built and own airports in all of the countries. Jamaica and the Dominican Republic have now introduced private financing and operations into some airports, but for the region as a whole, the dominant organizational form is still the government-owned statutory corporation.

Most countries have direct services to the key North American and European gateways of Miami, New York, Atlanta, Toronto, and London. Other countries have connections to nearby countries that operate direct services. Airport infrastructure is not a constraint on international air services because the runways are long enough to accommodate wide-bodied aircraft, except in Guyana. Whether a country has direct services or not depends mainly on the volume of passengers it serves.

In our study, all the countries, with the exception of Jamaica and the Dominican Republic, have “closed skies,” that is, they designate specific carriers under bilateral Air Services Agreements to ensure the provision of service. The Dominican Republic and Jamaica have “open skies” agreements with the United States that allow any certified carriers to operate on routes from the United States, but on other routes their skies are closed. Some countries have also established government-owned “flag carrier” national airlines. These airlines have gone through a range of mixed public and private ownership, but have often required government financing as well as protection.

**Institutional Arrangements—Airports**

This section describes the institutional arrangements for owning and operating airports, which are summarized in Table 7.2. The selected countries, airports, and their airport codes are shown in Table 7.1.

<table>
<thead>
<tr>
<th>Country</th>
<th>Airport</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamaica</td>
<td>Norman Manley, Kingston</td>
<td>KIN</td>
</tr>
<tr>
<td></td>
<td>Sangster, Montego Bay</td>
<td>MJB</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Las Americas, Santo Dominica</td>
<td>SDQ</td>
</tr>
<tr>
<td></td>
<td>Gregorio Luperon, Puerto Plata</td>
<td>POP</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>Hewanorra</td>
<td>UVF</td>
</tr>
<tr>
<td>Grenada</td>
<td>Point Salines</td>
<td>GND</td>
</tr>
<tr>
<td>Barbados</td>
<td>Grantley Adams</td>
<td>BGI</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>Piarco International, Trinidad</td>
<td>POS</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>Crown Point International, Tobago</td>
<td>TAB</td>
</tr>
<tr>
<td>Guyana</td>
<td>Cheddi Jagan International</td>
<td>GEO</td>
</tr>
<tr>
<td></td>
<td>Dominican Republic, Santo Domingo</td>
<td>Puerto Plata</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Airports and aviation sector legislation?</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Independent Regulator?</strong></td>
<td>Y(^1)</td>
<td>Y(^1)</td>
</tr>
<tr>
<td><strong>Administration Corporatized?</strong></td>
<td>Y(^2)</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Autonomous Board independent from Executive power</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Private Sector Participation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Airport Infrastructure</strong></td>
<td>Y(^3)</td>
<td>N(^4)</td>
</tr>
<tr>
<td><strong>Terminal Facilities</strong></td>
<td>Y(^3)</td>
<td>N</td>
</tr>
<tr>
<td><strong>Ground handling</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Fuelling</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Shopping</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Catering</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Car rentals</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Competition:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within airport services at the airport?</strong></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Among airports in the country?</strong></td>
<td>N(^5)</td>
<td>N(^5)</td>
</tr>
<tr>
<td><strong>Are there any airfield deficiencies affecting ICAO certification?</strong></td>
<td>Y(^6)</td>
<td>Y(^6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Civil Aviation Authority.
2. Owned by Airports Authority of Jamaica, concessioned to a private operator, MBJ Airport Ltd.
3. 30-year BOT arrangement after which it reverts to the Government of Jamaica.
4. Government of Jamaica is preparing this airport for privatization.
5. Limited competition.
7. Apron is too close to runway.
Regulation

All airports are subject to regulations over the range of services they provide, their objectives and duties, and regarding the prices they can charge for aeronautical and airport services. In addition, each country has legislation controlling airline access to its airports through licensing regulations.

Because one of the major airports is private and the other major airport is in the process of becoming private, Jamaica has an independent regulator of airports, the Civil Aviation Authority (CAA). The CAA sets the maximum aeronautical prices. Otherwise, there are no independent regulators since the airports, with the exception of those in the Dominican Republic, are publicly owned.

Ownership and Operation

Governments in most Caribbean countries hold airports in public ownership because they are in monopoly positions and the governments have chosen not to take the risk of passing control of their national gateways to private parties, particularly since these parties are likely to be located offshore.

Most of the airports in our study are owned and operated by statutory corporations, as shown in Table 7.3.

The exceptions are Jamaica, the Dominican Republic, and Barbados. In Jamaica, the Sangster Airport at Montego Bay is owned by a consortium (MBJ Airports Ltd.) in a 30-year build, own, transfer (BOT) arrangement. After 30 years, the ownership of the airport reverts to the Government. A similar arrangement is currently being prepared at the Norman Manley International Airport at Kingston. The privatization of Sangster Airport is described in the box below.

In the Dominican Republic, the Las Americas (Santo Dominica) and Gregorio Luperon (Puerto Plata) airports and four small airports are operated by a private consortium on a 20-year concession. The concession contract involves designing, financing, and constructing facilities that represent substantial improvements to the airports. In addition, the third largest airport, Punta Cana, was built and is operated by the private sector. The private participation process and the planning behind it are described in the box below.

In Barbados, the airport is currently in the process of being transferred from a government department to a statutory corporation.

Table 7.3. Statutory Corporations

<table>
<thead>
<tr>
<th>Country</th>
<th>Statutory Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Lucia</td>
<td>St. Lucia Air and Sea Ports Authority</td>
</tr>
<tr>
<td>Grenada</td>
<td>Grenada Airports Authority</td>
</tr>
<tr>
<td>Trinidad</td>
<td>Airports Authority of Trinidad and Tobago</td>
</tr>
<tr>
<td>Guyana</td>
<td>Cheddi Jagan International Airport Corporation</td>
</tr>
</tbody>
</table>
In addition, there are some privately provided services at all airports. All airports have private ground handling, fuelling, shopping, and car rental services. Most airports also have private catering services.

**Competition among Airports and within Airports**

Generally speaking, there is little or no competition among airports in each country. Smaller islands have only one major airport. Jamaica has two large airports, but they are well separated: one serves the capital and the other serves the tourist areas on the northern coast. There is only limited competition between them. Trinidad and Tobago has a major airport on each island. The only competition that exists among major airports within a country is in the Dominican Republic where there are seven international airports, most of which serve the tourist areas along the northern coast.

There is competition in some of the privately provided services within airports. In some cases, more than one business has a concession to provide a particular service, such as catering, and in other cases a contract is periodically renewed, such as for ground handling.
Private Financing for Airports in the Dominican Republic

Airports play an important role in the Dominican Republic's economy as a gateway for tourism and returning overseas residents. Seven international airports dot the Dominican Republic, located in Santo Domingo (Las Americas and Herrera), Puerto Plata (Gregorio Luperon), La Romana, Punta Cana, Santiago, and Barahona. The eighth airport (La Isabela), which will replace Herrera at Santo Domingo, has officially been inaugurated, but is not yet operational.

The majority of the airports in the Dominican Republic are operated by Departamento Aeroportuario (DAP). La Romana International Airport and Punta Cana International Airport were built and are operated by the private sector, with some services, such as air traffic control and customs/immigration, provided on a contractual basis by the Government.

In the past few years, the Government of the Dominican Republic has adopted a policy of privatization, through concession, for six of the airports. In July 1999, the Comision Aeropuertaria awarded a concession to a private consortium, Aerodom, comprising Vancouver Airport (Canada), Impregilo (Italy), Ogden (USA), and a local partner, to operate the Las Americas (Santo Domingo), Gregorio Luperon (Puerto Plata), Arroyo Barril (Samana) and Maria Montez (Barahona) airports, including passenger terminals, an airfield, and landside facilities for a 20-year period.

In February 2001, La Isabela and Catey (Samana) airports were added to the concession. Because these are new facilities, the concession was amended to include the additional responsibility of undertaking a program of airport development. At the same time, the concession term was extended to 25 years.

The Concession

Bidders were initially only interested in the more profitable Las Américas and Gregorio Luperon airports, but the Government wanted to ensure expansion of Samaná and Barahona, which were both losing money, and incorporated them into the single concession.

The concession was approved by Congress and signed by the President in December 1999. Under the concession, Aerodom is responsible for large-scale redevelopment of these airports, improving operations, maintenance, and management in line with international best practice.

The proposed upgrades to the airports share common features, such as repair of existing runways, terminals, cargo and parking areas, and some expansion activities (such as widening of taxiways). Modernization of existing airports involved rehabilitating and upgrading existing infrastructure. Works were limited to existing facilities.

Anticipated Benefits

The most significant benefit from the concession is the projected increase in passenger numbers to key tourist areas in the Dominican Republic. Las Americas and Gregorio Luperon are already the busiest airports in the Dominican Republic with 2.8 and 2.0 million arriving passengers per year, respectively (2001). They are both situated close to prime tourist destinations in the Boca Chica and Puerto Plata regions, respectively. The Samana and Barahona airports are similarly close to tourist resorts.

Source: Castalia.

Benchmarking—Airports

Airports and air services play an important role in ensuring that tourists and visiting businessmen are left with a favorable impression and are inclined to return. This section compares the relative performance of a representative sample of Caribbean and comparator countries on key industry indicators that measure the performance of airports.
We compare the performance of airports in terms of capacity, safety and security, quality, charges, and efficiency for the airports listed in Table 7.1. For this section we have also included the following comparators: Auckland International (New Zealand), Christchurch International (New Zealand), Changi International (Singapore), and Sir Seewoosagur Ramgoolam (Mauritius).

**Airport Capacity**

The physical capacity of an airport is an indication of its ability to accommodate flights and provide adequate service. There are many detailed measures of airport capacity. Based on the information we were able to gather for this study, we have measured it according to the following indicators:

- The number and length of runways.
- The number of aircraft stands.
- Terminal areas.

**Runway Lengths.** The airports reviewed for this study are the major airports for each country. Each has only one runway, with the exception of Guyana, Christchurch, Singapore, and Mauritius. Figure 7.1 compares the lengths of the longest runway at each airport.

In most cases, the runways are over 8,000 feet and are able to accommodate a long-haul flight on a Boeing 747. The exception is the Cheddi Jagan International Airport, where the maximum aircraft size that can be accommodated is a B757 or DC8.

**Aircraft Stands.** The number of aircraft stands is an indication of the airport’s ability to accommodate a number of aircraft at any one time. Figure 7.2 illustrates the number of aircraft stands per 1,000 departures at each airport.
Kingston, Grenada, Puerto Plata (Dominican Republic), and St. Lucia have as many stands per 1,000 departures as their comparators, Mauritius and Singapore. Other Caribbean airports have more stands per 1,000 departures than the New Zealand comparators. These figures indicate that Caribbean airports have adequate capacity in terms of numbers of stands. However, many of the Caribbean stands are “hard-stands,” lacking air bridges on which passengers can walk in comfort to the terminal. Comparator airports such as Singapore and Christchurch have air bridges serving a majority of their stands.

Terminal Areas. Figure 7.3 shows terminal areas in square meters in relation to passenger throughput. It indicates that Las Americas (Dominican Republic) has plenty of space for tourists and other passengers, and the Sangster Airport (Jamaica) does not. Expanding capacity was a key reason for granting a concession to a private firm to operate Sangster. The Crown Point International Airport in Tobago also appears to be small in relation to passenger throughput.

Safety and Security

Because tourism is so important to the Caribbean, it is important to uphold the region’s image in the eyes of travel agents—particularly American travel agents—as a safe tourist destination. Airport security and aviation safety are thus important components in assessing the quality of airport and aviation services.

Accordingly, the (CARICOM) countries have recently formed a Regional Aviation Safety Oversight System (RASOS) to provide technical assistance to the various Civil Aviation
Authorities so that they can provide the level of oversight to the aviation sector required by (ICAO). Areas of assistance include aviation licensing, aviation security, certification, inspection, and surveillance. RASOS has fostered agreement regarding rules and standards, sharing of technical resources, and inspection procedures relating to flight oversight responsibilities. RASOS is headquartered in Kingston, Jamaica.

There are three aspects of safety and security: airfield safety for the aircraft, air traffic control and other aeronautical systems, and security in relation to passengers, baggage, and cargo.

*Airfield Safety.* Airfield safety is governed by ICAO Annex 14. It covers the characteristics and physical layout of airports to allow for safe aircraft operation, including such matters as adequacy of runway end safety areas, clearance between runway and apron, fire service protection, and obstructions near the flight path.

Airports strive to meet ICAO standards set forth in Annex 14 in order to ensure that foreign carriers are prepared to operate from their facilities. Most airports surveyed had ICAO certification, but some have airfield deficiencies. These deficiencies are either noted or the airport has procedures recommended by ICAO to operate safely with them. They include:

- Jamaica’s Montego Bay and Kingston airports, which have deficiencies in the runway end safety areas.
- Guyana’s Cheddi Jagan airport, which also has a deficient runway end safety area.
- Grenada, where the apron is too close to the runway.
There are no airfield deficiencies at Las Americas and Puerto Plata in the Dominican Republic, or in the airports in St. Lucia, Trinidad and Tobago, or Barbados.

**Air Traffic Control.** Air Traffic Control services are provided by the governments, usually as part of their Civil Aviation Departments. They are governed by an ICAO standard. Jamaica, Barbados, Trinidad and Tobago, and Guyana have either Civil Aviation Authorities or Civil Aviation Departments. St. Lucia and Grenada are governed by the Civil Aviation Directorate of the OECS.

Upper air space (above 20,000 feet) is divided into Flight Information Regions (FIRs), which are controlled by different countries. In the Caribbean region, Cuba, Jamaica, Trinidad and Tobago, the Dominican Republic, and Haiti all manage their own FIRs. Smaller territories, including Barbados, Grenada, and St. Lucia, come under Trinidad’s FIR. All territories manage their own Terminal Control Areas (TMAs), which consist of air space above 700 feet and below an upper limit of between 10,000 feet and 20,000 feet within a 40-mile radius of their airport. Some territories have more sophisticated equipment than others, with radar coverage being poor in some areas.

**Aviation Security.** Aviation security is governed by ICAO Annex 17. It covers the inspection of boarding passengers, their hand baggage and cargo, secure airside terminal areas, and the overall airfield perimeter. ICAO periodically inspects airports to ensure their compliance.

In addition, the U.S. Transportation Security Administration (TSA) inspects airports to which U.S. airlines fly, and airports from which carriers depart for the United States. The agency took over this responsibility from the Federal Aviation Authority (FAA) after 9/11. Both the TSA and ICAO are powerful agencies and their certification is critical to each airport’s operation. Airports comply because otherwise airlines would not be able to obtain insurance to fly into them. In addition, the TSA has the authority to fine airlines for security breaches. Finally, the airlines themselves carry out inspections. Of the Caribbean countries reviewed by the US authorities, only Jamaica reaches Category 1. All the others are in Category 2, which means they do not fully comply with safety and security requirements.

Achieving an acceptable security rating under the requirements prescribed by ICAO Annex 17 means that airports must have a certain level of equipment, fencing, restricted access to airport and tenant areas, security processes and procedures, and the regulatory framework for a security program.

Given the growing importance of security, the World Bank recently conducted a review of the progress of air transport and port security projects in five OECS countries. It was found that in many countries additional investment in security measures such as airport fencing and screening machines was required. In addition, improved institutional arrangements and the development of a security culture and management discipline were absolutely necessary.

**Airport Quality.** Airport quality can be determined by a variety of measures. In this review, we have used the time taken for passenger baggage to arrive to give an indication of the quality of airport service. For all of the airports reviewed, passenger baggage took an average of 15 minutes to arrive. Figure 7.4 compares the time taken for baggage arrival with the total passenger throughput at each airport.
These figures show that baggage arrival time tends to increase with passenger throughput, which may reflect the greater distance that passengers and bags need to travel at larger airports.

**Airport Charges**

In benchmarking airports and air services, quality is often more important than cost. In many instances, it may be worthwhile to improve the quality of an airport and accept the consequent increase in costs. Passenger Facilities Charges or Airport Improvement Fees are acceptable ways of raising capital for airport development.

We collected detailed information on airport charges. Given the complex structure of most airport tariffs we also constructed, for comparison, the costs that a standard aircraft could expect to incur. Figure 7.5 shows the charges made to the airline and to the passengers for a visit by an Airbus 300 aircraft, a reasonably common aircraft in the Caribbean. The A300 is taken as having a Maximum Take-off Weight of 376,000 lbs, 266 seats, and 200 passengers.

Charges vary considerably from airport to airport. Surprisingly, costs to passengers dominate costs to the airlines. They reflect the degree of cost recovery from passengers that has been adopted by each government—for example, the inclusion of charges to recover the costs of Customs, Agriculture, and Immigration—over and above the capital and operating costs of the airports. To some extent, they represent a revenue sourcing opportunity.
Therefore, these charges do not necessarily indicate relative efficiency. To an extent, they indicate policy differences on cost recovery. When they are converted to a per passenger basis, they average US$31.00, compared with an airfare of US$600.00 to Miami and US$1,000 to London. With the exception of the Dominican Republic and Trinidad and Tobago, the charges do not appear to be out of line with the comparator countries.

**Airport Efficiency**

**Profitability.** Of the Caribbean airports reviewed, more than half were not profitable. Lack of profitability constrains an airport’s ability to invest in further development and thereby enhance the customer experience and generate additional revenue. Table 7.4 shows the position of the airports in our study.

The Norman Manley Airport at Kingston, Jamaica, generates an operating surplus, but not a profit. Since the airport in Barbados is currently a government department, it is difficult to determine its profitability. We believe it may be earning an operating surplus, but not a profit over the cost of its capital. All comparator airports are profitable.

**Revenue Generation.** The commercial performance of airports can be compared on a number of ratios, including revenue per square meter and revenue per passenger. We have been able to collect information on these indicators for all airports, with the exception of
the Dominican Republic and Barbados airports. Figure 7.6 provides a comparison of this information.

The airports with the highest revenue per passenger are those in Grenada, Mauritius, and Auckland. The high figure for Grenada is consistent with its profitable operation. Low figures are not, however, necessarily an indication of greater efficiency, since they could indicate that the airport offers fewer services or does not recover all costs. Figure 7.7 shows airport revenue per passenger together with total passenger throughput. It does not suggest that size is an explanatory factor.
Conclusions—Airports

More Security Efforts

All Caribbean countries are dependent on tourism and so their airports must, by and large, achieve ICAO certification that they meet safety and security standards. However, of the Caribbean countries rated by the U.S. FAA, only Jamaica is in Category One, meaning that the others do not fully comply with safety and security requirements. Investments in security measures such as fencing and screening are required, as is development of a security culture and management discipline. The United States is too crucial a source of tourists to allow for complacency in meeting safety and security standards. Failure to meet the required U.S. FAA ratings could stifle expansion of air services, which may be more significant than a relatively small increment in charges to cover additional costs.

Private Participation in Airports

Investing in attractive terminal buildings and facilities and operating them efficiently are vital for tourism. Few countries worldwide have actually placed the ownership of airports, including the terminals, in private hands. Auckland and Christchurch international airports are privately owned, but Singapore and Mauritius are under public ownership. In the selected Caribbean countries, only Jamaica and the Dominican Republic have introduced private operation and financing of airports.
Performance indicators such as capacity, baggage handling times, and revenue generation show that publicly owned airports can perform as well as those that are privately operated. However, six out of the seven publicly owned airports we reviewed in the region fail to cover their full costs, and so represent a fiscal burden. In contrast, all the privately operated airports cover their full costs, including capital costs. This suggests that private participation by concession can maintain and expand services effectively while limiting fiscal risk.

All airports already have privately provided services within them, such as ground handling, catering, shopping, and car rentals. These services are usually based on concessions and should be worth extending since they can be competitively allocated. The overall concern should be to raise the level of service for tourists and other passengers at moderate cost.

**Better Airport Management through Better Information**

We have found it difficult to obtain performance measures for the Caribbean airports on a consistent basis. We believe that benchmarking airports that serve similar functions, in this case those serving the tourist market, is a means of raising performance for the benefit of all. Therefore, we suggest a regional approach to benchmarking performance because it would embrace such measures as aeronautical revenue per airport employee engaged in aeronautical activities, time from arrival to baggage delivery, and aircraft time waiting for aircraft stands. Uniform benchmarking of airports is a well-developed methodology. It could be readily introduced (for example, the U.K. firm Skytrax offers benchmarking).

**Institutional Arrangements—Air Services**

The above sections covered the institutional arrangements for airports, their performance and our conclusions with respect to them. The charges for airports, however, represent only about five percent of the average airfare from Miami to the islands and about three percent from London, which allows for room to ensure that they are planned, built, and operated to high standards. The level of airfares and the quality of air services to each island can overshadow airport charges in relative importance to attracting tourists and other passengers. This section covers the arrangements for air services, discusses their performance, and reaches conclusions regarding air service and how they can be improved. Table 7.5 gives an overview of the policies toward air services.

**Open Skies Agreements and Competition**

International air services among states are governed by bilateral Air Services Agreements, which cover the basic frameworks under which airlines of one state are granted economic rights to fly into and beyond the other state. The frequency, capacity, and other operational issues are normally covered by Memoranda of Understanding (MOUs) that accompany the agreements. The agreements cover the rights of carriers to carry passengers originating and terminating in foreign territories under the five defined freedoms of the air.

The first freedom relates to an aircraft of one state flying over another state. The second freedom relates to landing for technical reasons in another state. The third and fourth freedoms relate to carriers from State A setting down passengers in State B and picking up passengers from State B, respectively. The fifth freedom relates to carriers from State A
picking up passengers in State B destined for State C or setting down passengers in State B originating in State C.

The first and second freedoms have been included in the International Air Services Transit Agreement. The other freedoms are covered in the bilateral Air Services Agreements. For many years, the number of carriers with third and fourth freedom rights and their capacities have been limited, fifth freedom rights have been restricted, and airfares have been regulated because of the degree of monopoly or duopoly conferred.

However, since 1992, the U.S. Department of Transportation (DOT) has pressed for open skies agreements with other countries. These agreements permit unrestricted air services by the airlines of the two countries between and beyond each other’s territory. They allow open entry on all routes, unrestricted capacity and frequency on all routes, unrestricted traffic rights, including the right to carry fifth freedom traffic, and liberal pricing rules. Freedom to enter the route opens up competition among airlines, which leads to better services to passengers and lower fares than under tight bilateral agreements.

Since 1992, the United States has obtained open skies agreements with European countries and many others. It has entered into 59 such agreements. In the Caribbean, the Dominican Republic has had an open skies agreement with the United States since 1999. Jamaica has recently reached an open skies agreement with the United States, although it has not as yet been enacted. Elsewhere in the Caribbean area, the United States has open skies agreements with the Netherlands Antilles, Aruba, and with the Central American countries of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

The other countries in our study do not as yet have open skies on any routes. They have adopted a common approach under CARICOM. We understand that there have been discussions between CARICOM and the United States over open skies, but their Air Services Agreements still designate carriers on all routes, giving them protection. Protection is intended to serve two purposes: to ensure a minimum level of service and continuity; and to attempt to assure the profitability of national or regional airlines.

<table>
<thead>
<tr>
<th>Is there a national airline?</th>
<th>Dominican Republic</th>
<th>St. Lucia</th>
<th>Trinidad and Tobago</th>
<th>Guyana, Georgetown</th>
<th>Barbados</th>
<th>Grenada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Does the airline require subsidies to operate?</td>
<td>Y¹</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there an open skies policy?</td>
<td>Y²</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Notes:
1. By way of loan guarantees and debt to equity conversions from government.
2. MOU has been signed the policy but legislation is yet to be promulgated.

Table 7.5. Overview of Policies toward Air Services

<table>
<thead>
<tr>
<th>Country</th>
<th>Is there a national airline?</th>
<th>Does the airline require subsidies to operate?</th>
<th>Is there an open skies policy?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamaica</td>
<td>Y</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>Republic</td>
<td>N</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>N</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>Y¹</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>Guyana, Georgetown</td>
<td>Y¹</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>Barbados</td>
<td>N</td>
<td></td>
<td>Y²</td>
</tr>
<tr>
<td>Grenada</td>
<td>N</td>
<td></td>
<td>Y²</td>
</tr>
</tbody>
</table>
National Airlines

Although there is room for efficiency gains in airports, greater gains can be made through improvements in the policies toward civil aviation and airline ownership. The price, routing, and availability of flights are much bigger factors than airport charges for the competitiveness of Caribbean countries. Over the years, some countries have sought to ensure a regular air service and, in order to safeguard it, invested in national airlines. These airlines have often required government finance while simultaneously demanding protection from competition, thereby denying the possibility of expansion and lower airfares. The airlines involved include BWIA, LIAT, Air Jamaica, Cayman Airways, and Bahamasair.

BWIA began as a British company in 1939 and for many years was seen as the Caribbean airline. In the early 1960s, it was acquired by the Trinidad and Tobago Government. By 1994, the airline had become partially privatized. The Government of Trinidad and Tobago has a 33 percent stake and holds another 15 percent on behalf of its employees.

LIAT was founded in 1957. It was bought and developed by BWIA, then sold and ultimately acquired by the regional governments in 1974 to rescue it from financial distress. For most of its 30 years it has operated at a loss and built a reputation for high prices and poor schedules. CARICOM governments are currently the main shareholders in LIAT and have been bailing it out for years. It came close to failure in late 2002. Antigua, Barbados, St. Vincent and the Grenadines, and Trinidad and Tobago are committed to restructuring LIAT. There was a plan to merge LIAT and BWIA by the end of 2003, but it has not yet materialized.

Air Jamaica began operations in 1969 with flights from Kingston and Montego Bay to New York and Miami. At that time, the airline was owned by the Government with a minority interest held by Air Canada. It became wholly government owned by the end of the 1970s when Air Canada withdrew. Air Jamaica was partially privatized in 1994.

Cayman Airways was also formed as a joint venture between the Government and a foreign airline in the late 1960s and became wholly government owned when the foreign partner withdrew. Bahamasair was created by the Government in the early 1970s.

Governments promoted these airlines to ensure the continued growth of tourism in the region and to avoid the risk of reliance on foreign carriers. In the early days, the international industry was highly regulated with a very restricted number of airlines per country per route. Hence, route cutbacks by any one airline would severely impact airline capacity for tourists. The energy crisis of the early 1970s, when many airlines cut services in response to rising fuel prices and shrinking demand, dramatized their vulnerability.

Subsidies to Airlines

Over the years, these airlines lost a great deal of money. To reduce fiscal risk and provide for access to private sector operating expertise and capital, many of the airlines were partially privatized in the 1990s or early 2000s. The exceptions were Bahamasair and Cayman Air, which remained fully publicly owned.

However, privatization was only partial, and governments continued to have financial, policy, and emotional stakes in their national airlines. The result was that governments partly indemnified private shareholders against losses.
For example, Air Jamaica received an estimated US$250 million in Government support from 1994–1999 alone, yet losses continued to grow and the Government continued to subsidize the airline. Some subsidies were initially packaged as loans, but were later written-off or converted to equity since the airline was unable to meet its obligations. As a result, the Jamaican Government is once again the largest shareholder in Air Jamaica.

In late 2002, BWIA received a Government loan of US$13 million, which was conditional upon restructuring measures. BWIA still lost over US$45 million in 2003, which required the Government of Trinidad and Tobago to make a US$40 million injection to eliminate debt and provide working capital. It will be made as a loan, which will be converted into government equity, increasing the Government’s shareholding.

LIAT has also received substantial Government support over the years. Since being privatized in 1996–1997, it has amassed a debt of over US$200 million. It is now seeking further support from governments to survive the impact of the Iraq conflict.

Overall, the experience of five national airlines over three decades with both government and private ownership has been one of consistent losses at taxpayers’ expense and, consequently, at the expense of other Government programs and projects.

**Benchmarking—Air Services**

**Airfares**

The following table shows the return airfares to and from Miami. There are usually a wide variety of fares on any route, from full-fare economy to charter flights and package deals. Our approach was to select the third lowest economy return airfares available on each route in order to provide a consistent standard.

The routes for which we collected airfare data are illustrated in Figure 7.8. In Figure 7.9, we show airfares graphed against distance. As would be expected, airfares generally become more expensive with the distance flown, and the airfare per km generally falls with distance. This relationship reflects the costs in terms of aircraft time of landing, standing, and takeoff. Airfares are higher where connections are necessary (St. Lucia and Grenada).

<table>
<thead>
<tr>
<th>Table 7.6. Airfares to and from Miami</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Miami</td>
</tr>
<tr>
<td>(km) (US$) (US$) (c/km) (c/km)</td>
</tr>
<tr>
<td>Kingston</td>
</tr>
<tr>
<td>Santo Domingo</td>
</tr>
<tr>
<td>St. Lucia via Bridgetown</td>
</tr>
<tr>
<td>Grenada via Port of Spain</td>
</tr>
<tr>
<td>Port of Spain</td>
</tr>
<tr>
<td>Barbados</td>
</tr>
<tr>
<td>Georgetown</td>
</tr>
<tr>
<td>Rio de Janeiro</td>
</tr>
</tbody>
</table>

*Source: The Terrace Travel Ltd., May 2004 quote.*
Regarding airfares from Europe, Table 7.7 shows return airfares to and from London. As with airfares to and from Miami, we show the third lowest economy airfares. The airfares from London are more expensive than those to London. The airfares to each country from London are generally similar, except for Georgetown, which only has connecting flights. Likewise, airfares to London are broadly similar, again except for Georgetown. The airfare
from London to Rio de Janeiro is low and significantly lower on a per km basis; however, it is not lower from Rio to London.

**Number of Commercial Airlines Serving the Airport**

The total number of airlines serving the airport is an indication of the openness of the skies. Figure 7.10 provides a comparison.

<table>
<thead>
<tr>
<th>Number of commercial airlines serving airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHC New Zealand</td>
</tr>
<tr>
<td>TKB, Tobago</td>
</tr>
<tr>
<td>GEO, Guyana</td>
</tr>
<tr>
<td>KIN, Jamaica</td>
</tr>
<tr>
<td>GND, Grenada</td>
</tr>
<tr>
<td>UVF, St. Lucia</td>
</tr>
<tr>
<td>MPU, Mauritius</td>
</tr>
<tr>
<td>BGI, Barbados</td>
</tr>
<tr>
<td>SDQ, Dom Rep</td>
</tr>
<tr>
<td>POP, Dom Rep</td>
</tr>
<tr>
<td>POS, Trinidad</td>
</tr>
<tr>
<td>AKL, New Zealand</td>
</tr>
<tr>
<td>SIN, Singapore</td>
</tr>
</tbody>
</table>

**Source:** The Terrace Travel Ltd., May 2004 quote.

<table>
<thead>
<tr>
<th>Table 7.7. Airfares to and from London</th>
</tr>
</thead>
<tbody>
<tr>
<td>From London US$</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Barbados 1,615</td>
</tr>
<tr>
<td>St Lucia 1,506</td>
</tr>
<tr>
<td>Grenada 1,615</td>
</tr>
<tr>
<td>Santo Domingo via Miami 1,670</td>
</tr>
<tr>
<td>POS 1,597</td>
</tr>
<tr>
<td>Miami 1,381</td>
</tr>
<tr>
<td>Georgetown via Bridgetown 1,688</td>
</tr>
<tr>
<td>Kingston 1,370</td>
</tr>
<tr>
<td>Rio de Janeiro 1,485</td>
</tr>
</tbody>
</table>

**Source:** The Terrace Travel Ltd., May 2004 quote.
This chart indicates that Trinidad, the Dominican Republic, Montego Bay, and Barbados are well served. The other Caribbean countries are served by relatively few airlines.

The Caribbean is a major crossroads between the Pacific and the Atlantic, and between North and South America. Miami currently performs a hubbing role in the region, but it is subject to thunderstorms that frequently disrupt airport operations. A Caribbean country such as Jamaica, for example, could also fulfill a hubbing role without the same weather disadvantage.

Singapore and Dubai are also analogous to Caribbean countries in that they are major transhipment ports in the shipping world, and the Caribbean has a number of transhipment ports with significant transhipment activity. Singapore is a major hub and is also the base for Singapore Airlines. Dubai, described in the box below, has also developed its airport as a major hub together with a successful airline, Emirates Airline, centered on that base. Both Dubai and Singapore have open skies policies. Both countries have open skies agreements with the United States and a number of other countries. They have not allowed ownership of airlines to prevent competition from introducing benefits to their economies. The Box below describes the Dubai experience, which might provide lessons for the Caribbean.

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**Dubai International Airport and Emirates Airline**

The Dubai International Airport, the first to be constructed in the United Arab Emirates (UAE), was built in 1959 by order of the late ruler, Sheikh Rashid bin Saeed Al Maktoum. It is now the second-fastest-growing airport in the world, handling 18 million passengers in 2003, an increase of 13 percent from 2002. The airport was also nominated “best airport” in 2002 and 2003 by a survey carried out by International Air Transport Association (IATA).

The Airport currently has two terminals and accommodates 100 airlines, which connect to over 140 destinations. A US$4 billion expansion program was launched in 1997 in a bid to accommodate the rising traffic levels. The second stage of the airport expansion program began in early 2002, and is expected to be completed by 2006, increasing the airport’s capacity to 60 million passengers. This program includes the development of a third terminal and two additional concourses, all dedicated to Emirates Airlines flights.

Emirates Airline, a member of the Emirates Group, is referred to as the official international airways of the UAE and was established in 1985 by the government of Dubai. It flies to 68 destinations around the world and has a number of unique non-stop flights, such as the recently inaugurated New York to Dubai route and the Sydney to Dubai route. Since its inception, the airline has won various international awards, including the Global Airline of the Year, and is one of the fastest-growing airlines in the world. Impressively, it has posted a profit every year since it was founded, with profits of US$429 million in the year that ended in March 2004.

The Emirates Airline fleet now consists of over 50 planes, including 28 Airbus A330-200, 9 Boeing 777, and 12 larger 300-series Boeing 777 aircraft. The airline plans to add an Airbus double-decker A380 by October 2006. In June 2004, Emirates and Airbus jointly developed and introduced “sleeping cabins” to the fleet.

The success of the airline and airport are indicative not only of their innovation and high service levels but also of the Government’s commitment to boosting Dubai’s infrastructure and its profile as both a convenient stopover and a travel destination in its own right. Sizeable investments are being made in turning the region into a business and vacation mecca, with a complete array of amenities, including the planned “Dubailand,” an amusement park that will eventually be twice the size of Disneyworld in Orlando, and the Gulf’s first cybercity, a US$200 million collection of offices aimed at attracting international e-commerce and online services.

Source: Castalia.
Conclusions—Air Services

Tourism is critical to the economies of the Caribbean countries. The policies toward air services should primarily be directed at obtaining the best quality of service for tourists at the lowest airfare. Better airline services and lower airfares are likely to be achieved through opening routes to competition and allowing competition to drive improved service quality and reduced airfares.

Although competitive air services are critical to tourism, they are equally important for business travel, inter-island travel, and for residents visiting families in North America and Europe and vice versa.

Open Skies

As described previously, the Dominican Republic and Jamaica have open skies agreements with the United States. Other countries in our study have bilateral agreements that limit the number of carriers serving their routes and the capacities provided.

A better approach is likely to be to liberalize air services, allowing airlines (possibly foreign-owned) to compete to offer services to each island. The world has evolved from favoring the bilateral aviation monopolies of the 1970s to the point where open skies policies are now feasible and desirable, and are being adopted by the European Union (EU), Australia, and New Zealand. Dubai and Singapore, which have large, expanding hubs and airlines, have open skies policies. For most Caribbean countries, the result of liberalization would in all likelihood be a net increase in the range and quality of air services as well as a reduction in airfares. Ideally, liberalization would include removing nationality restrictions in air-service agreements with other countries, so that, for example, European carriers were able to serve routes within the Caribbean and the USA.

The effects of liberalizing air services are illustrated by the relatively low airfares on a per km basis from Miami to the Dominican Republic. Because Jamaica has not yet implemented its open skies agreement with the United States, it is too early to see the benefits to it of lower airfares.

Such a policy approach involves risks, and governments may be reluctant to abandon traditional policies for a system in which they have less control over the provision of air services to their countries. Governments tend to resist liberalizing air services for three reasons:

- Concern that continuity of service may be put at risk,
- Concern over the impact on national or regional carriers, and
- Bureaucratic capture.

Contracts for Continuity of Service

Governments worried that a pure market approach may not guarantee the reliability and frequency of services their tourist industries require could supplement liberalization with the competitive award of contracts in which a carrier would guarantee to provide continuity of service on specialized routes in return for a contract payment. The subsidy would be minimized through a competitive bidding process. In a well-structured process, it is likely that the total subsidy could be competed away to close to zero.
This approach would allow for the benefits of competition and would ensure air services, while at the same time limiting subsidies and fiscal risk because the payments would be fixed in advance and not open-ended. We understand such an arrangement may already have been tried by some OECS countries on a negotiated basis with American Eagle. Adopting an open skies policy and awarding contracts through a competitive bidding process could be expected to significantly reduce needed subsidies.

**National and Regional Airlines**

The main barrier to liberalization of air services is the national airlines, which governments tend to protect from competition in order to reduce the amount of subsidy they need. An objective analysis, however, shows that in the Caribbean national carriers are not assets to be protected, but liabilities. The combination of protection and government funds allows unprofitable route extensions and inefficient operations to continue. For example, Air Jamaica flies from New York to St. Lucia and Grenada, and from Jamaica to Bonaire. It is hard to understand the reason for Jamaican taxpayers to subsidize these routes.

In many cases, both air services and national fiscal positions would improve if national airlines were left to prosper without government support and protection, to merge with each other, or to enter bankruptcy if they are unable to compete with other carriers. In our view, it is more important to offer the best mix of services to the tourist market than to protect a national carrier. Better services bring increased income from tourism. National carriers that can compete on a level playing field are contributing to their economies, but national carriers that need protection or financial support are a drain on those economies.

**Regional Approach**

We cannot envisage a regional approach toward airlines that would meet the needs of the countries better than allowing competition on even terms. Better services, lower airfares, meeting safety and security requirements, and minimum demands for government subsidies result from free market competition. Greater competition and improved service is achieved through opening the skies, not from subsidizing carriers. Too often the pressure to retain present regimes stems from those who have vested interests in it, something that could be easily altered with a policy change. Often there is an alliance of these parties, which would serve to deter improvements in aviation.

On the other hand, each country has an opportunity to liberalize, and those that do so first will enjoy the gains from boosting tourism sooner than other countries as well as get a jump on the competition.

It may be that carriers in the region such as BWIA, LIAT and Air Jamaica choose to merge with each other or other carriers in response to increased competition following liberalization. However we would not recommend a policy of merges to create a national airline in the absence of liberalization. This would simply reduce competition and choice further.
Conclusions and Recommendations

In this section we summarize our conclusions and recommendations.

Open skies air service agreements allow competitive forces to provide the best mix of air services in terms of quality and price. The Dominican Republic has had an open skies agreement with the United States since 1999, and Jamaica has just reached one. CARICOM countries are currently in discussions with the United States over an open skies agreement. We recommend the Caribbean countries move quickly to secure open skies agreements with at least the United States and key European countries.

The Caribbean countries do not have large tax bases. They are able to achieve better value for their expenditures on other programs than by subsidizing a national airline. Therefore, we recommend the Caribbean governments no longer subsidize national or regional airlines, and allow them to respond to competitive market forces. Should one collapse, its assets will be taken over by another company who should be able to use them more effectively.

A Caribbean government might have cause for concern over continuity of service on an international air route as a result of liberalizing air services. In such a case, we recommend that the government offer a competitively determined contract payment to a carrier in return for the carrier guaranteeing a minimum level of service.

As gateways to the Caribbean countries, airports need to be attractive and efficient, and need to meet ICAO standards for aircraft safety in the air and on the ground for security of the airport, passengers, and cargo. In cases where capital or commercial steps are needed to bring about necessary improvements, we recommend that private sector participation be considered. Loss-making government-owned airports should be required to cover their costs. Private participation may help to instill the necessary commercial discipline.

Each country should proceed as quickly as it can to improve its airports and air services and should not allow any perceived need for a regional approach to hold them back. Each

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**Figure 7.11. An Overview of Aviation Recommendations**

<table>
<thead>
<tr>
<th>The Policy Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy Recommendations</strong></td>
</tr>
<tr>
<td>Open Skies</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Competition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits</th>
</tr>
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<tbody>
<tr>
<td>Increasing Capacity</td>
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</table>
country needs to attract tourists. The performance of their airports could, however, be assisted by adopting a common methodology for benchmarking performance across a number of measures. In this way, opportunities for improvement can be identified and best practice can be transferred more quickly from airport to airport.

Figure 7.11 illustrates the policies we discuss in the airport and aviation sector, the effects these policies can have on the air transport market, and the benefits they can bring to the Caribbean countries. We believe these policies can increase the range and quality of air services to support tourism, ensure that international safety and security requirements are met, assure continuity of service, and substantially reduce aviation demands on government funds.
A Strategy to Sustainably Finance Infrastructure in the Caribbean

This chapter aims to outline a strategy for sustainable provision of infrastructure in the Caribbean. We aim to suggest ways in which international financial institutions (IFIs) could contribute to the policy reform outlined in the earlier chapters.

An infrastructure financing strategy in the region needs to take into account the current debt levels of Caribbean governments. These are reviewed in the first section below. Because sovereign debt is at or approaching unsustainable levels in many Caribbean countries, financing should be, so far as possible, self-financing, and not add to the existing fiscal burden. Highly indebted countries may also be better served by guarantees which help to mobilize investment in private infrastructure providers, rather than traditional public-sector lending operations. The second section provides practical ways to combine IFI products with private participation in infrastructure. Given the small size of many of the countries, and their similarities with each other, regional approaches can be helpful in some areas. The third section describes some high priority regional initiatives we recommend that IFIs could promote. The fourth section reviews each of the infrastructure sectors (Water, Electricity, Roads, Telecommunications, Ports, Airports and Airlines) to uncover opportunities for the IFIs. These range from significant lending operations in the less developed countries (Guyana and Haiti, for example) and less commercial sectors (water and roads) through guarantees and technical assistance loans in the more developed countries and more commercial sectors (power and ports, for example) up to private sector lending and investment in the most developed countries (for example, Bahamas) and most commercial sectors (airlines, telecommunications). While most of the chapter looks at project-based operations, true infrastructure development in the Caribbean requires a move toward local sourcing of finance for infrastructure. The fifth section sketches out some ideas for the development of regional capital markets with the depth and maturity to finance significant infrastructure.
The Debt Context

Many Caribbean Governments have debts which are at or approaching unsustainable levels. Debt to GDP ratios are illustrated in Figure 8.1, which shows that 14 Caribbean countries would rank among the 30 most indebted emerging market countries.

High debt levels mean that traditional Government borrowing to finance infrastructure is no longer sustainable for highly indebted countries like St Kitts, Jamaica, Antigua, Dominica, and Grenada. Most infrastructure investments will need to be either self-financing, or to the extent that it is not, generate rapid and significant economic growth which can generate increased tax revenues to allow the debt to be serviced.

This is not how infrastructure investment is generally analyzed. Normally roads, bridges, ports and the like generate returns over decades, and the cost benefit analysis is one of economic cost and benefits, not fiscal costs and benefits. Unfortunately, in many Caribbean countries the fiscal situation means that this approach is no longer possible. If we assume that the costs of default on debt are such that strenuous efforts are needed to avoid defaulting, then Government finance of infrastructure needs to largely pay for itself in fiscal terms.

This has a number of implications:

- Most new infrastructure finance will need to be serviced from user charges or higher taxes.

**Figure 8.1. The Caribbean: Ranking Among Top 30 Most Indebted Emerging Market Countries (Public Sector Debt-to-GDP Ratio, End–2002)**

There should be bias toward financing of infrastructure by private providers, for two main reasons:
—The evidence in the Caribbean is clear that private infrastructure providers are generally able to operate on a cost recovery basis, while government providers generally are not.
—Keeping borrowing off the books will help keep interest rates down, since rating agencies and financial markets find it difficult to assess the likelihood that particular investments will generate returns, and tend to regard all borrowing by a highly indebted country as negative, regardless of the actual financial and economic implications of the borrowing.

Justifying public investment in infrastructure will require demonstration of higher IRRs and quicker payback periods than usual.

New Financing Structures for Infrastructure

This report has recommended private operation and/or ownership of many infrastructure service providers. While private participation has had notable successes, in particular in the power and telecommunications sectors in the Caribbean, there have also been many problems. For example, management contracts in the Caribbean water sector have not worked well. Concession contracts in many countries overseas have run into difficulties. Insistence that private participation be accompanied by substantial tariff increases has created a barrier to private involvement.

Various initiatives are now underway to develop improved structures for private participation, which address these problems. This section outlines two such models, which may form a basis for operations in a range of infrastructure sectors. These models are:

- **The OBA Concession.** A concession contract modified to make it more pro-poor and socially acceptable through incorporation of OBA subsidies, and less risky through the use of guarantees and regulatory mechanisms built into the contract.

- **The Lease with Investment Trust.** A model to be used instead of lease, affermage and management contracts, which provides for better co-ordination of public investment and private operations than under existing models, facilitates a gradual transition toward private finance and full-cost recovery, and also includes guarantees and OBA payments for risk reduction and increased social acceptability.

These models are only two among a wide range of possible structures, but they illustrate what is possible if lessons from past generations of private participation arrangements can be combined with new World IFIs products such as OBA loans and partial risk guarantees.

Figure 8.2 illustrates the OBA Concession model. Key elements of the model include:

- A concession contract which specifies the services to be provided and the tariffs to be charged is the heart of the arrangement.
- Tariff adjustment and other regulatory provisions are contained in the contract, as is the regulatory machinery, which may include an independent firm to monitor performance, a Panel of Experts to advise on Periodic Reviews, and an Arbiter to resolve disputes.
The Global Output Based Aid Fund allows for explicit, output-based subsidies. These subsidies help keep tariffs or charges for new connections down in order to help poor customers, or during a transition period until service improves.

To ensure that the Government honors its commitments, including those related to subsidies and tariff changes, IFIs may provide a guarantee covering breach of contract (because regulatory rules are in the contract, this is an effective way of insuring against regulatory risk).

Figure 8.3 illustrates a similar model, but one in which the private firm only takes operating risk, and is not required to finance investment. Lease and affermage contracts have been popular in countries where private investors and lenders are not interested in investing or lending, where private operators are prepared to accept commercial operating risk, and where government or IFIs are willing to invest or lend.

Although there are several examples where this model has delivered improvements in service, it is recognized that areas where it can be improved include:

- Operators argue that in standard lease/affermage contracts investment decisions are outside of their control.
- The traditional model relies entirely on public or IFI funds to finance capital investments and has rarely attracted commercial financing.
Subsidies in the model are often implicit, in the form of Government finance for investment, rather than being explicitly paid for the delivery of outputs.

The model shown in Figure 8.3 below is designed to address most of these weaknesses.

In this model a Lessor or *Fermie* will sign a contract with the government that will give the Lessor/*Fermie* (or “operator”) the right to use the existing infrastructure and to collect revenues from end-users. The operator will be required to operate and maintain the system, and to comply with a set of service targets. In exchange, the operator will be entitled to receive revenues that will cover the full cost of service (operating expenses), as well as the cost of capital. If the government considers that a full cost recovery rate is too high, it could set a lower rate, and introduce an output-based subsidy to cover the difference between the true cost rate and a lower rate. The operator will be entitled to deduct from the full-cost-recovery revenue all non-capital costs. Capital related revenues will be transferred to an Investment Trust. The output-based-aid element of the operator’s revenues will be paid directly by the government (possibly from an OBA fund) against delivery of pre-agreed outputs.

To fund capital investments, the government will establish an Investment Trust that will be administered by a private financial institution, and will be governed by a set of predefined operating rules. Initially the Trust will be funded with loans from the government and/or IFIs. To repay these loans, the fund will receive payments from the operator. As the system matures and the risks of the business become more clear and controllable, the Trust could seek to raise debt from private investors or lenders.
To further enhance the attractiveness of the transaction, IFIs will provide the operator and possibly the administrator of the Investment Trust a regulatory and contractual guarantee that, beyond covering standard breach of contract events, will provide additional security that the government will set tariffs and provide output-based subsidy to cover the true cost of service.

Two features would be introduced to provide flexibility to the operator in making capital investment decisions, and comfort to government that capital funds are being properly utilized. First, the operator and the government will agree ex-ante a capital investment plan for a period of say one to three years. This plan will define the targets to be met by the operator as well as the capital investment funds required. Second, the operator will be required, above a certain amount, to follow a competitive selection process to award the capital works contract. Furthermore, the government will have the right to perform regular ex-post audits to verify the appropriate use of funds.

The performance of the operator will be monitored by an external auditor that will be contracted by government. This auditor could also act as mediator in attempting to resolve disputes such as disagreements on the scope of the capital investment plan, rate increases, or phasing-out of OBA.

The key benefit of this model is that it gives the operator considerable control over capital expenditure, allowing it to manage the company effectively, without requiring the operator to actually finance the investments, while also providing a reasonable level of public supervision.

Figure 8.4 provides a simple taxonomy of the models, showing how they can be described on two simple dimensions: whether or not tariffs cover costs, and whether...
finance is provided by the public or the private sector. The figure also indicates the situations in which different models are likely to be appropriate. In high risk countries such as Guyana and Haiti, where the private sector will not finance investment, lease contracts combined with investment trusts, OBA subsidies and guarantees are likely to work. In lower risk countries such as Trinidad, where tariffs may nevertheless need to remain below cost for some groups or during a transition period, an OBA Concession may be appropriate.

Regional Initiatives

Two regional initiatives recommended in the main report set the scene for other, country-specific initiatives.

*Development of regional regulators/contract management unit.* Such a unit would monitor and enforce tariff and service rules applying to private operators under infrastructure contracts and licenses. It could be modeled after ECTEL. Trinidad could also be encouraged to join. Barbados and Jamaica are larger economies with effective institutions, which could be left as they are.

*Development of a regional procurement agency.* Such an agency would manage procurement of for Government-funded infrastructure in the region, including for roads, and capital works in remaining Government owned entities. It would replace national agencies such as Government Tender Boards and Contract Committees. It would be beneficial for all English speaking Caribbean countries to join such a body, which could achieve real independence and transparency in procurement by lifting procurement decisions above the national political level. More analysis is required to determine whether it is realistic to try to include the non-English speaking Caribbean countries or Belize in these initiatives.

These initiatives are purely institutional, with no infrastructure. They would need to be financed from grants (such as PPIAF) to get the concept going, then perhaps by a Technical Assistance loan. While the sums involved are relatively small, the payoff in turns of the productivity of subsequent bricks-and-mortar investment could be huge.

There is a real political interest in the development of the Caribbean Single Market now. These initiatives would further promote those objectives.

Sectoral Overview

The following subsections consider opportunities sector by sector, starting with water and electricity, then considering roads, telecommunications, ports and finally airports and aviation.

*Water*

Water is one of the most promising areas for IFI involvement in infrastructure, since the sector is not yet able to attract private capital, and the scope for improvements in service and productivity through improved policies and institutional arrangements is great.
The evidence shows that government-owned and operated water utilities in the Caribbean are uniformly inefficient and under-capitalized. This is true even in Barbados, where on the whole government entities perform relatively well. Loans for bricks and mortar and system rehabilitation have not helped; nor have twinning and technical assistance contracts. Management contracts in Jamaica (1980s), Trinidad (1990s) and Guyana (current) have brought some limited improvements, but these have generally fallen far short of both expectations and contractual targets, and have not created sustainable institutional change.

There is a significant opportunity for IFIs to promote new models of private participation such as the OBA Concession and the Lease with Investment Trust. In countries with relatively low regulatory risk (Trinidad, Jamaica, Barbados, the OECS) OBA Concessions are likely to be a good option. In higher risk countries—including Guyana, Suriname, and Haiti—Lease with Investment Trust models are likely to be the best hope for real improvements.

In Guyana for example, an OBA project could be developed to finance a comprehensive plan to improve quality and reliability of supply, as well as the commercial performance of the water utility. This could be developed to work in conjunction with the current management contract (which would help to alleviate some of the problems with the contract), and could pave the way for a move from the management contract to a lease/affermage in the future.

Another option is extensive out-sourcing of functional areas, such as meter-reading and billing, and Unaccounted for Water reduction. This option is suitable for countries which have a reasonable level of management capacity and are not ready to hand full management responsibility for the utility to a private company. The Dominican Republic is already doing this. Trinidad is likely to be well disposed to this option, and is considering inviting private participation in remote readable meter installation and operation through “pay-per-read” contracts.

IFIs could provide technical assistance to develop and implement the out-sourcing, and lend to the utility for associated equipment and capital works (for example, new billing systems, meters, and pipe replacement), or alternatively lend into an OBA scheme which finances new connections, or provides a social-safety net for disadvantaged groups as a way of making tariff increases socially palatable.

**Electricity**

There is a significant opportunity for IFI involvement in countries with poorly performing government-owned power utilities, including Guyana, Haiti and Dominican Republic (where private distributors are being returned to government). For these countries the Lease with Investment Trust model is likely to be appropriate. IFIs could provide advisory services in creating and implementing the structures, through grants, TA loans or the IFC, and then lend to the Investment Trusts for new investment. IFIs could also help to establish and fund OBA subsidy facilities.

Countries with Government-owned companies which are at or close to cost-recovery through the tariff, and which are in relatively stable political environments, should be privatized. Countries which could benefit from this approach include Trinidad (TSTT) and those OECS countries with publicly-owned power utilities, for example St. Kitts.
Countries with private ownership but lacking institutions to regulate them effectively (for example, St Lucia and Dominica) could benefit from a TA loan to assist them in joining a regional regulatory jurisdiction.

**Roads**

Roads were not one of the sectors reviewed in the main report. Nevertheless, we include this sector in the strategy because we think it likely that:

- In many Caribbean countries, additional road investment would have good economic returns.
- Difficulties in implementing private roads means that roads will need to be financed by Government, making it an easier sector for IFIs to lend to than many other sectors.
- Road construction and maintenance practices seem to be particularly poor in the Caribbean.

Key problems seem to be that:

- Roads are not built to last.
- When repairs are made they soon need to be done again.
- Road contracts are particularly susceptible to corruption of the sort described in Chapter 2.

These problems come about because road construction and repair is relatively simple (compared to work on electricity infrastructure, for example) so many small contractors can be involved. This makes it easier to award road contracts for patronage and political favors. Government agencies are not good at construction supervision, and may be demoralized because of the extent of patronage in contract awards, so enforcement of construction quality is poor. At the same time the contractor has an incentive to do poor quality work, since the sooner the road needs fixing again, the sooner the contractors will have the opportunity to receive another contract.

We recommend moving toward a system similar to that used in New Zealand, Argentina, the UK and elsewhere, in which medium term road maintenance contracts are let (or construction and maintenance contracts), for new roads. Under this model, rather than being paid simply to build a road, or to fix a pothole, a contractor would be paid to build or rehabilitate a road, and then maintain it in good condition for a period, for example 5 years for a rehabilitation contract, or 10 years or more if construction of a new road was involved.

IFIs’ role in promoting this opportunity would include:

- Technical assistance to design, award, and supervise the contracts; and
- Loans to Government to finance the payments under the contracts.

**Telecommunications**

Many countries in the region—including Jamaica, Barbados, and most of the OECS—have private companies and competitive markets. Countries which have not liberalized include Trinidad, Antigua, Guyana, Suriname, and Haiti. St Kitts and St Vincent are liberalizing
but have government owned incumbents which should be privatized. These Governments need assistance to develop liberalization policies and negotiation strategies (and to encourage them to join a regional regulatory jurisdiction). The package may also include assistance in privatization of incumbents (by share sale or concession) and running a bidding process to bring competitive mobile operators.

As part of this liberalization assistance, IFIs could also consider the following elements:

- **OBA loans to Universal Access Funds to pre-fund them**, thus easing fears that liberalization will lead to a break down of universal service. Debt service on the loans could come from a mix of USO levies and government contributions. The OBA loan could be a small sweetener for countries the better-off countries, such as Trinidad, and sufficient to finance substantial new investment in poor countries like Haiti.
- **Risk mitigation products such as guarantees against expropriation and regulatory risk.**

**Ports**

Our review did not reveal a need for significant investment in port infrastructure to serve local trade. Some ports (including Kingston and Port of Spain) are planning significant investment to expand their transhipment business. However, transhipment is a footloose business, and we would recommend, Bank and government investment only where private investors, such as specialist port operators or shipping lines, were prepared to invest alongside Government and take equal risks.

There may be a useful role in helping “Public Service” ports transform themselves into “Landlord Ports”. This would involve Technical Assistance loans. The transformation process might be assisted by loans which could be used by new terminal operators to finance a portion of terminal and equipment upgrades on taking over responsibility for operations.

**Airports**

Our core recommendation on airports is to promote concessioning of loss-making public airports. This will reduce the fiscal drain, and should facilitate terminal upgrades and an improved tourist experience, as well as help security compliance. The concessionaire would be expected to take operating risk, and some level of investment risk.

In high-risk countries like Haiti and Guyana all finance for investment could be provided by the public sector, creating a model similar to the Lease with Investment Trust. Credit enhancement such as partial risk guarantees to mitigate regulatory risk should be included.

In lower risk countries such as the OECS, Trinidad and Jamaica (for Norman Manley airport at Kingston) the concessionaire would be expected to provide more of the capital.

**Airlines**

The policy objective should be rapid and in necessary unilateral aviation liberalization, with the complete privatization (or if necessary closure) of flag carriers like Air Jamaica, BWIA and LIAT. Countries which are concerned that the market may not provide sufficient or reliable airlift capacity could award contracts competitively to private carriers under which the carrier would guarantee provision of at least minimum frequencies and capacities.
This policy is likely to be resisted by the Governments which have national flag carriers such as Trinidad and Jamaica. It may be possible to persuade them of the merits of the approach. Such a program might include:

- Development of the service contracts;
- Lending to support initial payments under the service contracts;
- Award of “transition” service contracts to the incumbents, in place of current subsidies, to support privatization (this is similar to the way government-owned generators are privatized in a typical electricity sector restructuring);
- Assistance with privatization of the airlines, through TA loans for transaction advisors. Some working capital could also be lent to airlines on privatization; and
- Technical Assistance to develop and implement an open-skies strategy.

Countries which do not have their own flag-carriers may be more open to these recommendations. This could include Guyana and Grenada.

**Regional Financial Market Development**

So far this chapter has focused on project-specific interventions. True development will entail the Caribbean being able to finance infrastructure from local savings. This should be done on a regional basis, since the region is already well-integrated at a financial markets level, and become more so. Trinidad, in particular, is emerging as a supplier of capital to the rest of the region, and is well placed to do this since Trinidadian financiers understand the conditions and risks in the other Caribbean countries better than would investors from the USA or Europe.

Local capital markets need to develop the interest and capacity to provide long-term finance for infrastructure. This is a long term, multi-faced exercise, requiring work in three inter-locking areas:

- On the demand side, infrastructure service providers need to start to look more to local capital markets for funding, instead of to Governments and development agencies.
- On the supply side, natural investors in infrastructure projects include regional insurance companies and pensions funds, which need long-lived investments with only moderate risk. Caribbean insurance companies and pension funds are interested in infrastructure, but because there are so few investment opportunities they have not invested in the ability to promote or appraise such details.
- Transaction and risk-management eco-systems—in developed markets, infrastructure financing involves a myriad of specialist professionals, institutions and instruments. There are specialist infrastructure funds which invest money pooled from insurance companies and elsewhere, investment banks to promote deals and arrange finance, specialist lawyers, guarantee agencies, tax advisors and the like. In Asia, Hong Kong and Singapore provide such eco-systems of professionals and institutions which serve countries throughout the region. The Caribbean does not yet have this diverse mix of specializations, making any deal much harder to do, since players must be drafted in to perform their roles for the first time.
Initial steps toward a local capital market capable of providing significant infrastructure finance, include:

_**Encouraging the issuance of infrastructure bonds by Governments and Government-owned entities.**_ These should be similar to the bonds issues by US municipalities and municipally-owned utilities, and employ similar structuring and credit-enhancement techniques.

_**Encourage listing of infrastructure providers on local or regional stock-exchanges.**_ For example, as part of program to involve the private sector in Guyana’s electricity company or Trinidad’s water utility, some of the equity could be issued on local or regional stock exchanges. Such exercises in popular capitalism where highly successful in the United Kingdom and Australia, and would also work in the Caribbean.

_**Encouraging development of local infrastructure investment funds.**_ These could pool money from insurance companies and other sources to invest in infrastructure.

_**Providing IFI credit-enhancement.**_ This would be done by through co-investment with private investors such as an infrastructure investment fund (either subordinated debt or pari passu) or providing guarantees.

_**Involving local financial services companies in structuring and arranging transactions.**_ Regional investment banks are developing a capability in small capital raisings for infrastructure providers. Reform programs should use local firms as well as international specialists in deal structuring and finance-raising, to encourage the development of local capacity in these areas.

_**Link to initiatives in regional private catastrophe insurance.**_ The vulnerability of Caribbean infrastructure providers to natural disasters, especially hurricanes, makes effective catastrophe insurance vital. The IFIs has previously suggested ways in which capital markets could be developed to offer better value and more effective catastrophe risk cover. It would be worth seeing to what extent these ideas could reduce infrastructure costs in the Caribbean, while perhaps at the same time contributing to the development of deeper capital markets more able to finance infrastructure in the region.

The opportunities outlined in the paper have been developed with political sensitivities in mind. While we remain of the view that private participation will often be needed to make infrastructure providers effective, the bitter pill of loss of government control can be sweetened with:

- OBA subsidies, so that socially- and politically-necessary subsidies can be combined with private commercial operations;
- Local stock-market floatation of the private infrastructure providers, to offset the fear that control and profits will all move offshore; and
- Ceding sovereignty upward to regional regulators and procurement agencies, in a move compatible with the project of Caribbean integration.

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### Institutional Features of Infrastructure Sectors in the Caribbean

#### Telecommunications

<table>
<thead>
<tr>
<th>Country</th>
<th>Antigua and Barbuda</th>
<th>Barbados</th>
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**Electricity**

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### Institutional Features of Infrastructure Sectors in the Caribbean (Continued)

#### Water and Sanitation

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#### Ports

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<th>Rio Haina</th>
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<th>Georgetown</th>
<th>Kingston</th>
<th>Castries</th>
<th>Point Lisas</th>
<th>Port of Spain</th>
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<td>N</td>
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(continued)
### Institutional Features of Infrastructure Sectors in the Caribbean (Continued)

#### Ports

<table>
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<tr>
<th>Port Name</th>
<th>Bridgetown</th>
<th>Rio Haina</th>
<th>St. Georges</th>
<th>Georgetown</th>
<th>Kingston</th>
<th>Castries</th>
<th>Point Lisas</th>
<th>Port of Spain</th>
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<td>N</td>
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#### Airports and Aviation

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<th>Jamaica</th>
<th>Jamaica</th>
<th>St. Lucia</th>
<th>Trinidad</th>
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<td>Point Salines</td>
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<td>Hewanorra</td>
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### Institutional Features of Infrastructure Sectors in the Caribbean (Continued)

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<td>Autonomous Board independent from Executive power</td>
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<td>Terminal Facilities</td>
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<td>N</td>
<td>Y</td>
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<td>Ground handling</td>
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<td>Shopping</td>
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<td>Competition: Within airport services at the airport?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
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<td>N</td>
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</table>
| Among airports in the country? | N | Y | Y | N | N | N | N | N | N | N | N | N | (continued)
### Institutional Features of Infrastructure Sectors in the Caribbean (Continued)

#### Airports and Aviation

<table>
<thead>
<tr>
<th>Country</th>
<th>Antigua and Barbuda</th>
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<td>Georgetown</td>
<td>Montego Bay</td>
<td>Kingston</td>
<td>Hewanorra</td>
<td>Piarco</td>
<td>Tobago</td>
<td></td>
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<tr>
<td>Are there any airfield deficiencies affecting ICAO certification?</td>
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<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<td>N</td>
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<tr>
<td>Is there a national airline?</td>
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<td>Does the airline require subsidies to operate?</td>
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<td>Is there an open skies policy?</td>
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<td>Y</td>
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References

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<thead>
<tr>
<th>Trees*</th>
<th>Solid Waste</th>
<th>Water</th>
<th>Net Greenhouse Gases</th>
<th>Electricity</th>
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<td>307</td>
<td>14,387</td>
<td>130,496</td>
<td>28,262</td>
<td>52,480</td>
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</tbody>
</table>
*40' in height and 6-8" in diameter

Pounds | Gallons | Pounds | KWH
Institutions, Performance, and the Financing of Infrastructure Services in the Caribbean is part of the World Bank Working Paper series. These papers are published to communicate the results of the Bank's ongoing research and to stimulate public discussion.

This book reviews the access to services, investment needs, tariffs, and efficiency of fifteen Caribbean countries across five infrastructure sectors (telecommunications, electricity, water and sanitation, maritime transport and ports, and airports and air services). Benchmarks are established to compare Caribbean countries with each other, and with similar countries. To some extent, differences in performance can be explained by unalterable factors such as a given country's size and location. However, we find that, in many cases, differences in performance among countries cannot be completely explained by such factors. Many of the remaining differences seem to be attributable to institutional and policy factors, such as the level of competition among service providers within a given sector, whether providers are government or privately-controlled, and the quality of regulatory and subsidy regimes. The study highlights several key policy findings and recommends changes that have the potential to help Caribbean governments overcome some of their inherent disadvantages of scale to provide better, cheaper infrastructure services.

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