

PERFORMANCE BENCHMARKING OF CARIBBEAN UTILITIES

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SUMMARY

In 2004 CARILEC conducted a benchmarking study of Caribbean utilities in order to assess and compare regional performance. The study identified, measured and benchmarked suitable indicators for the island utilities with regard to their technical, commercial, financial and organizational performance and assessed their standing against best international practices. This paper presents the methodology used and the main results and conclusions.

INTRODUCTION

The Caribbean Electric Utility Services Corporation CARILEC is the regional body of the electric utility industry in the Caribbean, orienting the utilities, investors and other stakeholders about the characteristics, behaviour and outlook of the electrical industry in the region. Acting as aggregator of its member needs, CARILEC produces and disseminates adequate information on the operations of regional utilities to improve electric energy supply in the Caribbean.

In 2004 CARILEC, conducted a benchmarking study of its member utilities in order to assess regional performance, provide comparative data and facilitate establishing operating standards and best practices for electricity supply across the region. The objective of the study was to identify, measure and benchmark suitable performance indicators for island utilities with regard to their technical, commercial, financial and organizational performance and to determine the standing of utilities operating performance against best international practices.

Figure 1 – The Caribbean Region



Seventeen utilities providing electricity service in countries and territories of the Caribbean participated in the study and the results and conclusions allowed characterizing the current operating profile of the electric utility industry in the region.

This paper presents the methodology used to carry out the benchmarking study and the main results and conclusions.

METHODOLOGY

Study's Approach

Benchmarking is an analytical method used to compare the activities of one company (or business units) with those of comparable companies providing similar products and services. Through an informed comparison, companies learn from each other, identify potential productivity improvements and thus explore better ways of running their business. Benchmarking techniques also allow estimating the degree of relative efficiency of a company and quantifying productivity improvement targets.

For electric utilities, the application in a structured manner of key performance indicators and benchmarking techniques represents an indispensable tool for any objective-oriented management approach and it is essential for the development of performance enhancing and cost reduction programs. The utilization of key quantitative indicators and benchmarking analysis provides valuable comparative information that used properly can help utilities gain perspective on their operating performance and design strategies to increase overall efficiency.

A benchmarking study involves identifying key performance metrics, choosing companies to benchmark, defining and collecting data on performance, analysing the data and identifying opportunities for improvement. The overall goal is to identify, adapt and implement superior practices to improve performance.

The methods and results of benchmarking can be integrated as part of an integral Performance Management System (PMS) oriented to achieve corporate objectives. Such a system allows managers to keep control on key company indicators, establish targets, track the evolution in time and evaluate the results of operating changes and efficiency improvement plans. The selection of suitable performance indicators, the implementation and updating of a database to measure operating results and periodic monitoring are all components of a PMS.

Accordingly, the regional benchmarking study was conceived and developed as the initial stage of a Performance Management System that can be implemented by CARILEC to establish regional improvement strategies and by each utility at the company level to fulfil their own corporate objectives.

Criteria and Activities

The Caribbean benchmarking study included the selection of key indicators to measure utilities' performance, defining and collecting data on system characteristics and utility operating results, building a regional database, measuring and comparing performance indicators, identifying best practices and analysing the results. Careful attention was given to identify characteristics of utility operations that allowed meaningful comparisons, so utilities could benefit from sharing data with regional peers, identifying desired performance levels and establishing future performance targets.

The study utilized key indicators to measure and compare utility's performance; quantitative metrics reflecting key aspects of the organization were selected as performance indicators. The metrics selected are aimed to assist management in measuring the achievement of utility objectives, and therefore appropriate indicators measuring physical inputs and outputs were utilized in addition to more usual financial ratios used to evaluate corporate results.

There is not a standard set of indicators applicable to all utilities, however, the similarity of the activities related to the provision of electricity services and the specific characteristics of the island systems allowed for the identification of a group of indicators suitable to measure and benchmark the operating performance of Caribbean utilities.

The following criteria were used to select the set of performance indicators for the study:

- Indicators used internationally by the electric utility industry.
- Performance metrics tailored to the specific characteristics of island systems.
- Aggregate indicators suitable to be used at executive level for management purposes.
- Indicators considering organizational, economical and technical aspects.
- Indicators covering the different areas of the utility business: generation, transmission-distribution and commercial operations.
- Indicators suitable to be used as part of a Performance Monitoring System.
- Availability and quality of utility data.

Phases

Based on the set of performance indicators selected for the study, it was prepared a list of the information required from the utilities considering data necessary to calculate the indicators and information about the companies and their electric systems useful to characterise the regional profile and to interpret the results. As main means to gather the information required a standard questionnaire was distributed by CARILEC among the utilities for that purpose.

The data received through the questionnaires was 'debugged' and validated for consistency and with other sources to the extent possible. Likewise, information from CARILEC and other publicly available from the utilities like annual reports, operations reports, financial statements, investor information, and tariff sheets was consulted. The information collected from the utilities and the other sources was used to build a regional database with the characteristics of the electric systems and the operating results of the utilities.

The regional database was used to measure the performance indicators and contained other information useful for the subsequent analyses. The indicators calculated were then compared and benchmarked regionally. Additionally, comparisons with international figures were carried out for the most relevant indicators in order to gain insight on regional performance in relation with other world regions. Finally, the results of the study identified particular characteristics of the region, specific differences among utilities and strengths, weaknesses and improvement areas for the range of issues covered by the indicators.

DATA

Seventeen (17) member utilities of CARILEC provided information for the study. The list of participant utilities is shown in Table 1.

Table 1 – Participant Utilities

	UTILITY	SHORT NAME	COUNTRY
1	Anguilla Electricity Company Ltd.	ANGLEC	Anguilla
2	Antigua Public Utilities Authority	APUA	Antigua and Barbuda
3	Aqualectra	AQUALECTRA	Curaçao
4	Belize Electricity Limited	BEL	Belize
5	The Barbados Light & Power Company Ltd.	BLPC	Barbados
6	Caribbean Utilities Company Ltd.	CUC	Cayman Islands
7	Dominica Electricity Services Ltd.	DOMLEC	Dominica
8	N.V. Elmar	ELMAR	Aruba
9	Grand Bahama Power Company	GBPC	Bahamas
10	N.V. GEBE	GEBE	St. Maarten
11	Grenada Electricity Services Ltd.	GRENLEC	Grenada
12	Jamaica Public Service Company Ltd.	JPSCo	Jamaica
13	St. Lucia Electricity Services Ltd.	LUCELEC	St. Lucia
14	Nevis Electricity Company Ltd.	NEVLEC	St. Kitts and Nevis
15	St. Vincent Electricity Services Ltd.	VINLEC	St. Vincent and the Grenadines
16	Water- En Energiebedrijf Aruba N.V.	WEB Aruba	Aruba
17	Water- En Energiebedrijf Bonaire N.V.	WEB Bonaire	Bonaire

A set of about thirty key quantitative performance indicators showing utilities results during year 2002 were calculated and benchmarked. The data collected included information about the following aspects:

Area of service and population
Services provided
Ownership structure
Legal/regulatory framework
Energy and environmental policies
Rate setting
Management and organization
Financial data (assets, income and debt)
Number of employees
Occupational incidents
Outsourcing
Cost breakdown
Typical rates
Type and number of customers
Energy sales and consumption
Energy generation and purchases
Meter reading and billing
Energy losses and bad debt
Customer service
Number of complaints
System frequency and voltage levels
Network configuration and type
Installed capacity
Generating plant data
Peak demand
Substation and transformer data
Network length
Service interruptions
Non-served energy
Power quality
Operating standards

A sample of the information gathered from regional utilities is presented in Table 2 showing characteristics of utility service areas.

Table 2 – Service Areas

Utility	Service Area (sq. km)	Population served	Customers (num.)	Demand (MW)	kW / customer
ANGLEC	91	11,920	5,900	9.2	1.564
APUA	280	69,000	26,132	38.6	1.477
AQUALECTRA	444	130,000	61,750	104.4	1.691
BEL	22,960	252,630	59,815	53.7	0.898
BLPC	416	271,300	105,202	134.7	1.280
CUC	197	43,000	20,270	77.1	3.802
DOMLEC	754	71,138	26,297	13.0	0.496
ELMAR	120	100,000	33,907	103.0	3.038
GBPC	1,472	50,000	17,926	71.1	3.966
GEBE	68	47,677	17,215	40.7	2.364
GRENLEC	343	101,000	35,226	22.5	0.640
JPSCo	10,991	2,620,000	528,758	581.3	1.099
LUCELEC	616	158,178	48,647	43.4	0.892
VINLEC	384	110,000	32,663	19.5	0.595
WEB Aruba	N/A	N/A	1	114.5	N/A
WEB Bonaire	130	12,000	6,106	10.0	1.638

CARIBBEAN UTILITIES

Outlook

The majority of countries and territories forming the Caribbean region are located in the islands of the Caribbean sea basin and the total population of approximately 40 million is mostly concentrated in the largest islands. Agriculture, extraction of natural resources, tourism and other services constitute the basis of the islands' economies, with manufacturing being also important in the largest islands.

The islands are facing significant economic challenges stemming from increased exposure to global competition and the end of trade privileges for many of its traditional products. At the same time, because the region is relatively stronger than other world areas, development assistance is diminishing.

The perspectives of the electricity supply in the region are inseparable to its economic development and the availability of energy resources. The economic activity is the main driver of electricity demand and will determine future requirements in terms of new investments, reliability and quality of service. With a few exceptions, the islands are predominantly net energy importers and oil dependent, so energy costs and environmental awareness are important for the region.

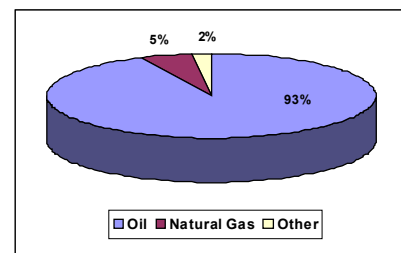


Figure 2 – Primary Energy Consumption

Regulation

In general, Caribbean utilities are vertically integrated monopolies subject to traditional cost of service regulation. Governments set service rates and monitor compliance with concessions and license requirements. The governments of the region have pursued regulatory reforms to some extent, mostly through the privatization of companies and on price regulations. Competition is limited to the presence of independent power producers (IPPs) in a few islands. Some countries have regulatory bodies and have introduced modern incentive price regulation while quality regulation is in initial stages.

Characteristics

Most utilities show similar organizations, having a rather flat scheme with two managerial levels; one at the top executive level and other conformed by division managers. Outsourcing is gaining importance within regional operations. In general, fuel costs represent the highest item cost for utilities

accounting in average for 30 to 40% of total annual utility costs.

The market composition shows a high percentage of commercial consumption, with a share of 40% to 60% of total consumption, explained by the electric loads of hotels and tourist facilities. Residential demand comes second in energy consumption and industrial load is significant in some islands.

In 2002 the average regional energy consumption growth rate was 3.1%, declining from 6.3% of year 2001 and 6.6% of year 2000, probably due to a slowdown of regional economies.

Electric Systems

The areas of service of the utilities are subject to the particular Caribbean weather conditions, including salty and corrosive environment, and the occurrence of natural phenomena that impose special conditions on the electric systems for their design, operation and maintenance.

The insular condition of the service areas also determines a high dependence on diesel generation and the lack of benefits from the network interconnections of larger systems. On the other hand, the relative small sizes of the electric systems make circuit lengths shorter and unit sizes a larger fraction of system load compared to other systems.

Thermal generation is the predominant energy production technology found in the region. The most common generating units are low and medium speed diesels but steam and combustion turbine generation is also used. All diesel, steam and combustion turbines use fuel oil as primary energy source. A few hydro generation units and two wind plants are also in operation.

Low voltages are used for energy transportation due to the relative short distances between production and consumption centres in the islands. A combination of ring and radial configurations can be found in the regional networks favoring service reliability. Another relevant feature is the significant proportion of underground circuits present in some islands.

RESULTS

Based on the information supplied by the utilities and the benchmarking of performance indicators carried out, the main findings of the study showed the following:

- With a few exceptions, mainly due to differences in the scope of services provided, the results of year 2002 indicated a rather uniform performance explained by the similarities of technologies used in the region and of the physical environment where the utilities carry out their business.
- Differences in performance were found that could be explained in part by differences in the characteristics of the systems beyond the control of utilities like customer base, load density and demand composition.

- Other differences in the indicators pointed out a more efficient performance of some companies compared to others regarding particular aspects indicating potential opportunities for improvement.

CONCLUSIONS

The benchmarking study of Caribbean utilities has been conceived as the initial stage of a performance monitoring system at both regional and company level and includes annual updates for a three-year period. The approach, methodology, performance indicators selection and results of this study are valuable for government agencies, electric industry associations and companies considering similar performance evaluations especially across regions including several jurisdictions and utilities.

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BIOGRAPHIES

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