



**CARILEC**

An Association Of Electric Utilities

## **Caribbean Benchmarking Study**

**Questionnaire 2005**

(revised version)



Date of issue: August 28, 2007.

## PREFACE

For the Caribbean Benchmarking Study Update 2005, the Questionnaire has been revised. Carilec and KEMA have noticed that different electric utilities were faced with difficulties in collecting the data for answering certain questions. This has resulted in the situation that many questionnaires were not returned or were only returned after a long period and in some cases incomplete.

For this reason this Questionnaire 2005 has been revised and is now consisting of 3 sections as follows:

- A General Section for collecting General Information
- Section A with questions that are basically needed for the Benchmarking Study covering the most important items for performance indicators to be compared and analyzed
- Section B with additional questions that are covering information for calculating additional performance indicators and for getting the database more complete

It is anticipated that answering the questions in Section A will not take too much efforts for the participating utilities. Once the questions in section A are answered, please consider which of the questions in section B can also be answered quickly, before returning the questionnaire to Carilec.

In principal we can include a participating electric utility in the Benchmarking Study Report if all answers in section A have been provided.

Dependent on the level of information that has been given in Section B of the Questionnaires, additional comparisons and analyses of more performance indicators will be included in the Benchmarking Study Report.

<b>Reporting Period:</b>	
<b>Country:</b>	
<b>Utility:</b>	
<b>Form Completed by:</b>	
<b>Position:</b>	
<b>E-mail address:</b>	
<b>Tel. Nr.:</b>	

## Instructions

- Complete this format electronically and send by email or print and fax it to CARILEC.
- For queries and observations contact KEMA Caribbean, Curaçao [roel.verlaan@kema.com tel: (+5999) 747-0916].
- All the information requested refers **only to the electricity service**. Please allocate costs, equipment, personnel and other items accordingly.
- All data is required in per annual basis and must correspond to **year 2005** except when otherwise indicated.
- All monetary values should be entered in US dollars (preferred) or local currency indicating applicable rate exchange.
- If there is no information available on a particular topic mark **n.a.**, if it does not apply mark **N/A**.
- Mark information you consider to be confidential. The questionnaire will be made available only to CARILEC and KEMA to the effect of this study.
- Feel free to use additional space or add additional information when answering the questionnaire.

## General Information

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Please enter the following general data of the country or political territory **for year 2005**, include additional comments as you consider necessary.

### 1.1 Country data

<b>Name:</b>	
<b>Area (km<sup>2</sup>):</b>	
<b>Total Population (number):</b>	
<b>Gross Domestic Product (\$ USD):</b>	
<b>Local Currency:</b>	
<b>Exchange Rate (\$ Local currency/ \$US Dollars)<sup>(1)</sup>:</b>	

(1) Use the average value of year 2005 or the rate applicable to data provided in \$USD

Please enter the following general data about the utility company **for year 2005**, include additional comments as you consider necessary.

### 1.2 Company data

<b>Name:</b>	
<b>Island(s) (where company provides service):</b>	
<b>Service Area (km<sup>2</sup>):</b>	
<b>Total Population (within service area):</b>	
<b>Population with electricity (within service area)<sup>(1)</sup>:</b>	

(1) For any non-electrified areas or not completely electrified areas, please estimate the non-served population of these areas in order to calculate the total population with electricity

**1.3 What is the ownership structure of the company?**

	<b>Name (private owners and others)</b>	<b>Share %</b>
<b>Private</b>		
<b>Government</b>		
<b>Management/Employees</b>		
<b>Others</b>		

**1.4 What other utility services are provided besides electricity?**

<b>Services</b>	<b>Yes/No</b>	<b>Annual Turnover (%)</b>
<b>Water</b>		
<b>Telecommunications</b>		
<b>Gas</b>		
<b>Other (specify)</b>		

**1.5 Describe the institutional framework of electricity activities?**

<b>Legal Framework</b>	<b>Description</b>	<b>Issue and Expiry Years</b>
<b>Act</b>		
<b>Concession/License</b>		
<b>Other (specify)</b>		
<b>Government Role ( short description )</b>		
<b>Main Energy / Environmental Policies ( short description )</b>		

**1.6 Describe the regulatory framework for the electricity service?**

<b>Regulatory Agency</b>	
<b>Name</b>	
<b>Relationship with Government</b>	(Short description)
<b>Main legal responsibilities</b>	(Short description)

Regulations	
<b>Separation of activities</b>	(Yes/No, legal/accounting)
<b>Rate setting</b>	(Short description of criteria and methodology)
<b>Rate of return (%)</b>	(base rate of return used for rate setting)
<b>Power quality requirements *</b>	(for instance voltage and frequency tolerances)
<b>Service quality requirements *</b>	(for instance with respect to outages or customer service)
<b>Other issues *</b>	(for example regarding system losses, heat rate, recovery of hurricane restoration costs)

\* List legal or mandatory requirements established by regulations

**1.7** Describe the electrical activities developed by the utility. Mark all that apply. Use the following definitions and describe any integration with other business (for example combined electricity and water production):

- *Generation*: activities related to the production of electric energy
- *Transmission - Distribution*: activities related to the transportation and delivery of energy
- *Commercialization*: marketing and retailing activities related to customer supply and service

Activity	Yes/No	Description
<b>Generation</b>		
<b>Transmission</b>		
<b>Distribution</b>		
<b>Commercialization</b>		

**1.8** Company's management and organization: provide a brief description of the responsibilities/activities of executive management and each organizational main area or division.

Management Position	Responsibilities

Unit / Division	Activities

## SECTION A: REQUIRED BASIC INFORMATION

Please enter the following corporate data about the utility for year 2005, include additional comments as you consider necessary.

**A.1** Enter the following financial data for years 2004 and 2005 (specify currency used).

Year	Non Current Assets <sup>(1)</sup> (\$)	Operational Revenue <sup>(2)</sup> (\$)	Before Tax Net Income <sup>(3)</sup> (\$)	Long-Term Debt (\$)
2004				
2005				

(1) Property, plant, equipment and other non current assets. Use depreciated historic cost for assets value. If any specific asset is used for several purposes (e.g. electricity and water production) please enter only the value allocated to electricity activities.

(2) Income from electricity sales and related operations.

(3) Before tax net profit, use historic depreciation to calculate net income.

**Comments on financial data:**

**Please provide information on the issue of taxes:** any tax holidays regarding importation tax, turnover tax; payroll tax, VAT to be applied although not part of the revenue, etc. A footnote on tax issues in your country is appreciated.

**A.2** What is the number of employees per organizational area? Use FTEs.

A full-time equivalent FTE represents the number of full-time employees that could have been employed if the reported number of hours worked by part-time employees had been worked by full-time employees. It is calculated by dividing the part time hours paid by the standard number of hours for full-time employees.

Area	Number of Employees	Time Dedication (FTE)			
		Full-time	Part-time	Contract	Total <sup>(1)</sup>
Generation					
Transmission-Distribution					
Commercialization					
Administration/Other <sup>(2)</sup>					

(1) Do not include personnel of outsourced activities – do not include overtime

(2) Share of administrative personnel allocated to electricity for costing purposes

**A.3** Provide the following data about occupational incidents in 2005:

<b>Number of incidents:</b>	
<b>Lost employee working hours<sup>(1)</sup>:</b>	
<b>Total employee working hours:</b>	

(1) Add all employee working hours lost due to occupational incidents

**A.4** Provide information on main outsourced activities (e.g. meter reading, line maintenance, etc.) indicating organizational area. Do not include contracted project work or turn-key projects for realizing new generation, substations, lines, etc.

<b>Outsourced Activity</b>	<b>Organizational Area</b>	<b>Equivalent FTEs</b>	<b>Annual Cost (\$)</b>

**A.5** List major ongoing plans of the company (e.g. loss reduction, energy conservation, efficiency programs, etc.)

<b>Plans</b>	<b>Description</b>

**A.6** Enter cost breakdown per activity, use the following definitions and specify currency used:

- *Generation*: activities related to the production of electric energy
- *Transmission - Distribution*: activities related to the transportation and delivery of energy
- *Commercialization*: marketing and retailing activities related to customer supply and service

Annual Costs (\$)	Generation (\$)	Transmission - Distribution (\$)	Commercial Operations (\$)	TOTAL (\$)
<b>Operation and Maintenance</b> <sup>(1)</sup>				
- Fuel cost		N/A	N/A	
<b>Capital cost</b> <sup>(2)</sup>				
<b>Overhead and Administration</b> <sup>(3)</sup>				
<b>TOTAL</b>				

(1) Including energy purchases/imports. Fuel costs should be included separately (second line)

(2) Include depreciation, amortizations and cost of capital.

(3) Share of costs assigned to electricity (for multi-service utilities) and to each business (for integrated utilities)

**A.7** What would have been the monthly bill paid for the following consumption levels? (Use annual averages, specify currency used).

Consumption	Basic Rate (\$)	Fuel Surcharge (\$)	Others <sup>(1)</sup> (\$)	Total (\$)
Domestic consumer using 100 kWh/month				
Domestic consumer using 400 kWh/month				
Commercial consumer using 2,000 kWh/month, having a demand of 5 kVA				
Commercial consumer using 5,000 kWh/month, having a demand of 10 kVA				
Industrial consumer using 10,000 kWh/month, having a demand of 30 kVA				
Industrial consumer using 100,000 kWh/month, having a demand of 275 kVA				

(1) Value Added Tax and other charges

**Comments on electricity rates:**

(Provide information about taxes, subsidies, discounts and or special fees included on user rates)

**A.8** Provide information about rates and conditions as applicable for delivery of electricity to the grid by IPPs, renewable sources, co-generators and self-generators, if any:

	Rates	Conditions
IPP's		
Renewable sources		
Co-generators		
Self-generators		
Others		

**A.9** Estimate the proportion (%) of service in urban and rural areas in the utility's area of service

A rural area is one of less than \_\_\_\_\_ connections / km<sup>2</sup>.

Type	% of Connections	% of Peak Load
Urban		
Rural		

**Comments:**

**A.10** Enter the type and number of costumers, total consumption per type of costumer (MWh) and total energy sales (\$) per type of costumer (specify currency used).

Type	Number	Consumption / Energy delivered (MWh)	Energy Sales (\$)
Residential			
Commercial			
Industrial			
Exports			
Others *			
<b>TOTAL</b>			

\* For street lighting consider the number of independent circuits (not lamps)

**A.11** What is the total energy entering the system?

Energy entering the system	MWh	Cost (\$)
Net energy generated and delivered to the grid		N/A
Energy purchased from external producers		
<b>TOTAL</b>		

**A.12** Describe the billing process for each class of customer

Activity	Description			
	Residential	Commercial	Industrial	Other
Meter reading <sup>(1)</sup>				
Reading frequency <sup>(2)</sup>				
Billing process <sup>(3)</sup>				
Billing frequency <sup>(2)</sup>				
Collection lag (days) <sup>(4)</sup>				

(1) Manual, automatic, remote, etc.

(2) Monthly, 2 months, etc.

(3) By hand, by computer, automated, etc.

(4) Average outstanding days

<b>Comments</b>
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**A.13** What is the total number of complaints received from customers in the year?

Causes	Number	%
Outages		
Power quality		
Billing		
Others *		
<b>TOTAL</b>		100

\* Do not count information inquiries

**A.14** Enter the number of customers whose consumption is not metered (customers without meter).

<b>Number</b>	
<b>% of customers served</b>	

**A.15** What was the average level of bad debt (bills unpaid after 180 days) in 2005? (In \$, specify currency used).

<b>Bad Debt (\$):</b>
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**A.16** Summarize the main characteristics of the power system including frequency, voltage levels, grid configuration and transmission-distribution characteristics (overhead and underground). Attach the single-line diagram of the electrical system.

<b>System Characteristics</b>			
<b>System Frequency (Hz) =</b>			
	<b>Voltage (kV)</b>	<b>Configuration (radial, ring, etc.)</b>	<b>Characteristics</b>
<b>Generation</b>			
<b>Transmission-Distribution</b>			
<b>End Use</b>			
<b>Other Characteristics</b>			

**A.17** What is the installed capacity of the system, total and per type of generation (diesel, gas, hydro, wind, etc)? (In MW, data for last 2 years)

Type of Generation	Installed Capacity (MW)			
	2004		2005	
	Nameplate	Operational	Nameplate	Operational
<b>TOTAL</b>				

**A.18** What is the total peak demand of the system (In MW, data for last 2 years)

Peak Demand (MW)	
2004	2005

**A.19** What is the rate of growth of load demand? (data for last 2 years)

	2004 (%)	2005 (%)
Consumption growth		
Peak demand growth		

**A.20** Enter the following data of generated energy (data for last 2 years):

Own Generation	MWh	
	2004	2005
Total gross energy generated (MWh)		
Total net energy generated (MWh)		
Gross energy generated by thermal plants only (MWh)		

## SECTION B: ADDITIONAL INFORMATION

It would be appreciated if you could also enter the following data about the utility **for the year 2005**, which will enable us to consider more performance indicators in the Benchmarking Study. Please include additional comments as you consider necessary.

**B.1** Enter total non-technical energy losses (MWh) due to non-registered consumptions (energy theft plus metering and billing errors, do not include grid losses).

Causes	MWh	%
Energy theft		
Metering errors		
Billing errors		
Other causes		
<b>TOTAL</b>		<b>100</b>

**B.2** What is the total peak demand per customer category? (In MW, data for last 2 years). The sum of the peak demands per customer category is not necessarily equal to the system peak load.

Type of Customer	Peak Demand (MW) <sup>(1)</sup>	
	2004	2005
Residential		
Commercial		
Industrial		
Others <sup>(2)</sup>		
<b>System Peak Load (question A.18)</b>		

(1) Coincident peak demand, maybe not available for all customer categories

(2) Street lighting, etc.

**B.3** Describe the criteria to provide generation reserves for operation and expansion (N-1, %, LOLP, etc).

Type	Reserve Criteria
Operation	
Expansion	

**B.4** Provide the following information about substations and power transformers in the electrical system.

Voltage Levels (kV)	Number of Substations			Transformation Capacity (MVA)	No. of Power Transformers
	AIS <sup>(1)</sup>	GIS <sup>(2)</sup>	Metal Clad		

(1) Air Insulated Substation

(2) Gas Insulated Substation

**B.5** Enter the number of distribution transformers per capacity ranges, consider company and customer owned transformers:

Capacity Range (KVA)	1 ph		3 ph	
	Number	MVA	Number	MVA
0 – 75				
75 – 150				
150 – 300				
> 300				
<b>TOTAL</b>				

**B.6** Enter the length of transmission-distribution circuits (km) per type and voltage level:

Voltage Level (kV)	Overhead Length (km)	Underground Length (km)	Description
<b>TOTAL</b>			

**B.7** Enter the energy balance of the network *per each voltage level*:

Voltage Level (kV)	Entering Energy (MWh) <sup>(1)</sup>	Losses (MWh)		Delivered Energy (MWh) <sup>(2)</sup>
		Grid Losses	Non-Technical Losses	

(1) Energy entering to each voltage level of the network (net energy delivered from upstream levels plus generation and purchases at the corresponding level).

(2) Energy delivered at each voltage level of the network (energy consumption at that level plus net energy delivered to downstream levels).

**B.8** Provide information on customer service, including service points, service telephone lines, online services and management of requests and complaints.

Aspect	Description
Service points <sup>(1)</sup>	
Telephone lines (call center, emergency lines, etc)	
Online services	
Trouble call management	
Service request management <sup>(2)</sup>	
Other	

(1) Company operated locations for customer service

(2) New connections, reconnections, meter maintenance/change, reading review, etc.

**B.9** Provide the information requested about service interruptions due to Transmission-Distribution outages, use the following criteria to classify and record service interruptions:

- Compute by feeder and add up results
- Consider only 'sustained' outages/interruptions, i.e. those lasting five minutes or longer<sup>1</sup>.
- Exclude major events. Consider a major event one where **all** the following conditions are met: severe weather conditions causing significant physical damage, more than 10% of the customers within the service area are affected and service cannot be restored within 24 hours.
- Do not consider events outside the T-D system like load-shedding operations due to supply limitations, i.e. forced outages.
- Do not include scheduled interruptions like routine maintenance.

Service Interruptions	
Number of Interruptions	
Total Number of Customers Interrupted	
Total Customer Interruption Duration (customer-hours) <sup>*</sup>	

\* Total Customer Interruption Duration =  $\sum$ (Duration of each Interruption \* Number of Interrupted Customers for each interruption)

**B.10** Provide the following data of non-served energy (in MWh) due to service interruptions as indicated. Do not consider hurricanes and other "major" events.

Non-Served Energy	
Caused by:	MWh
Generation outages <sup>(1)</sup>	
Transmission and distribution interruptions <sup>(2)</sup>	

(1) Forced and planned outages.

(2) Only consider feeder interruptions (planned or unplanned).

<sup>1</sup> According to the IEEE Std 1366-2003

**B.11** Provide the information requested on frequency and voltage power quality. Frequency is system wide, for voltage consider medium and high voltage levels measured in main substations.

Parameter	Voltage Level (kV)	Variation Range (+/-) <sup>(1)</sup>	Allowed Deviations (No.) <sup>(2)</sup>	Actual Deviations (No.) <sup>(3)</sup>
Frequency	N/A			
Voltage Level 1				
Voltage Level 2				
Voltage Level 3				

(1) Accepted variation by the applicable standard or regulation

(2) Number of times that the parameter can deviate from the acceptable variation range

(3) Number of times that the parameter actually deviated from the acceptable variation range

