

Monitoring Performance of Electric Utilities

Indicators and Benchmarking
in Sub-Saharan Africa

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PREFACE

This publication is an outcome of the initiative “Electric Utility - Capacity Assistance Project for Africa” (EUCAP), which was developed in the Africa Energy Group of the World Bank and financed by the Energy Sector Management Assistance Program (ESMAP). The initiative was prepared as a component of the Regional strategy plan to expand capacity in key African institutions and sectors. The core of the initiative is creation of a knowledge-based information-sharing network of African electric utilities to pursue the goal of improved utility efficiency. Knowledge-based cooperation among countries is receiving more and more emphasis in regional strategy and approaches to development in Africa. As the Africa Region’s Vice President Oby Ezekwesili emphasized in her recent speech “Focus on Innovation, Results, and Knowledge Agenda” (October 14, 2009), “a stronger focus on results and the knowledge agenda” have become crucially important as “the global crisis has led to stronger demand for development impact from the limited resources available”. Focus on knowledge-based cooperation was re-emphasized by Colin Bruce (Director of Strategy and Operations, Africa Region) who stressed “a tremendous appetite”... “to learn from best practices adopted in other countries”.

The World Bank lending to infrastructure in Africa, a large part of which benefits the power sector, has been substantially increasing in the recent past. Talking to the press in 2005, Michel Wormser (Director of Strategy and Operations, Africa Region), said: “In 2000 we were lending about US\$600 million to the African continent for infrastructure and this year we are going to lend US\$1.8 billion. We are foreseeing a further 30% increase, so by the end of the next couple of years, we will probably be at US\$2.4 billion to US\$2.6 billion a year,” he said. This forecast was precise - the World Bank Africa infrastructure lending reached \$2.4 billion in 2007. In 2009, the World Bank financing for infrastructure-related programs and projects in Africa reached US\$3.3 billion. Almost 40% of it is power sector lending. Considering this high level of the World Bank's investment in the power sector, it is crucial to assure that the African power utilities have relevant capacity to use these resources efficiently and to their maximum benefit.

The outcomes of the work under the umbrella of this initiative include creation of a comprehensive electricity sector database Africa Support Kiosk for Electric Utilities (ASK) and this publication. The initiative is planned to continue, with transferring the data and the data collection methodology to African partner institutions and with a set of activities aimed at building capacity of knowledge-sharing among African utilities.

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Collaboration with the African Energy Commission (AFREC), Union of African Electricity Producers, Distributors and Conveyors (UPDEA) and partner governments was essential for this work. The authors are grateful to the managers and specialists of African power utilities for cooperation and sharing the utility level data.

The authors appreciate being able to find valuable data necessary for analytical work in the following published sources: African Development Bank (AFDB), the United States Agency for the International Development (USAID), Energy Information Administration (EIA), International Energy Agency (IEA), Demographic and Health Surveys, World Bank Group Enterprise surveys and IDA-14 Results Measurement System.

I. Introduction

Performance of electric utilities is essential for the reform of the electricity sector in the Sub-Saharan Africa (SSA) countries. The World Bank is leading a number of initiatives to improve electric utility performance in SSA. The Africa Energy unit of the World Bank recently introduced the *Electric Utility Capacity Assistance Program (EUCAP) for Africa*. Among other activities, the EUCAP aims to collate relevant utility performance data within the context of the Bank operations, with the dual objective of assessing the impact of reforms and motivating utility management to achieve better outcomes.

In order to reach this objective, performance benchmarking approach was developed. In this approach, benchmarking starts with the selection of the *Key Performance Indices (KPIs)* reflecting major elements of utility day-to-day operations, including technical, operational and financial. Then a framework to compare performance of the sector in various countries and among utilities using these indices is applied.

Once the *KPIs* were identified and the benchmarking approach was developed, the next step consisted of compiling indicators corresponding to each *KPI*. Data for each indicator were collected from various published sources. When the needed indicators were not available from published sources, the data were obtained from the stakeholders (i.e., utility managers, engineers, planners, etc.).

The resulting database *Africa Support Kiosk for Electric Utilities (ASK)*¹ is the outcome of a major data collection and presentation effort by a World Bank team including specialists from the Africa Energy Group (AFTEG), Finance Economics and Urban Department (FEU) and the World Bank Institute (WBIGM). The objective was to collect data for the selected electricity sector indicators from all sources available and present them on the web in a form that would be useful for all types of potential audiences within and outside the World Bank: utility managers and specialists, policy makers, energy sector practitioners, researchers and wider public. The program responds to a critical need for a central database with comprehensive electricity sector data that has been expressed numerous times by both practitioners and researchers.

The program was coordinated with the Africa Infrastructure Country Diagnostic (AICD) study to maintain consistency in indicator selection and data presentation. AICD study is one of the most important sources of data for the *ASK database*. The program also took into consideration the findings of a recent major electricity sector performance monitoring exercise – Latin America and the Caribbean (LAC)

¹ The database can be found on the web: http://etoolsdev/ask4electricutilities_new/

electricity benchmarking study.

The *ASK database* presents electricity sector data for the countries of the Sub-Saharan Africa. It is a comprehensive dataset and as such includes over 130 series and more than 23,000 data points for 47 countries and 42 electric utilities in Sub-Saharan Africa for the period from 1990 to 2007. It covers five areas: power system capacity, power system operations, service provision to customers and financial characteristics of the sector and the utility.

In addition to being a centralized source of a wide range of power sector data, the *ASK database* offers an analytical framework to conduct comprehensive examination of the SSA power sector and utility performance with regards to their technical and commercial efficiency and financial soundness. This framework is reflected in the database structure and presentation on the web, the combination of which enable, in a simple and user friendly way, in-depth examination of the power utility and sector performance in the SSA region. The website users can view, compare, simulate and analyze the performance data of SSA electricity utilities, create a full picture of power sector performance in a particular country, or compare sector characteristics in different countries.

The *ASK database* time series will be continued in the future to maintain the database over the years and provide information for longer-term electricity sector monitoring, which would help improve utility performance in a consistent manner, based on comparable time series data.

The *ASK database* presents non-edited data, kept the same as they are in the original sources. Available data, when put together, in many cases forms time series with gaps and reveals the inconsistency in data from different sources. The *ASK database* authors did not edit or eliminate any of the data series, but rather aimed at making the database fully inclusive, consistent with its comprehensive character. At the same time, efforts were made to label the data in a clear way, so that the user can make an informed decision on data selection and validity. Alternatively, the user can choose to rely on the authors of the *ASK database* in the selection of the source for a particular indicator in cases when more than one source is available: the database marks one of the sources as preferred.

The users have an option of editing the data and commenting on the data. Editing can be done using downloadable Excel files on the ASK website. The contact e-mail address for edits and comments is provided on the website, under the menu option “Challenge the data”. Potential contributions of the database’s users to fill the gaps, expand coverage, and resolve inconsistencies in the data, all of which are critical for increasing the value of the database, will be highly appreciated.

II. Defining Key Performance Indices (KPIs)

The final set of KPIs, compiled after extensive discussions and consultations with practitioners, is presented in Table II.1. The KPIs form three categories: “Technical”, “Commercial” and “Technical and Operational Capabilities”. The table has the KPI’s name, code, unit of measurement and its broad definition. The final set of KPIs formed the basis for the indicators of the ASK database: each KPI was translated into one or more database indicators. After that, data corresponding to each indicator were collected from available published sources. **Annex IV “ASK Database: Country Data Tables”** presents a complete list of indicators and data from the ASK database for each of the Sub-Saharan Africa countries.

Table II. 1. Final set of key performance indices

Index Name	Unit	Broad Definition
<i>Technical Indices</i>		
Generation Capacity/Demand	ratio	Measures to what extent installed capacity meets demand. Demand equals actual demand plus demand from connected customers who cannot be served.
Cost of Electricity Generation	\$/MWh	Measures the cost of producing 1 MWh of electricity. Should include the cost of power generated internally and procured externally by the utility. The total cost is divided by the total number of energy units sold.
Off-grid/On-grid Demand	ratio	Reflects how widespread independent grid demand is as compared with on-grid demand. Due to high costs of off-grid power, low level of this indicator usually means opportunities for the utility to benefit from connecting off-grid customers to lower-cost power.
Customers per km	customers/km	Measures electrification density of the utility. When both transmission and distribution length are included in the denominator, the measure is less clear, as it is affected by the “profile” of the utility of being transmission or distribution oriented. Therefore, it is best to have separate measures for transmission and distribution.
System Losses	% of supply	(Electricity supplied to grid (GWh) – Total electricity billed (GWh))/ Electricity supplied to grid (GWh). Reflects utility’s effort in measuring theft/illegal connections, possibly augmented with overloaded system parts. Total losses combine technical and “non-technical” losses. Technical losses are typically between 5-10%, while “non-technical losses” can be 20- 30% and at local level as high as 50%.
Number of Outages per Year	#/yr	Measures quality of power supply. Consumer dissatisfaction with service is often related to high level of outages. Outages can be caused by generation or network failures.

Index Name	Unit	Broad Definition
Number of Transformer Failures per Year	#/yr	Reflects one of the most common reasons for outages and high O&M costs. Could also reflect low oil based protection, due to theft or non-availability of oil.
Illegal Connection Rate	% of total connections	Estimates how widespread illegal connections are. Reflects utility's ability to monitor their customers.
<i>Commercial Indices</i>		
National, Urban and Rural Access to Electricity	%	Measures household electrification rate, including connection to the main grid and a local grid. This indicator might take into account off-grid connections.
Connectivity Potential	#	Number of new households in the country (or the utility area) minus number of new connections per year. A growing value will indicate a growing problem.
Tariff Settings and Adjustments	times/yr	Measures utility's ability to revise tariffs and adjust tariff schemes in order to cover costs with revenues. For many utilities, tariff decisions are made politically and not on the cost basis. Often utilities are not compensated for resulting losses.
Profit/Loss	%	Indicates to what extent the utility can have cost reflecting tariffs and keep control of investments, costs and bill payment.
Customers/Employee	ratio	Measures labor efficiency of utility. The ratio tends to be higher in well-managed, efficient utilities.
Staff cost/Total cost	ratio	Measures the weight of staff costs in the cost structure of the utility. Staff costs are a major factor of utility profitability.
Customer Bill Collection Rate	%	Revenues collected / Total electricity billed. Shows effectiveness of the utility in bill collection.
Total O&M Cost/Revenue	%	Operation and maintenance cost as a percentage of utility total revenue. Too low O&M cost may result in a need in very high investment and O&M cost in the future. Too high O&M cost indicate generic problems for the utility.
<i>Indices of Technical And Operational Capabilities</i>		
Service Restoration	Score (0-10)	Measures utility's capability to restore power to as many customers as possible in the shortest time possible. The score attempts to address typical questions, such as: Does the utility have an outage management and service restoration protocol in place? Are good utility practices being followed?
Customer Service	Score (0-10)	Measures ability of the utility to provide customer service such as handling outages, billing payment, dispute resolution, etc.
In-house Modeling & Analysis Capability	Score (0-10)	The index will assess the in-house capability in engineering computation and analysis, system modeling and planning. What software and hardware is available to engineers, planners and managers? Is it used?

Index Name	Unit	Broad Definition
Ongoing Inventory of Spares and Assets	Score (0-10)	Indicates how the utility manages its assets and inventory of spare parts and equipment. Are good utility practices followed, e.g., is a GIS based facilities management system in use?
Training and Manpower Development Program	Score (0-10)	Assesses how the utility addresses its manpower requirement from the apprentice linemen to the foremen and engineers. Is there a training and manpower development program in place?
Information Technology Use	Score (0-10)	Assesses the extent of IT use in the operation and management of the distribution utility. These include remote telemetry, SCADA, database, etc. Does the utility use an Intranet? Does the utility have adequate web presence?
Availability of installation and maintenance equipment	Score (0-10)	Measures availability of necessary equipment for installation and maintenance of distribution system: vehicles, trucks, cranes, aerial lifts, etc. What percentage of the equipment is in working order?
Workshop and Repair Facilities	Score (0-10)	Assesses availability and capacity level of workshop and repair facilities in the utility. For example, can transformers and switchgears be repaired in-house?
Technical standards used	Score (0-10)	Measures use of appropriate technical standards. Is there a single “one-system fits all” approach, or do standards vary depending on application, customer mix, local conditions, etc.? Are “low-cost” single-phase standards applied? Are planning procedures and guidelines updated?
Utility management autonomy	Score (0-10)	Measures autonomy of the utility. Is there a board? Who appoints the Board members? What role has the board? How many directors are there in the utility? Are there incentives for efficiency in daily operations? Is management performance monitored? What is the role of the Energy Minister?

Examples of scoring for selected KPIs:

For the KPIs in the technical and operational capability category, some data were obtained from utility databases or from utilities directly via surveys and questionnaires. At the same time, some of the indices in this category were estimated by utility managers and specialists. For this purpose, a scale from 0 (non-existent) to 10 (best practice in the industry globally) was used. The minimum required by an SSA utility can be set at 5, as shown below for selected KPIs.

Service Restoration: This index measures utility’s capability in restoring power to as many customers as possible in the shortest time possible. Does the utility have an outage management and service restoration protocol in place? Are good utility practices being followed?

Score	Scoring guidelines
Zero	Utility with no service restoration plan in place
1-4	Utility with ad-hoc restoration procedures
5-7	Utility with service-restoration plans and procedures but with resource difficulties
8-10	Utility following “best utility practices”

Customer Service: This index measures ability of the utility to provide customer service such as handling outages, billing payment, dispute resolution, etc.

Score	Scoring guidelines
Zero	Utility with no customer service department in place
1-4	Utility with poor or limited customer service
5-7	Utility with service-restoration plans and procedures but with resource difficulties
8-10	Utility following “best utility practices”

Ongoing Inventory of Spares and Assets: The index indicates how the utility is managing assets and inventory of spare parts and equipment. Are good utility practices being followed, is a GIS based facilities management system currently in use?

Score	Scoring guidelines
Zero	Utility with no asset and inventory management system in place
1-4	Utility with rudimentary asset and inventory management system.
5-7	Utility with GIS-based asset and inventory management system but faced with resource shortages and difficulties
8-10	Utility following “best utility practices”

Workshop and Repair Facilities: The index assesses availability and capability level of the utility workshop and repair facilities. For example, can transformers and switchgears be repaired in-house?

Score	Scoring guidelines
Zero	Utility with no in-house workshop and repair facility
1-4	Utility with minimal workshop and repair facility.
5-7	Utility with good workshop and repair facility but faced with resource shortages and difficulties
8-10	Utility following “best utility practices”

III. Making Sense of Performance Monitoring Indicators

Each performance monitoring indicator should come in a package encapsulating its definition, analysis, recommendations and tools for improvement (DART):

- i. **Definition** of each indicator with a formula and sufficient detail for users to know unequivocally what data are included in the indicator.
- ii. **Analysis** of the importance of the KPI in measuring utility performance and operations.
- iii. **Recommendations** of methods and strategies to improve utility’s performance in such indicator, and
- iv. **Tools** of practical nature such as case studies and country experiences to help utility achieve an improvement (descriptions of methods to implement the recommended strategy or strategies, best practice stories, links to bidding packages, advice of experts in the relevant area regarding tackling a specific problem; etc.)

Example of the DART framework: indicator of total system losses

Summary

Full name:	Total system losses
Short name:	System losses
Formula:	$(\text{Electricity supplied to national grid} - \text{Total electricity billed}) \times 100 / \text{Electricity supplied to national grid}$
Units:	%
Key importance of the KPI:	Operationalizes overall distribution performance of utility (including technical and non-technical aspects).
Customer service contribution:	Availability, reliability, cost, customer relations.

Note: Electricity supplied to national grid = Electricity generated (net)+Electricity imported- Electricity exported.

Definition and analysis

Total system losses is a popular indicator for measuring all losses that occur during the transmission and distribution of electricity from generating stations or points of purchase to end-use customers. Total system losses equal the difference between the power (GWh) supplied for consumption within the country and the power (GWh) billed to end users.

$$\text{System losses} = (\text{In-country generation, net of plant own use (GWh)} - \text{Export (GWh)} + \text{Import (GWh)}) - \text{Electricity billed to customers} / (\text{In-country generation, net of plant own use (GWh)} - \text{Export (GWh)} + \text{Import (GWh)})$$

The main components of system losses are technical losses (e.g. heat or copper losses, magnetic losses, or transformation losses) and non-technical losses (e.g. meter failure, meter tampering or fraud, un-metered or illegal connections, or data encryption losses in billing, in other words, commercial losses, metering failures and theft). It provides more reliable and thus better comparable performance information than Technical and Non-technical losses, which are very difficult to separate. Total system losses, as referred here, do not include collection losses that occur due to customer unwillingness or inability to pay, failures in billing and collecting.

For a vertically integrated utility total system losses equal combined Transmission and Distribution (T&D) losses. However, the indicator can be broken into two parts: System losses of electricity transmission and System losses of electricity distribution. Each of them will comprise technical and non-technical losses.

System losses are most often indicated as a percentage of total electricity supplied to the network, even though it can also be indicated in terms of an amount of energy (GWh).

System losses is one of the most essential power sector indicators, especially for developing countries, as it provides information about power system efficiency and overall performance of a power utility in terms of energy that it procures, sells and bills to customers.

Monitoring total system losses closely is crucial because of the multiple financial and commercial areas of performance it captures. Reducing system losses often provides one of the fastest ways to improve a utility's financial performance. Regulators, governments and public interest groups are also interested in monitoring this indicator, as it has important implications for tariff calculations and required fiscal support to electricity companies.

Limitations of the indicator

System losses provide a good overview of a utility's performance but the indicator is limited to be used on the system level: while providing an overall estimate of sector efficiency, the indicator of system losses does not help understand the sources of inefficiency. This happens due to the fact that system losses combine technical and all types of non-technical losses. Therefore, while estimating the

overall level of inefficiency, it does not define where the problems are – in the condition of the equipment, in sector management or in theft. Other loss measures are needed to better understand the sources of losses.

Other limitations of the indicator arise from the way in which it is usually calculated. The level of system losses is usually a rough estimate rather than accurate value due to the following measuring issues:

- a) For measuring consumption precisely, metering of all consumption points is required. However, the level of metering is low in the region and usually total electricity billed in megawatts hours is estimated.
- b) There is a typical lag between reading the injection point meters and the consumption point meters. Meters at the injection points are all read once at the start of the month. Meters at the consumption points are read at different times during the month. One consumer's meter could be read on one day of the month, and yet another consumer's meter on another day. Generally, different categories of consumption have different billing cycles: meters of industrial connections are read once in a month, meters of residential connections are read once in two months and so on. At the same time, for the above formula to give a precise measure, all the injection and consumption point meters have to be read at the same time. The formula could have given a reasonable deduction even if all consumption points at least are read at the same time.
- c) To measure System losses correctly it is also essential to know the amount of units injected into the system. This can only happen if all injection points at different voltage levels and all grid interfaces are metered. However, this limitation of the indicator is minor, as a fairly accurate figure of units injected into the system can be verified with the commercial transactions between the utility and the power generators.

Operational dimensions of the indicator

Technical efficiency: The system loss indicator is a direct measure of the technical efficiency of a utility. Although not perfect, this indicator provides more reliable information on technical efficiency than other measures of losses (e.g. technical and non-technical) because the input data of the indicator is more verifiable than those of other indicators.

Commercial efficiency: This dimension has two components: (a) non-technical losses due to billing and metering errors, theft of electricity among other causes and (b) collection efficiency that compares revenues collected against the bills issued. Given that the system losses indicator only addresses the first component of the commercial efficiency, this indicator cannot be used to assess the commercial efficiency of a utility.

Optimal range

“Optimal” range of system losses varies from system to system. Total system losses typically range between 7% - 10% in developed countries while they are about 30%-50% in Sub-Saharan Africa. The most efficient utilities in the region report total system losses below 20%.

Alternative indicators

- Transmission losses, Distribution losses (In unbundled systems or for lower level view of losses)
- Aggregated technical and commercial (AT&C) losses (For an overview including losses in collections)

Benchmarking of the indicator

Sub-Saharan African countries differ substantially according to the level of system losses, which ranges from 14.5% in Angola to 68% in Swaziland (Figure III.1a). The countries are quite evenly distributed within this range, with the mean level of losses at 27.5% and the median level at 23.8%. Countries with losses below 20%, the benchmark used to define good performers,² are Angola (14.5%), Botswana (14.8%), Burundi (15.0%), Cape Verde (17.0%), Gabon (17.8%), Cote d'Ivoire (18.1%), Kenya (18.1%), Benin (18.2%) and Namibia (18.4%).

At the other end of the scale are countries with the lowest performance according to this indicator – they have losses that exceed the good performance benchmark more than twice. These are Swaziland (with losses at 68.0%), Republic of Congo (losses at 55.6%), Togo (46.0%) and Zimbabwe (43%).

In addition to comparing level of losses in a country with a benchmark, countries were compared to each other: they were ranked by their level of losses and then divided into quintiles.³ The mean losses in the top quintile (best performers, countries with the lowest level of losses) turned out to be 16.2%. The mean losses in the bottom quintile (worst performers, countries with the highest level of losses) appeared to be equal to 47.2%.

Overall, Sub-Saharan African countries had a relatively flat trend in total system

² The 20% benchmark is used for good performers and is calculated as 10% of technical losses (a generally accepted level) plus 10% of commercial losses (assumption made here based on average reported level of system losses in developing countries).

³ Refers to 1/5 of a ranked sample.

losses in the period from 1999 to 2006. Compound annual reduction of the level of losses in the countries in the sample during this period did not exceed 10%, and compound annual increase in losses was at levels below 11% (Figure III.1b). Countries that achieved compound annual system losses reduction of more than 5% were Nigeria (9.57% reduction), Rwanda (7.52% reduction), Republic of Congo (6.26% reduction) and Ethiopia (5.2%). Rise in losses by more than 5% was observed in Benin (5.24% increase), Lesotho (5.57% increase) and Togo (8.71% increase).

There are four patterns of system losses trends in Sub-Saharan African countries in the 1999-2006 period:

1. Most typical pattern is lack of material changes in the level of losses, both annually and from the beginning to the end of the period. Countries with this pattern are Chad, Cote d'Ivoire, Ghana, Lesotho, Kenya, Namibia, Madagascar, Mozambique, Sierra Leone, Tanzania.
2. Similarly, some countries did not produce substantial changes in system losses over the years 1999-2006. However, the trend was not consistently flat – there appears to be some variation in the level of the indicator from year to year. This applies to Republic of Congo and Senegal.
3. Yet another pattern is reflected in noticeable increase in the level of losses over the period, with consistent rise of the indicator from year to year. The only country in this group is Togo.
4. This pattern is opposite to pattern (3), representing a noticeable decrease in the level of losses over the period, with a stable improvement from year to year. There is one country in this group: Nigeria.

While system losses differ substantially across countries, they are very similar among the sub-regions ranging from 23% in Eastern Africa to 29% in Central Africa (Figure III.2).

Figure III.1a. Total system losses as % of electricity sent to customers, latest year available 1999-2006

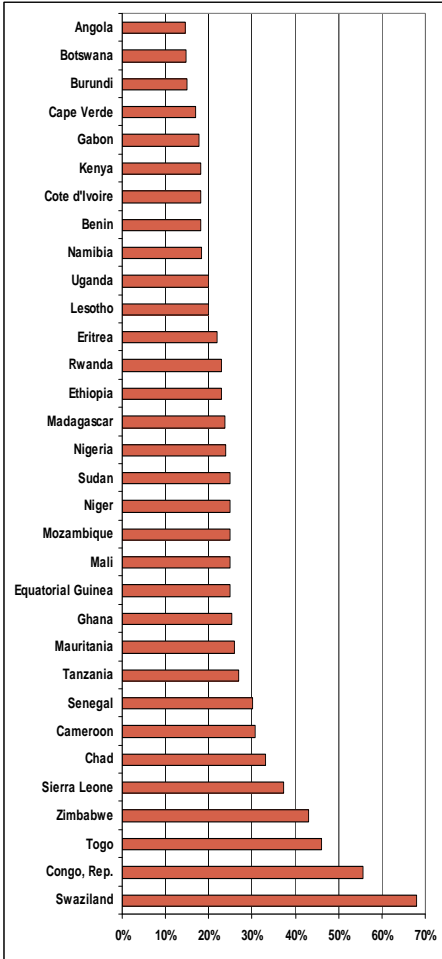


Figure III.1b. Compound growth in losses, available years 1999-2006

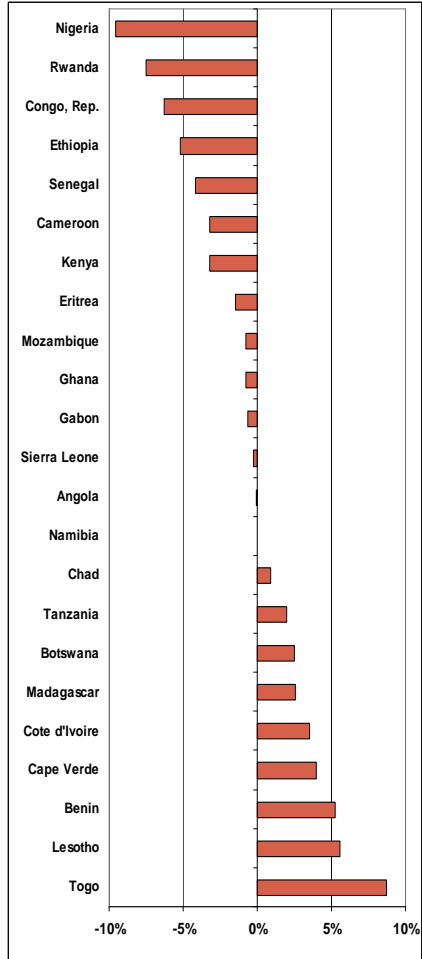
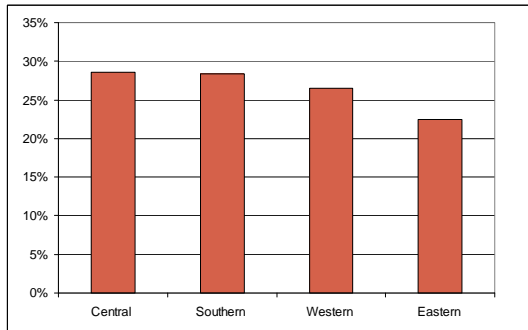


Figure III.2. System losses by sub-region, latest year available 2004-06



Strategies, recommendations and tools for improvement⁴

Following is a list of strategies and tools that have proven useful in reducing System losses:

1. Implement or improve energy accounting:
 - 1.1. Improve power distribution company operations to accelerate power sector reform.
 - 1.2. Conduct system energy balances to determine the main sources of electricity losses.
 - 1.3. Perform targeted energy accounting by customer type and location, to pinpoint areas of highest losses.
 - 1.4. Implement energy accounting throughout stages (geographic area, administrative area, electrical unit such as substation, feeder, transformer, etc.) to identify the locations where management should have more focus and create accountability.
 - 1.5. Perform distribution transformer metering using remote transmission units (RTUs) to conduct energy audits. This method is cost effective.
 - 1.6. Matching industrial production to electricity consumption is another method to conduct effective energy audits. There are established cost

⁴ Sources of information about tools to address system losses:

- Case study of the United Energy Distribution Company (UEDC) of Georgia: http://www.muirad.com/pages/images/uedc_story.pdf
- Improving infrastructure service delivery, Commercial Reorientation of Electricity Sector Toolkit (CREST), 2006
- Ghana Energy Development and Access Project (GEDAP), 2004

accountancy practices to adopt this form of energy audit.

- 1.7. Maintain power factors at optimum levels by enforcing adequate capacitor compensation in the system.
2. Improve billing and collection:
 - 2.1. Decrease share of estimated billings by increasing meters.
 - 2.2. Enforce disconnection for non-payment.
3. Establish benchmarks of performance in areas of greatest loss (for both system losses as well as collection losses) to set targets and monitor improvement over time.
4. GIS/GPS-based inventory of all distribution infrastructures, such as poles and transformers.
5. Improve metering:
 - 5.1. Install calibrated, tamper-resistant meters.
 - 5.2. Periodically check current transformer (CT) ratios and ensure that they are updated in the billing database.
 - 5.3. Implement automatic meter reading of high value customers.
 - 5.4. Install dedicated transformers and meter high voltage consumption. For example, metering all customers above 20kW on the 11kV side results in an immediate reduction in losses and improvement of voltage profiles.
 - 5.5. Locate pole mounted meters in a junction box on a pole and the meter counters on the customer premises. This has been found to be very useful in checking theft originating from electro mechanical or electronic credit meters.
 - 5.6. Increase usage of prepayment meters, which are more difficult to bypass and tamper with. Some prepayment meters have a "split" counter, where the actual metering unit is placed on the pole and the counter is on the customer premises. This minimizes the possibility of tampering.
6. Special legislation to reduce electricity theft together with the strict enforcement of laws has been found to be a very effective mean to reduce system losses in some utilities, such as in Andhra Pradesh, India as presented in several energy seminars at the World Bank and through the "View Point" publication of the World Bank.
7. Converting to High Voltage Distribution System has many benefits for the effective operation of the utility. It reduces technical losses and non-technical losses by making it much more difficult to bypass the meter or connect directly to the network.

IV. Benchmarking Main Performance Indicators⁵

Capacity Factor

Capacity factor is a ratio of actual generation of power to maximum capacity to generate. This indicator measures percentage of installed capacity that is utilized.

Capacity factor provides information on how close the power supply system is to being overloaded or, in other words, to its limit defined by the level of installed capacity. When capacity factor is high (i.e., actual supply is approaching its capacity limit), there is a risk of system overload and power blackout. At the same time, high capacity factor reflects that power equipment usage is efficient⁶. Low capacity factor indicates inefficiency in equipment usage.

Capacity factor is calculated as ratio of average hourly generation to maximum possible generation at the installed capacity level (before losses). It is usually expressed in percentage terms.

$$\text{Capacity factor} = (\text{Net annual electricity generated (MWh)} / (24\text{hours} * 364\text{days})) / \text{Installed capacity (MW)}$$

Capacity factor is an important indicator. However, in the African context, with a high percentage of non-operational equipment and highly uneven distribution of power load over time (during the day, the week, from season to season), resulting in low operational ratio and high load factor, its importance is reduced as compared to other regions. Therefore, it should be analyzed together with operational ratio and load factor – the indicators whose importance in Africa is higher than in the other regions.

Capacity factor ranges from 23% in Swaziland to 94% in Uganda. Countries with capacity factor below 40% are Ethiopia (36%), Rwanda (35%), Cape Verde (34%), Congo, Dem. Rep. (32%), Niger (32%) and Swaziland (23%). Capacity factor above 80% can be observed in Botswana (84%) and Uganda (94%). (Figure IV.1a)

Capacity factor in African countries also changes noticeably over time. To measure these changes, we calculate percentage difference between the minimum and the maximum levels of this indicator over the period 2000-05. The only country where this difference is low is Senegal (16%), while in the rest of the countries it is above 30%, with the highest level in Niger (78%) and Rwanda (77%). (Figure IV.1b)

⁵ Source of data: ASK database, unless specified otherwise

⁶ This depends on the level of peak load – see section “Load factor” in this chapter.

Capacity factor in the four SSA sub-regions is as follows: according to capacity factor, Southern Africa (56%) and Eastern Africa (58%) are performing better than Western Africa (48%) and Central Africa (34%) (Figure IV.2).

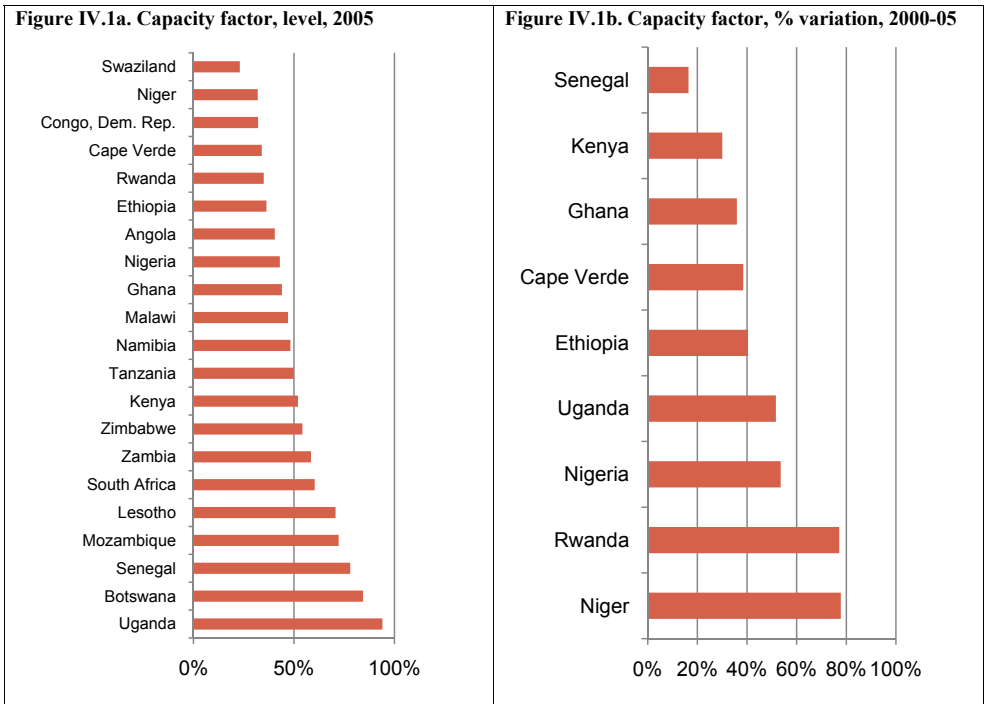
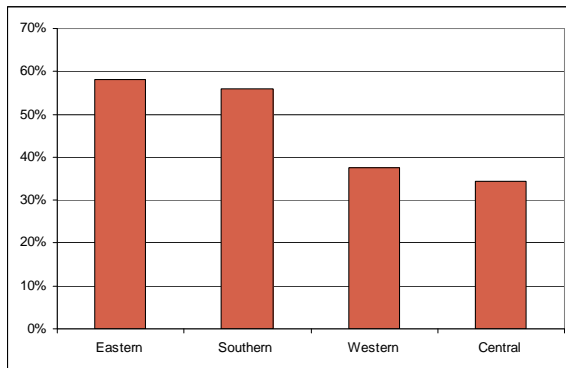


Figure IV.2. Capacity factor, level, by sub-region, 2005



Load Factor

Load factor is a ratio of average annual load to maximum annual load. This indicator measures how much power is supplied on the average per unit of peak demand.

Load factor provides information on how efficiently the power system equipment is used and, to a certain extent, helps understand how close the power supply system is to being overloaded. When load factor is high (i.e., average supply is only marginally below peak demand), equipment usage efficiency is high and vice versa. At the same time, when load factor is close to 100%, the system might be at its capacity limit and could collapse with potential increase in peak demand.⁷

Load factor is calculated as ratio of average hourly supply (before losses) to peak annual demand of power. It is usually expressed in percentage terms.

$$\text{Load factor} = (\text{Annual electricity supplied (MWh)} / (24\text{hours} * 364\text{days})) / \text{Peak annual demand (MW)}$$

Load factor is a very important indicator for the SSA region. It is more reliable in the African context than many other efficiency indicators. In addition, this indicator is very useful for many SSA utilities, where a major objective is to reduce the cost of producing and supplying power, as it points to cases when equipment usage efficiency could be increased.

Load factor levels differ considerably among the SSA countries, ranging from 10% in Benin to 100% in Cote d'Ivoire. Among 23 countries with available data, only five have load factor at a level below 50%: Namibia at 48%, Lesotho at 42%, Swaziland 31%, Botswana at 26% and Benin at 10%. Eight countries have healthy levels of load factor ranging between 70% and 86% - these are Madagascar, Congo, Dem. Rep., Senegal, Kenya, Angola, Zambia, South Africa and Nigeria (Figure IV.3a).

Changes in load factor over time are very different across countries. To measure these changes, we calculate percentage difference between the minimum and the maximum levels of this indicator over the period 2000-05 (deviation). Load factor deviation can be very low at 4%-5% (Ethiopia, Lesotho, Cape Verde) or as high as 64% in Niger, 35% in Mozambique and 23% in Ghana. (Figure IV.3b)

⁷ To make an informed conclusion about how close a power system with high load factor is to its capacity limit, load factor should be analyzed together with capacity factor, the latter showing how close average generation is to operating capacity (see "Capacity factor" section in this chapter).

Figure IV.3a. Load factor, level, 2005

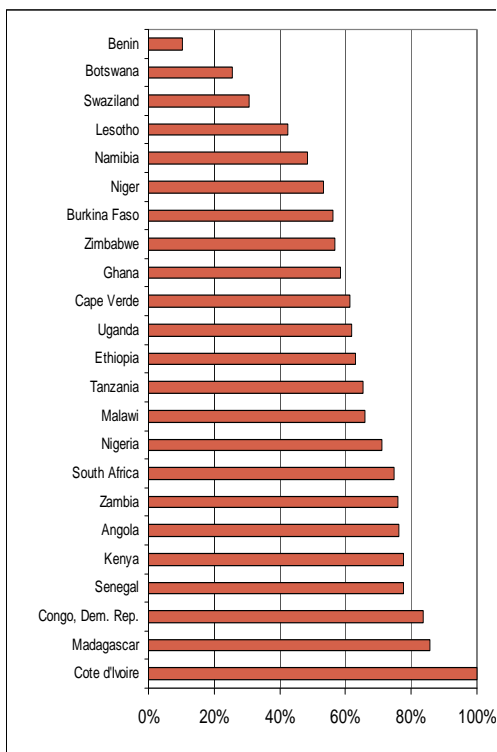
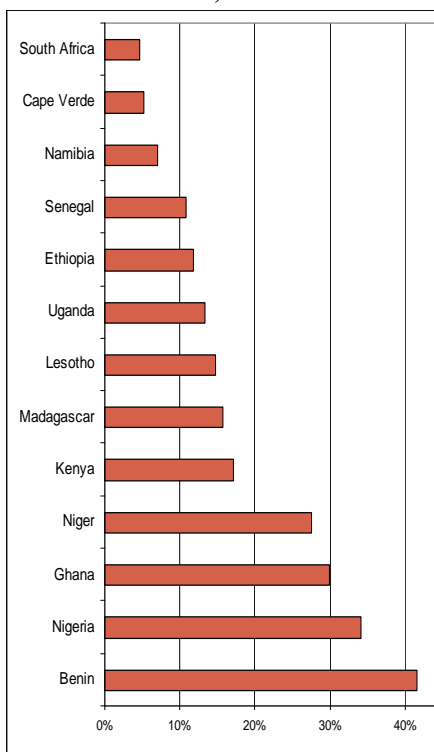
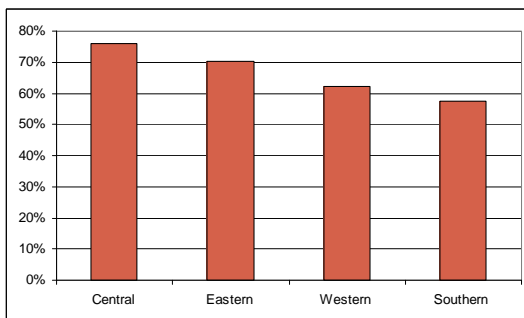


Figure IV.3b. Load factor, % variation, 2000-05



Average performance level according to load factor is similar in all four sub-regions of Sub Saharan Africa ranging from 58% in Southern Africa to 62% in Western Africa to 67% in Eastern Africa and to 84% in Central Africa (Figure IV.4).

Figure IV.4. Load factor, level, by sub-region, 2005



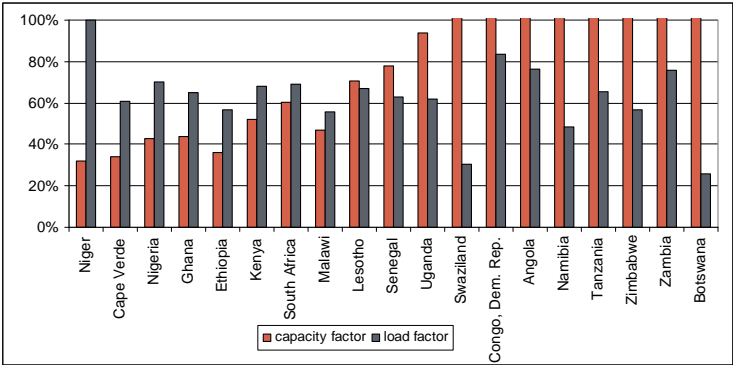
The three indicators – load factor, capacity factor and operating ratio – could be analyzed together in order to present a more complete picture of utility operational performance as related to electricity production. Combined analysis provides fuller understanding of power demand and supply, as well as capacity to supply.

In particular, load factor can be used together with capacity factor to diagnose the problem. High level of capacity factor together with high level of load factor signals that capacity needs to be increased in order to avoid the danger of not meeting demand in the future.

Alternatively, if capacity factor is high, but load factor is not high, the solution might be in creating incentives for customers to redistribute their power usage over time and use less during the peak hours.

Countries that have high capacity factor along with a high load factor (South Africa, Zambia, Senegal), might be at the physical limit of their capacity to meet demand, when the only solution is to increase capacity. At the same time, countries with high capacity factor and low load factor might find solution in reducing variation in demand over time (Botswana, Lesotho) (Figure IV.5).

Figure IV.5. Load factor and capacity factor, 2007 or latest year available



Operating Ratio

Operating ratio is the ratio of operating to installed capacity. It measures actual capacity of the power system as compared with nominal capacity and usually is expressed in percentage terms. The formula for calculating operating ratio is:

$$\text{Operating ratio} = \text{Operating capacity (MW)} / \text{Installed capacity (MW)}$$

Operating ratio provides information about the condition of the power sector assets. This information is important by itself, as it reflects the burden of unutilized assets for both the power sector and the fiscal system. In addition, it provides context to the analysis of other efficiency indicators, such as load factor and capacity factor.

This indicator is quite important for African countries, where quantity and quality of power supply are major problems, both of which are directly related to the poor condition of the sector assets. It also points to cases, in which non-operational assets might create serious fiscal problems.

Figure IV.6a. Operating ratio, level, 2007 or last year available

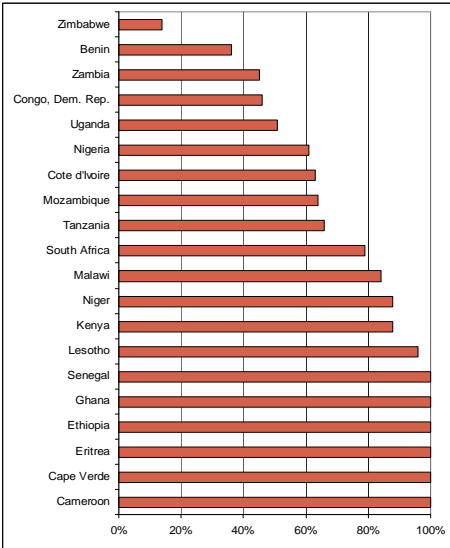
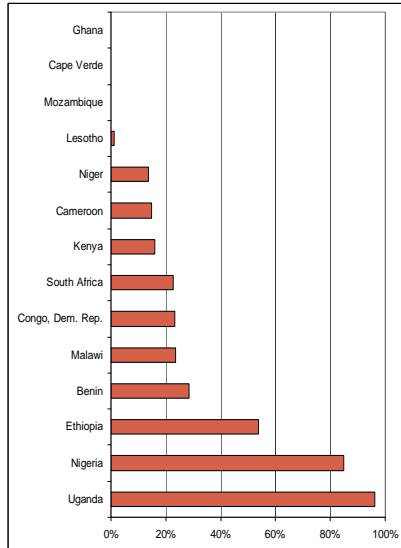


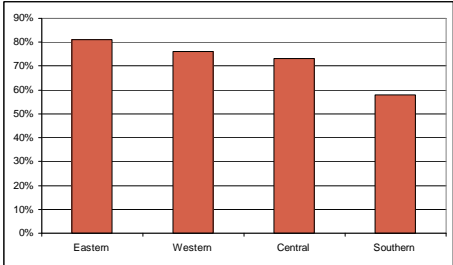
Figure IV.6b. Operating ratio, % variation, 2000-07



Operating ratio differs from 14% in Zimbabwe to a level close to 100% in Cameroon, Cape Verde, Eritrea, Ethiopia, Ghana, Senegal, and Lesotho. Worrisome levels of the operating ratio – when it is below 50% - are Congo, Dem. Rep. (46%), Zambia (45%), Benin (36%) and Zimbabwe (14%). Healthy operating ratio at the level above 70% is observed in Cameroon, Cape Verde, Eritrea, Ethiopia, Ghana, Senegal, Lesotho, Kenya, Niger, Malawi and South Africa (Figure IV.6a-IV.6b).

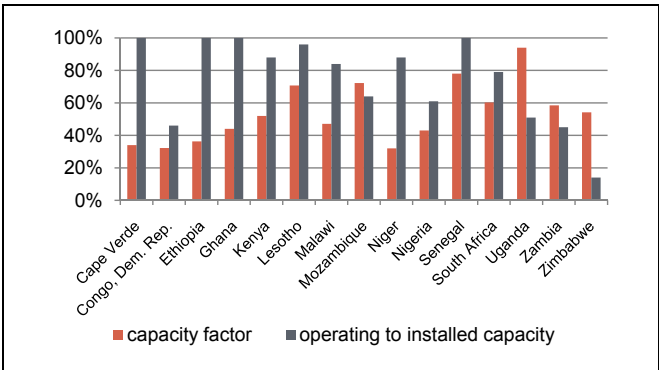
All four sub-regions of Sub Saharan Africa demonstrate relatively similar performance levels according to operating ratio, which falls within a narrow range from 64% in Southern Africa to 73% in Central Africa to 78% in Western Africa and to 81% in Central Africa (Figure IV.7).

Figure IV.7. Operating ratio, level, by sub-region, 2007 or latest year available



There is a relationship among the three indicators described here – load factor, capacity factor and operating ratio. Operating ratio can be used to check if the low level of capacity factor can be explained by condition of the power system physical assets or by other reasons, most likely managerial inefficiency or theft. When both capacity factor and operating ratio are low (there are no such countries in our sample), at least one of the explanations for low capacity factor is condition of the assets. When capacity factor is low while operating ratio is high (the case of Cape Verde, Ethiopia, Niger, Ghana, Malawi, Kenya), the low capacity ratio cannot be explained by physical asset condition and other reasons should be assumed. (Figure IV.8)

Figure IV.8 Capacity factor and operating ratio, 2007 or latest year available



Electric Power Consumption per Capita

The indicator of annual per capita consumption of electricity reflects level and potential of the country economic development. It is also indicative of the power sector's ability to benefit from the economies of scale in the sector.

This indicator is an estimate of actual consumption per capita, which is difficult to measure directly in Sub-Saharan African countries. This estimate is calculated as total production of power plants in public system, net of normative transmission, distribution, and transformation losses, divided by total population. The indicator, however, does not account for either technical losses above the norm or commercial losses. Both types of losses are considered to be high in the region, although it is difficult to estimate their values in most of African countries. Therefore, the indicator provides an approximation of end-user consumption, with actual consumption being either equal or below the estimated level.

SSA's consumption of electricity is low by international standards, with the per capita mean at 542 kWh per year and the median at 160 kWh per year. When South Africa is excluded from the sample, the mean consumption of electricity in the region drops to as little as 156 kWh per year, while the median barely changes and equals 155 kWh per year. Such level of consumption is substantially below levels of the other regions: three times lower than in South Asia, 10 times less than in the Middle East, North Africa, Latin America, or East Asia, and 23 times beneath Europe and Central Asia (Table IV.1). The level of power consumption in SSA, excluding South Africa, is also 2.6 times lower than in IDA countries⁸. But it is close to the level of Heavily Indebted Poor Countries (HIPC) countries.

Correlation between electricity consumption and the level of development (measured as GNI per capita) is strong across regions and income groups, as well as within the Sub-Sahara Africa region. Correlation between these two indicators is very high at 96% among regions and groups of countries by income. For the 20 of the 47 African countries for which data are available, correlation between these two indicators is 75%. When South Africa – an outlier with per capita electricity consumption nine times above SSA mean and three times above the level of Namibia, the next largest consumer of power on per capita basis – is excluded from the sample, correlation increases to 87%.

⁸ IDA countries borrow from the World Bank on special terms. These are 78 poorest nations, 39 of them in Africa, with GNI per capita below a threshold - in 2009, it was US\$1,095. A few IDA countries exceed the threshold – these are small island economies lacking the creditworthiness needed to borrow from IBRD.

Table IV.1. Average annual per capita consumption of electricity, by region, income group and lending status, 2006

By Region (mean, unless indicated median):	
Sub-Saharan Africa	
Mean	542
Median	160
Mean without South Africa	156
Median without South Africa	155
East Asia & Pacific	1,669
Europe & Central Asia	3,835
Latin America & Caribbean	1,808
Middle East & North Africa	1,418
South Asia	453
By lending group and income (mean):	
HIPC	184
IDA blend	551
IDA only	221
IBRD only	2241
Low income	309
Lower middle income	1,269
Middle income	1,651
Upper middle income	3,242
High income	9,675
World	2,751

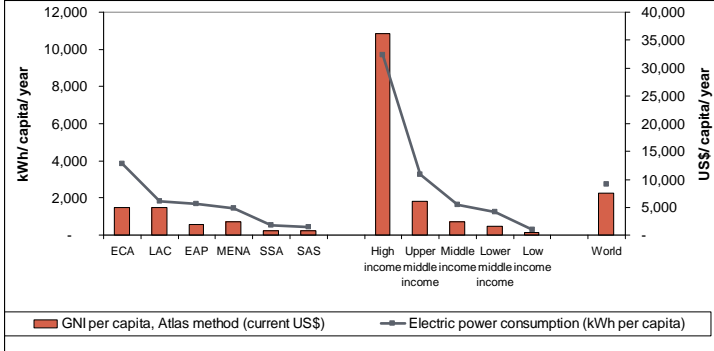
Source: World Development Indicators, World Bank

The levels of annual electricity consumption per capita vary widely in the region (Figure IV.9, Figure IV.10). Of the 20 African countries with data, the countries in the top quintile of ranking are South Africa (4,847 kWh in annual electricity consumption per capita), Namibia (1,428 kWh/ capita), Botswana (1,406 kWh/ capita), Gabon (999 kWh/ capita) and Zimbabwe (953 kWh/ capita). The countries in the lowest quintile are Ethiopia (34 kWh/ capita), Tanzania (61 kWh/ capita), Benin (69 kWh/ capita), Congo, DR (91 kWh/ capita), Togo (94 kWh/ capita) and Sudan (94 kWh/capita).

Growth in electricity consumption per capita also differs substantially across African countries (Figure IV.11). Eight countries (Ghana, Zimbabwe, Congo, Rep., Congo, Dem. Rep., Cote d'Ivoire, South Africa, Kenya, Tanzania) have compound annual growth rates in electricity consumption of less than 1% in 1997–2005, while countries with the highest annual growth rates are Sudan (10.1%), Angola (7.4%), Benin (6.7%), Namibia (6.1%), Nigeria (5.8%) and Botswana (5.4%). Mozambique is an outlier in the region reporting an annual growth rate of 38.6%. In addition, 12 African countries had electricity consumption growth rates lower than the annual

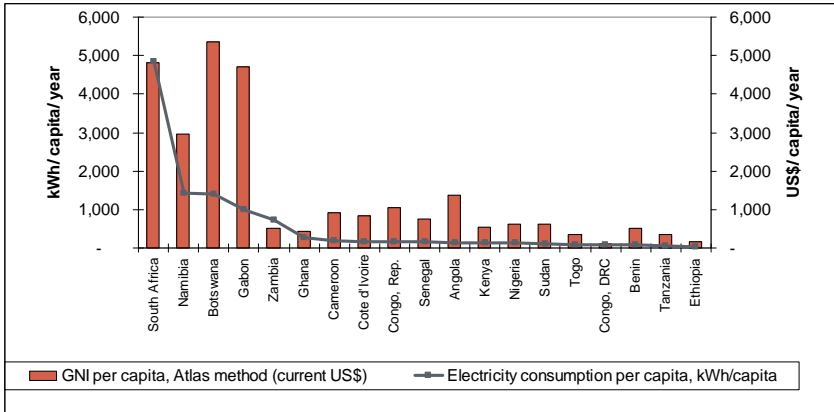
growth rate of the GDP in the studied period, suggesting the expansion of the electricity sector was not able to keep up with demand.⁹

Figure IV.9. Electricity consumption and per capita income, by income group and region, 2005



Source: World Development Indicators, World Bank, and EIA

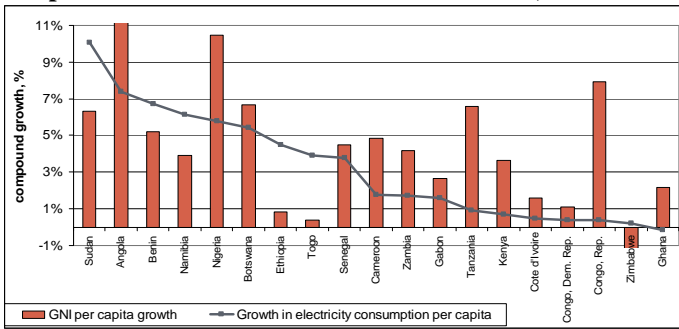
Figure IV.10. Electricity consumption and per capita income in selected Sub-Saharan African countries, 2005



Source: World Development Indicators, World Bank, and EIA

⁹ One percentage growth in GDP requires, on average, one percentage growth in the electricity supply so that electricity does not become a constraint for growth (see: Africa Infrastructure Diagnostic, World Bank, Washington DC, 2009).

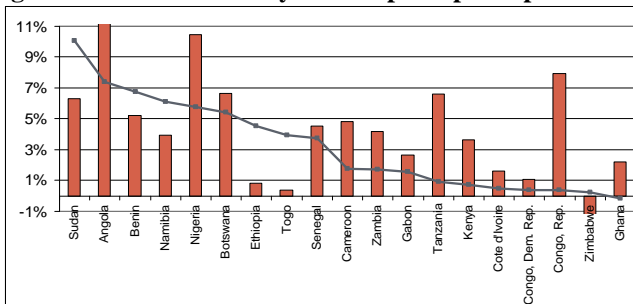
Figure IV.11 Compound annual growth rate in electricity consumption per capita and GDP in selected African countries, 1997–2005



Source: ASK database and World Development Indicators, World Bank

The growth in electricity consumption per capita is highest in two groups of countries: those with lowest and those with highest consumption levels (Figure IV.12). However, within the first group of countries, characterized by lowest electricity consumption, the growth is lower when consumption is higher. This means that most of the countries at the very low end of the power consumption scale did not have noticeable improvement in consumption in the last eight years. At the same time, for the rest of the sample (except South Africa) – countries with high and medium consumption of power per capita – growth in consumption is clearly higher when consumption is higher.

Figure IV. 12. Electricity consumption per capita in 2005 and compound annual growth rate in electricity consumption per capita in 1997–2005



Source: ASK database and World Development Indicators, World Bank

Correlation between per capita consumption of electricity and its annual compound growth in the 20 African countries studied is low or negative. It was at negative 18% in 1997–2005. However, when countries are compared with income-based benchmarks, a clearer picture emerges. In countries with consumptions below the HIPC benchmark, the average growth rate in consumption is the highest but the range across countries is also wide. For countries with consumption levels higher

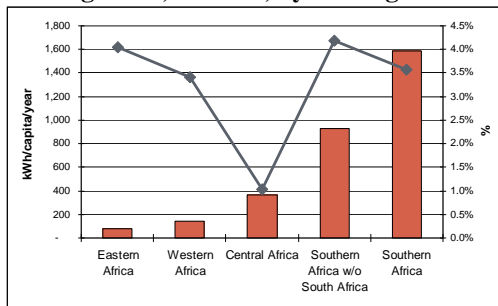
than the HIPC average but lower than lower middle income average, the average growth rates are just around 1%. For countries with consumptions levels higher than the lower middle income average, the growth rates again are high, primarily driven by Botswana and Namibia. (Table IV.2)

Table IV.2 Annul electricity consumption per capita in selected African countries and its compound annualized growth, by income-based benchmarks

Benchmarks	Countries in the group	kWh: range and mean (2005)	Growth,% (1997–2005)
Below HIPC mean	Ethiopia, Tanzania, Benin, Congo DR, Togo, Sudan, Nigeria, Kenya, Angola, Senegal, Congo Rep. and Cote d'Ivoire	34 to 170, mean=111	0.36% to 10.1%, mean=4.5%
Above HIPC mean, below LIC mean	Cameroon, Ghana	191 to 243, mean=231	0.8%
Above LIC mean, below LMIC mean	Zambia, Zimbabwe, Gabon	721 to 999, mean=891	1.2%
Above LMIC mean	Botswana, Namibia, South Africa	1,406 to 4,847, mean=2,560	4.0%

Annual electricity consumption per capita and its growth differ substantially across sub-regions (Figure IV.13). The Southern Africa sub-region has highest consumption (1,583 kWh), even when South Africa is excluded (930 kWh). Central region has second highest consumption (362 kWh), while Western Africa (146 kWh) and Eastern Africa (82 kWh) fall far behind. Three regions (Southern, Eastern and Western) experienced annual growth rates of over 3% in 1995-2005, while the Central region’s annual growth rate was at 1%.

Figure IV.13. Electricity consumption per capita, 2005, and its compound annual growth, 1997-05, by sub-region



Household Access to Electricity

Household access to electricity is measured as percentage of households that are connected to an electric power source (grid or off-grid). It is calculated as follows:

$$\text{Household access to electricity} = \frac{\text{Number of households connected to electricity} \times 100}{\text{Number of households in the country}}$$

Household access to electricity is a main indicator of power sector performance. It shows how advanced the sector is in achieving its developmental goal of connecting households and businesses. In addition to directly measuring household access, it can be used as a proxy for commercial access, because many commercial entities in SSA operate from household residences and also because it reflects availability of power in the country. However, household access cannot be used as a proxy for industrial access.

Household access to electricity is defined as percentage of population with access to power out of population in the utility service area. Access data can come from many different sources, including utility records, Census estimates, and various survey outcomes. Here we use household survey data, thus accounting for household access from all sources including illegal connections.

Household access to electricity is a very important indicator in the African context due to low current rates (see Table IV.3) and importance for the economy and society to increase them.

Table IV.3 demonstrates that Africa differs substantially from other regions in household access to power, with rates more than three times below other regions. Low income African countries differ from the rest of the developing world even more: the difference is almost ten-fold, pointing to very low usage of electricity by connected households and businesses, as well as low industrial usage.

Table IV.3. Access to electricity in Sub-Saharan Africa low and middle income countries (LICs and MICs) as compared to other developing regions

	SSA LICs	Other LICs	SSA MICs	Other MICs
Access to electricity (% households)	16%	41%	32%	88%
Capacity (MW per million people)	37	326	251	648

Source: Yepes, T, J. Pierce, V. Foster, Making Sense of Africa’s Infrastructure Endowment: Benchmarking Approach, Africa Infrastructure Country Diagnostic, Working Paper #1, World Bank, 2009

There is a noticeable variation in the national level of access among SSA countries. It ranges from 3.5% in Chad to 93.6% in Mauritius (Figure IV.14a). Approximately

one-half of the countries have access level below 20% and the other one-half has access above 20%. Distribution of access is slightly skewed toward less electrified countries, with the mean level of 26.3% and the median level of 19.2%.

Countries with access above 50% are Mauritius (93.6%), South Africa (69.7%), Cote D'Ivoire (58.9%), Guinea-Bissau (53.5%) and Nigeria (52.2%). Countries at the other end of the scale – those with access below 10% - are Chad (3.5%), Rwanda (4.8%), Central African Republic (6%), Malawi (6.9%), Niger (7.1%), Mozambique (8.1%) and Togo (8.9%).

Sub-Saharan African countries range widely in their national electrification trend over the last decade. Annual compound growth in the population access to electricity from a point of time between 1995 and 2000 to another point of time between 2001 and 2005 varies from a negative 6.2% in Rwanda to a positive 21.8% in Lesotho (Figure IV.14b). The best performers, countries that achieved annual compound increase in access of more than 10% were Lesotho (21.79%), Togo (17.23%), Madagascar (17.02%), Kenya (15.38%), Mali (15.21%), Botswana (15.02%), Guinea-Bissau (13.95%), Gabon (11.49%), Benin (10.63%) and Burkina Faso (10.56%). The worst performers, countries with annual compound growth in access below 1%, were Rwanda (-6.20%), Mauritania (-4.85%), Zimbabwe (-3.79%), Mauritius (-1.64%), Namibia (-0.96%), Sudan (0.00%), Zambia (0.38%), Niger (0.83%) and Uganda (0.86%).

While it would be reasonable to anticipate that countries with higher achieved access rate have lower annual increase in access, the data do not support such hypothesis. In fact, mean annual growth in access is approximately the same for four out of five quintiles¹⁰ of countries ranked by access level: it ranges from 3.2% to 5.2% for the bottom and the top three quintiles, while reaching 12.5% in the second quintile, which combines countries with access level from 11% to 17%.

Reversed analysis provides similar outcomes: contradictory to reasonable expectations, there is no relationship between increase in access and level of access to power. Mean access level for different quintiles of growth in access ranges from 30% in the bottom quintile to 34% in quintile 2, to 32% for quintile 3, dropping slightly to 25% for quintile 4 and finally to 23% in the top quintile.

Difference in national access across SSA sub-regions is not high, although noticeable, with Southern and Western Africa reaching levels above 30% and thus performing on the average slightly better than Central and Eastern Africa, the regions with national access levels close to 25% (Figure IV.15)

¹⁰ Refers to 1/5 of the sample ranked by access level.

Figure IV.14a. Household access, national, latest year available 2002-2005

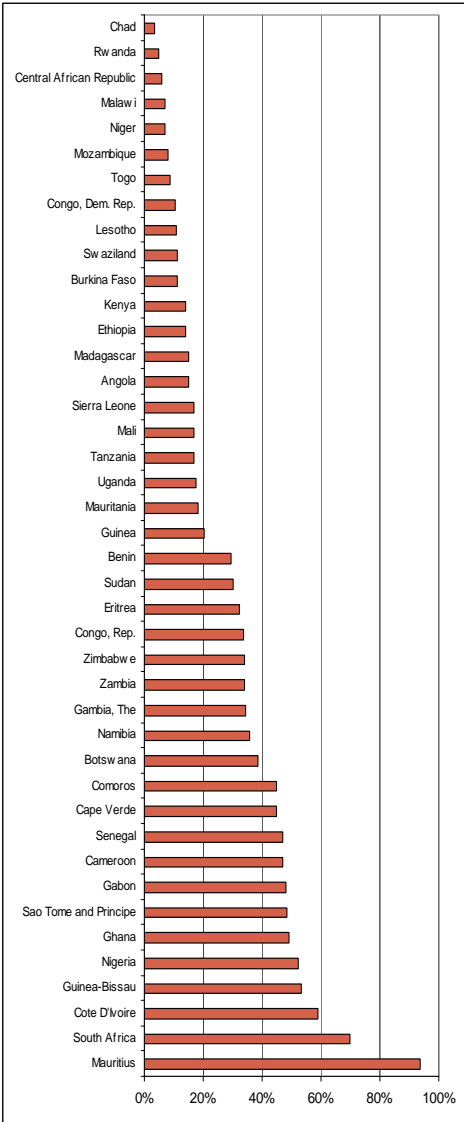


Figure IV.14b. Compound growth in national access, available years 1995-2001

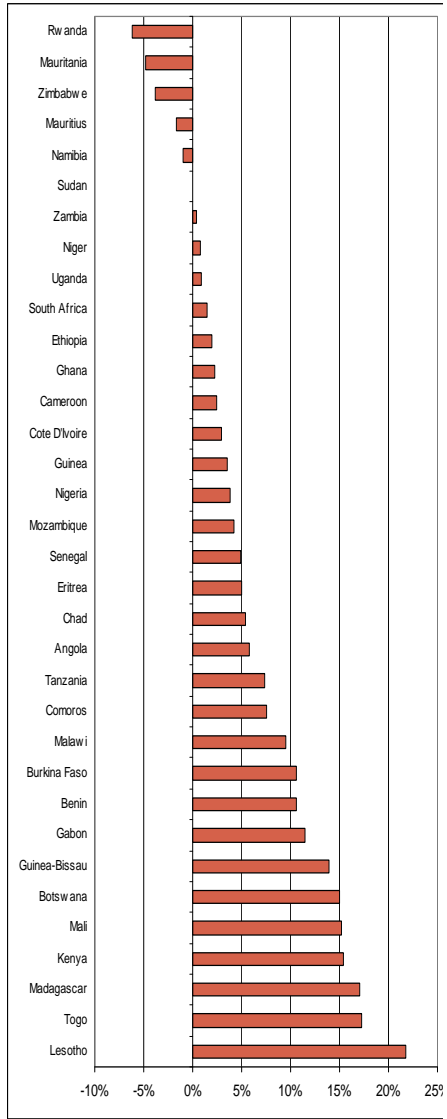
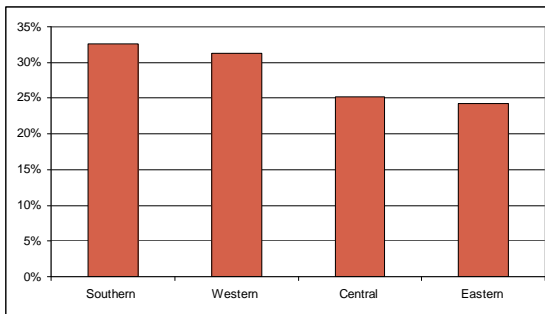


Figure IV.15. Household access, national, by sub-region, latest year available 2002-2005



Access to power in Africa is characterized by a large difference between urban and rural levels. Considering high variation in the level of urbanization across the region and the low density of population in rural Sub-Saharan Africa, it makes sense to include urban access in the analysis, in addition to the national access.

Urban access is more evenly distributed among Sub-Saharan African countries than national access: the mean and the median are almost the same, 56% and 53% respectively. While urban access is substantially higher than national in all SSA countries, growth in urban access is lower than in national access.

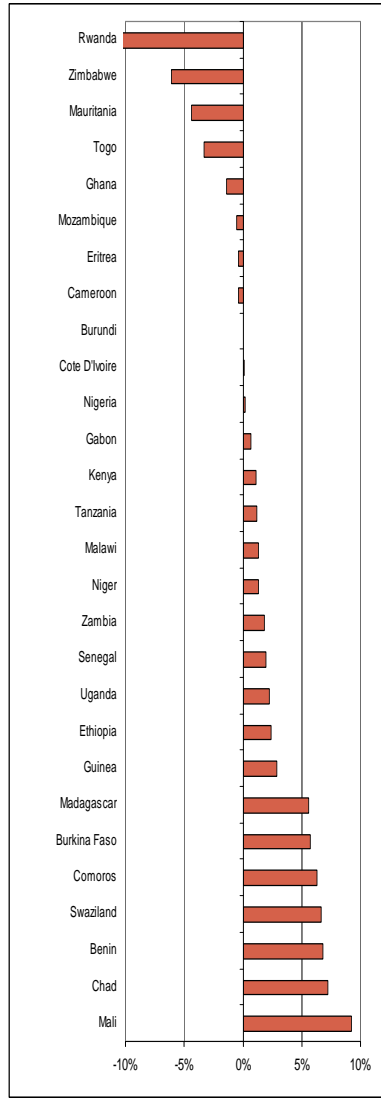
Urban access level ranges from 16% in CAR and Chad to 93% in Gabon (Figure IV.16a). Countries with urban access above 80% are Gabon (93.2%), South Africa (86.5%), Cote D'Ivoire (86.4%), Ethiopia (85.7%), Nigeria (84.9%), Cape Verde (83.1%) and Senegal (80.4%). Countries at the other end of the scale – those with urban access below 30% - are Central African Republic (15.6%), Chad (16.4%), Mozambique (25.0%), Rwanda (25.1%) and Lesotho (26.2%).

Sub-Saharan African countries range widely in their urban electrification trend over the last decade. Annual compound growth in the urban access to electricity from a point of time between 1995 and 2001 to another point of time between 2002 and 2005 varies from a negative 10.37% in Rwanda to a positive 9.24% in Mali (Figure IV.16b). The best performers, countries that achieved annual compound increase in access of more than 5% were Lesotho (9.24%), Togo (7.2%), Madagascar (6.82%), Kenya (6.63%), Mali (6.27%), Botswana (5.71%) and Guinea-Bissau (5.56%). The worst performers, countries with negative annual compound growth in urban access, were Rwanda (-10.37%), Zimbabwe (-6.08%), Mauritania (-4.35%), Togo (-3.33), Ghana (-1.37), Mozambique (-0.52%), Eritrea (-0.41%) and Cameroon (-0.4%).

Figure IV.16a. Household access, urban, latest year available 2002-2005



Figure IV.16b. Compound growth in urban household access, available years 1995-2001



Quality of Service, Customer Perspective: Outages and Delay with Connection

Two indicators – number of outages per year and number of days of delay in obtaining power connection¹¹ – are used to measure the quality of customer service from the customer perspective.

Customer perspective of service quality is an important indicator of utility performance. It provides feedback to the utility and, at the same time, can be used for enabling the customers to influence sector performance. Specifically important is information from customers about objective characteristics of service quality as opposed to customer perceptions. The best objective service quality indicators provided by customers and available for the African countries are number of outages per year and days of delay in obtaining power connection. These indicators are especially valuable because utility data measuring the same characteristics of utility performance are not always available or reliable in the region.

Number of outages per year is the main indicator of service quality, especially in Africa, where it is very high as compared to other regions. Blackouts and brownouts are damaging for businesses and households from both economic and social points of view. They force customers to use expensive emergency power or invest in own generator. They reduce the amount of power that utilities provide to customers and thus negatively affects utility income. They damage equipment. They interrupt production process. They negatively affect social life and family activities.

Days of delay in obtaining power connection is also an important indicator in the context of Africa, where increase in connectivity is a major task for the sector, considering the current low level of access, and where delays with connection are known to be high.

The service quality data are obtained from surveys of enterprises¹² and thus are related to business customers only. However, the sampling procedure provides that these indicators can be used to evaluate overall service quality. The number of outages estimated by these surveys would be approximately the same for residential customers, as surveys use samples of businesses that have different size and are located in all areas of the country, the procedure providing for equal likelihood of experiencing outages by residential end-users. In addition, delays with obtaining electricity connection are likely to be similar or even higher for residential

¹¹ Refers to the average wait, in days, experienced to obtain electrical connection from the day the enterprise applied for it to the day it received the service.

¹² Source of data: The World Bank Enterprise Surveys: <https://www.enterprisesurveys.org/>

customers, who are less likely to be able to pay for them – therefore, using the indicator of business connections delay provides for conservative estimate.

While many SSA countries have a high number of outages per year and long delays with electrical connection, the region’s performance according to both indicators is better than that of South Asia. SSA also has slightly lower level of outages that EAP and shorter delays with connections than MENA. The country annual average number of outages per year equals 164 in SSA as compared with 1,219 in South Asia, 171 in EAP, 99 in ECA, 53 in MNA and 36 in LAC. Delays with obtaining power connection are 35 days long in SSA, while taking 55 day in MNA, 49 in South Asia, 34 in LAC, 22 in EAP and 20 in ECA. (Figures IV.17a-IV.17b)

In SSA countries, the number of outages per year ranges from six in South Africa to 407 in Guinea. Countries with the lowest number of outages per year are South Africa (6), Namibia (20), Botswana (21), Swaziland (30), Mozambique (38), Mauritania (45) and Zambia (50). The highest number of outages is observed in Guinea (407), Nigeria (321), Gambia (286), Niger (248), Congo, Dem. Rep. (213), Rwanda (164), Cameroon (152) and Cape Verde (150).

Delays with obtaining electricity connection in the region can be as short as seven days (South Africa) or as long as 98 days (Malawi). The least delay is observed in South Africa (7 days), Mauritania (8 days), Nigeria (8 days), Cape Verde (8 days), Namibia (9 days) and Senegal (10 days). The countries with the longest delay are Angola (60 days), Gambia (64 days), Eritrea (65 days), Benin (72 days), Cameroon (79 days), Zambia (93 days) and Malawi (98 days). (Figures IV.18a-IV.18b)

SSA sub-regions differ substantially in the number of outages per year. The best performance according to this indicator is observed in Southern region, with outages averaging 42 per year. Southern region is followed by Eastern Africa, which has 104 outages a year on the average. Central and Western regions experience more outages, with average country levels respectively at 170 per year and 171 per year.

Figure IV.17a. Outages, country annual average, by region, latest year available

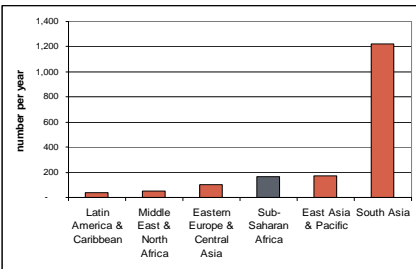


Figure IV.17b. Delays with electricity connection, country annual average, by region, 2005

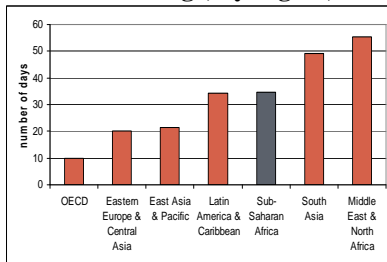


Figure IV.18a. Outages and delays with electricity connection, country annual average – sorted by outages

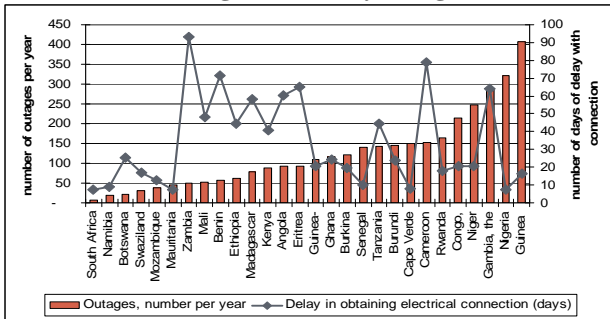
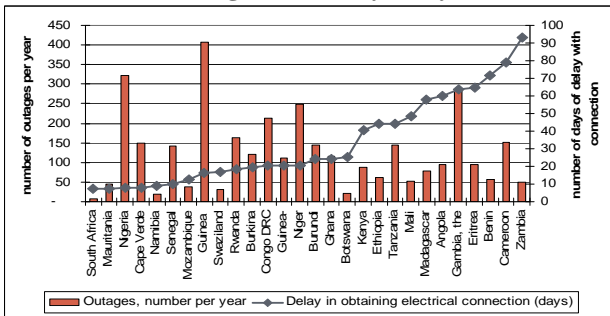


Figure IV.18b. Outages and delays with electricity connection, country annual average – sorted by delays



Variation among SSA sub-regions in the length of delay with obtaining power connection is relatively low. It ranges from 27 days in the Western region to 35 days in the Central region, then increases to 41 days in the Southern Africa and moves up to 45 days in Eastern Africa. (Figures IV.19a-IV19b)

Figure IV.19a. Outages, country annual average, by sub-region, latest year available

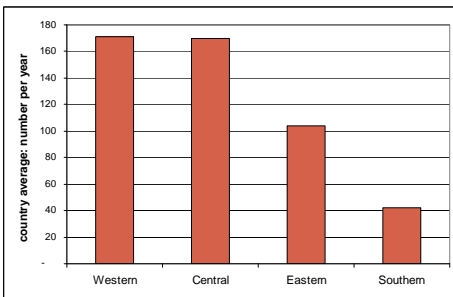
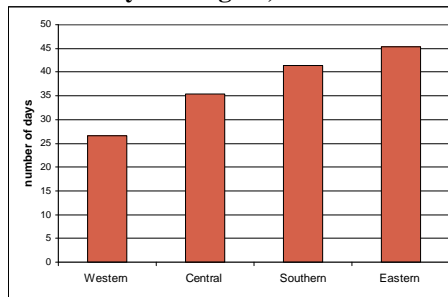


Figure IV.19b. Delays with electricity connection, country annual average, by sub-region, 2005



Residential Tariffs¹³

The structure of residential electricity tariffs differs substantially among the SSA countries. Some tariffs include a fixed monthly charge, which can be quite large. While all tariffs include the volume-based charge, which defines how much should be paid for each kWh consumed, the way it is structured differs from country to country: in some cases, the rate is flat – the same amount is charged per kWh for any level of monthly usage; some countries selected increasing block rates, with the charge per kWh rising from the first block consumed to the second and so on, with the highest charge per kWh applied to the highest block of consumption; other countries opted for decreasing block rates, with the price per kWh dropping as the amount of electricity used during the month increases. The blocks can be constructed in many different ways. In Sub-Saharan African countries, the number of blocks ranges from 1 (flat rate) to 11; the border between the first and the second block can be as low as 15 kWh or as high as 300 kWh; and the span of the variable charge for the first block stretches from 1 US cent per kWh to 23 US cents per kWh.

Considering all the complications of the residential tariff structure, the best way to have a cross-country comparison of residential electricity tariffs is through effective tariffs, which measure price of kWh at different monthly consumption levels. The formula for effective tariff calculation is: $t = a * x + c$, where: b is volume-based charge per kWh, x is volume consumed, and c is fixed charge.

In Sub-Saharan African countries, effective residential tariffs for a wide range of monthly consumption levels span from 2 US cents/kWh to 36 US cents/kWh (Table IV.4). While tariffs at the lower end of this range appear to be unsustainably below the efficient cost and cannot be sustainable, the tariffs at the upper end of the range are questionable in their affordability for the population, considering income levels in the observed countries.

Figure IV.20 shows residential effective tariffs at 100 kWh per month, the level slightly above typical household consumption in Sub-Saharan African countries. Chad, Cape Verde, Madagascar, Uganda and Burkina Faso have the highest effective tariffs ranging from 20 US cents/kWh to 30 US cents/kWh. These tariffs are observed to be efficiently structured in their volume-based part: the second block is priced at a high level as compared to the first one¹⁴ and the border between the first and the second blocks is relatively low (at or below 50 kWh). However, efficiency of these tariffs in some of the countries is reduced due to inclusion of the

¹³ This analysis was prepared for: Electricity Tariffs in SSA countries, Working paper, Africa Infrastructure Diagnostic, World Bank, Washington DC, 2009.

¹⁴ Setting second block tariffs high as compared with the first one helps achieve the combined goal of cost recovery and tariff affordability for the poor only if the tariffs are above costs.

fixed charge in the tariff (Madagascar, Uganda, Burkina Faso) and in others – due to insufficient variation between the first and the second block tariff (Cape Verde, Burkina Faso). Ethiopia, Congo, Dem. Rep., Malawi, Nigeria and Zambia have the lowest effective tariffs, not even reaching 5 US cents/kWh. In all these countries, tariffs are not structured efficiently: the volume based charges are very low and the fixed charge is included in the tariffs.

Table IV.4. Effective residential tariffs by level of household monthly consumption

	50kWh	75kWh	100kWh	150kWh	200kWh	300kWh	400kWh	450kWh
Benin	12.6	13.3	13.6	14.0	14.1	19.7	22.5	23.5
Burkina Faso	20.6	20.2	20.0	19.9	19.8	20.1	20.3	20.4
Cameroon	17.2	15.1	14.1	13.0	12.5	12.3	12.3	12.2
Cape Verde	23.6	25.1	25.8	26.5	26.9	27.3	27.4	27.5
Chad	22.9	27.3	30.0	32.7	34.1	35.4	36.1	36.3
Congo	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.9
Côte d'Ivoire	9.6	11.1	11.9	12.6	13.0	13.4	13.6	13.6
Ethiopia	3.9	4.1	4.1	5.3	5.6	6.1	6.2	6.4
Ghana	8.7	8.4	8.2	8.0	7.9	7.8	9.1	9.6
Kenya	8.4	12.7	14.8	16.9	18.0	19.1	19.9	20.1
Lesotho	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Madagascar	23.5	25.0	25.8	26.5	26.9	27.2	27.4	27.5
Malawi	4.2	3.7	3.5	3.3	3.2	3.1	3.0	3.0
Mozambique	9.6	7.7	6.8	7.4	7.7	9.0	9.6	9.8
Namibia	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Niger	14.5	14.2	14.1	13.9	13.9	13.8	13.7	13.7
Nigeria	2.5	3.8	3.4	3.8	4.2	4.9	5.3	5.4
Rwanda	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Senegal	18.6	16.4	15.2	14.1	13.5	13.0	12.7	12.6
South Africa	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Sudan	nav	nav	nav	nav	nav	nav	nav	nav
Tanzania	3.2	5.5	6.7	7.9	8.5	9.0	8.8	8.8
Uganda	19.5	20.7	21.4	22.0	22.3	22.6	22.8	22.8
Zambia	4.2	3.3	2.9	2.4	2.2	2.0	2.1	2.1

Based on trends in effective residential tariffs from low to high consumption levels, one can clearly distinguish four types of tariffs in Sub-Saharan African countries:

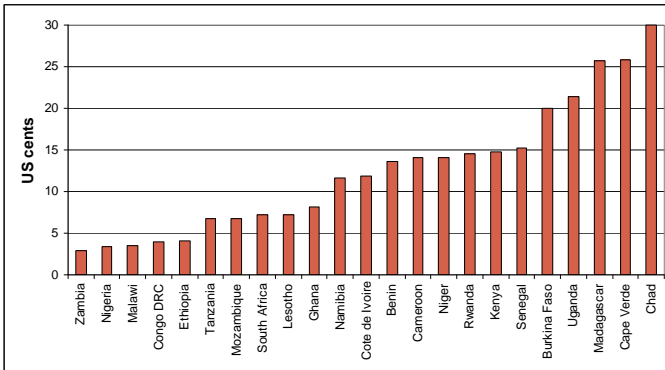
1. Effective tariffs increase steeply with rise in consumption. These tariffs are efficient from affordability perspective. Countries with such tariffs are Chad and Kenya. While Kenya is one of a few countries that achieve cost recovery, Chad is not – due to very high production costs.
2. Effective tariffs increase slightly with rise in consumption. These tariffs might be efficient from the point of view of affordability, but only marginally. Countries with such tariffs are Cape Verde, Cote d'Ivoire, Madagascar, Tanzania, and Uganda.

Most of them achieve cost recovery – those are Uganda, Madagascar, Cape Verde, - while Cote d’Ivoire is very close to it.

3. Effective tariffs are flat, do not change with growth in consumption. These tariffs do not provide any subsidy to the low income customers from the higher income ones and are inefficient from affordability perspective. From this point of view, they do not differ from flat rate tariffs. In addition, billing with IBT tariffs is more expensive than with flat tariffs, and therefore these tariffs increase utility expenses without providing any social benefit. Countries with this tariff type are Congo, Dem. Rep., Niger and Burkina Faso, all with tariffs below cost recovery level.

4. Effective tariffs decrease with increased consumption. Clearly, these tariffs are counterproductive from affordability point of view. In most of cases, these tariffs include a large fixed charge (Cameroon, Malawi, Zambia) and/or have low level volume-based part (Malawi, Zambia), or have the second block priced at a lower rate than the first one (Senegal).

Figure IV.20. Effective residential tariffs at 100 kWh monthly consumption



Accounts Receivable

Accounts receivable is cash that customers owe to the utility for power supplied to them. The indicator of days of accounts receivable shows how fast the utility collects payments from customers. The lower this indicator, the more financially efficient the utility is. This indicator is calculated as:

$$\text{Accounts Receivable (Days)} = 365 \text{ Days} / (\text{Annual Operating Revenues}/\text{Year-end Accounts Receivable})^{15}$$

Another way to present the same formula is:

$$\text{Accounts Receivable (Days)} = \text{Year-end Accounts Receivable} / (\text{Annual Operating Revenues}/365 \text{ Days})^{16}$$

In either case, the outcome of the calculations gives the number of days it will take to collect outstanding accounts receivable considering past year's experience with the average time gap between the day the service was provided and the day the payment was received.

For SSA countries with data available, mean number of days utilities take to collect accounts receivable is quite high, amounting to almost four months (117 days) – however, the median is much lower at 2.5 months (78 days). Variation among countries is very high – from six days in Niger to 476 days in Nigeria. The best performers with respect to this indicator are the countries whose accounts receivable fall below two months: Niger (6 days), Rwanda (10 days), South Africa (46 days), Lesotho (56 days) and Namibia (60 days). The worst performers – countries with accounts receivable above six months are Benin (184 days), Ghana (206 days) and Nigeria (476 days). (Figure IV.21a)

This indicator changes over time in all countries in the sample, however, there is no regular pattern – in some countries it increases, in other countries it decreases. Compound annual decrease in this indicator over the period of 4 years within the 2000-2006 time frame ranges from -3.2% in Senegal to +35.6% in Lesotho, with the mean at 10% and the median at 7%. The countries whose performance with regard

¹⁵ The denominator of the equation is called turnover ratio=net sales / end-year receivables. Turnover ratio shows how many times the company turned over its receivables in a year. It is preferable to use average of end-year receivables for the current year and the previous year.

¹⁶ The denominator of the equation shows average daily revenue. Dividing accounts receivable by average daily revenue gives number of days daily average is called turnover ratio=net sales / end-year receivables. It is preferable to use average of end-year receivables for two years: the current one and the previous one.

to this indicator improved the most, are Lesotho (35.6% decrease), Benin (27.5% decrease), Rwanda (27.5% decrease), Uganda (19.5% decrease) and Niger (11.4% decrease). The worst performers are Senegal (3.2% increase), Nigeria (3.0% increase), Ghana (2.9% increase), Namibia (2.5% increase), Cape Verde (0.5% increase). (Figure IV.21b)

Figure IV.21a. Accounts receivable (days), latest year available 2004-06

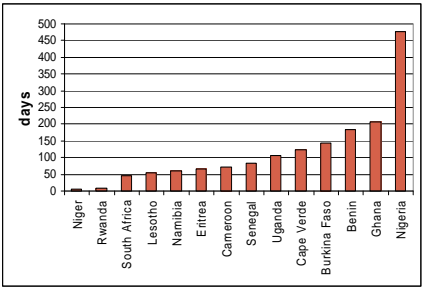
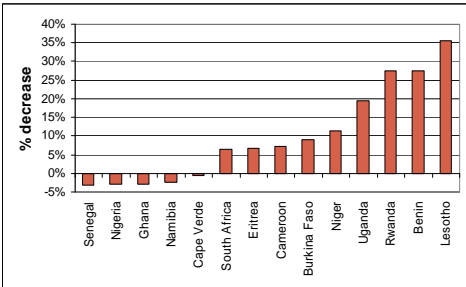


Figure IV.21b. Compound annual decrease in days of accounts receivable (%), period from earliest year available 2000-03 to latest year available 2004-06



Cost Recovery Ratio

Cost recovery ratio can be measured¹⁷ as ratio of effective tariff¹⁸ to cost per kWh, expressed as percentage. It makes sense to use two such ratios: operational and total, the former based on operational cost and the latter on total cost, which has both operational and capital components. Together with the indicator of operating expenses covered by revenues, cost recovery ratio reflects utility ability to cover its expenditures with revenues. However, they differ: ratio of operating expenses to revenues takes into account actual consumption level, while cost recovery ratio ignores current consumption level and can be calculated for any theoretical level of consumption. Here we present cost recovery ratio calculated for a residential customer (household) consuming 100 kWh per month – a level close to average for SSA countries.

Only in 10 out of 21 countries with available data effective tariffs cover operational costs and only in 6 of these countries effective tariffs cover total costs. This means that for more than half of the countries in the sample costs are not covered by tariffs even if investment is not included in the costs, and for more than three-quarters of the sampled countries, covering both operational cost and investment would require at least partial subsidization. Given that tariffs are high as compared with more developed regions¹⁹ and levels of incomes are lower²⁰, further increase in effective tariffs is not likely to be affordable and the only feasible way to reduce sector losses occurring due to lack of cost recovery is cost reduction.²¹

¹⁷ Cost recovery can be measured in a different way, for example, as ratio of unit revenue to cost. In this case it would reflect the price-cost-revenue collection relationship, while the proposed in this section tariff-to-cost ratio reflects the price-cost relationship, separated from the collection rate.

¹⁸ Effective tariffs measure electricity price per kWh at different monthly consumption levels. The formula for effective tariff calculation is: $t = a * x + b$, where: a is volume-based charge per kWh, x is volume consumed, and b is fixed charge. See section “Residential tariffs” in this chapter.

¹⁹ For comparison, recent residential prices in other regions are as follows: SAS – 4 US cents/kWh, EAP – 7 US cents/kWh, ECA – 7 US cents/kWh, LAC – 7 US cents/kWh, SSA – 13 US cents/kWh, OECD – 15 US cents/kWh (Source: Foster, V. and Cecilia Briceno-Garmendia, eds. *Africa’s Infrastructure: A time for transformation*, Africa Infrastructure Country Diagnostic, World Bank, Washington DC, 2009)

²⁰ GNI per capita in PPP terms is PPP\$1,861 in Sub-Saharan Africa, PPP\$2,289 in South Asia, PPP\$4,359 in East Asia, PPP\$6,710 in Middle East and North Africa, PPP\$8,682 in Latin America, PPP\$9,791 in Europe and Central Asia, and PPP\$35,586 in high income OECD countries.

²¹ *Electricity Tariffs in SSA Countries*, Working paper #8, Africa Infrastructure Country Diagnostic, World Bank, Washington DC, 2009

With respect to total cost recovery, the best performers are Uganda (174%), Madagascar (156%), South Africa (126%), Cape Verde (111%), Kenya (108%), Cameroon (101%) and Benin (99%). The list of best performers at the operating cost level is similar: Nigeria (154%), Namibia (161%), Kenya (177%), Ethiopia (197%), South Africa (214%), Madagascar (215%), Uganda (368%) and Benin (636%). (Figure IV.22a)

The worst outcomes according to total cost recovery are in Zambia (38%), Rwanda (38%), Chad (36%), Malawi (34%) and Niger (33%). Similarly, the countries with the worst operating cost recovery are Nigeria (154%), Namibia(161%), Kenya (177%), Ethiopia (197%), South Africa(214%), Madagascar(215%), Uganda (368%) and Benin (636%). (Figure IV.22.b)

Figure IV.22a. Cost recovery ratio (based on total cost)

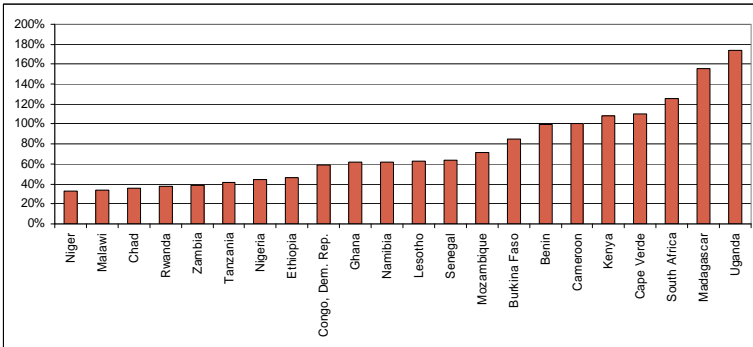
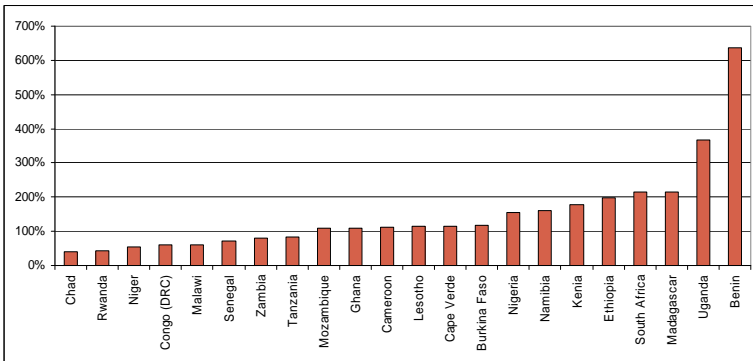


Figure IV.22b. Cost recovery ratio (based on operating cost)



Operating Expenses Covered by Revenues

The indicator of operating expenses covered by revenues is a ratio of operating costs to revenues billed, expressed as percentage. As opposed to Days of accounts receivable, it does not take into account utility collection efficiency, but rather reflects whether the utility is capable of recovering its current expenditures at the existing consumption level and tariffs. This indicator is below 100% if operational cost is covered by revenues. To be able to recover costs that include capital expenses (in addition to operating expenses) and to account for non-collection, this indicator should be noticeably below 100%.

In SSA countries, the indicator of operating expenses covered by revenues ranges from 20% in Tanzania to 158% in Chad, with the mean at 90% and the median at 97%. Sixty-five percent of the countries in the sample have this indicator at the level above 100% or below, but very close to 100%. The worst performers according to this indicator are: Chad (157%), Lesotho (111%), Cameroon (111%), Namibia (109%), Cape Verde (106%), Kenya (104%). The best performers are: Tanzania (20%), South Africa (45%), Rwanda (67%) and Benin (69%). (Figure IV.23a)

It is important to mention that some of the factors of performance according to this indicator are outside of utility decision making power. This includes tariffs and certain elements of operating costs. For example, tariff levels are not defined by utility and in many of SSA countries are set below costs. Also, operating cost largely depends on source of generation and, with thermal generation, on oil prices. These examples show that the word “performance” used in the paragraph above does not necessarily mean “utility efficiency”. However, many components of the costs and collection level can certainly be optimized by utilities – therefore, the indicator of operating expenses covered by revenues can be improved with increased utility efficiency.

Annual compound decrease in the indicator of operating expenses covered by revenues varies from 18.2% in Tanzania to -29.1% in Malawi, with the mean level at -1.8% and the median at -0.3%. The fastest improvement in this indicator occurred in Tanzania (18.2% decrease), Rwanda (6.5% decrease), South Africa (5.3% decrease) and Cameroon (5.1% decrease). This indicator worsened the most in Lesotho (35.6% increase), Benin (27.5% increase), Rwanda (27.5% increase) and Uganda (19.5% increase). (Figure IV.23b)

Figure IV.23a. Operating expenses covered by revenues, %, latest year available 2004-06

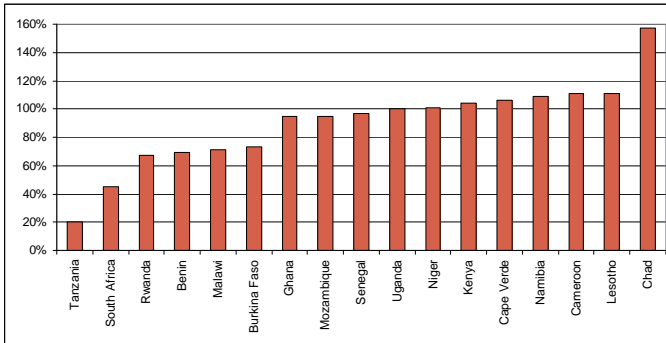
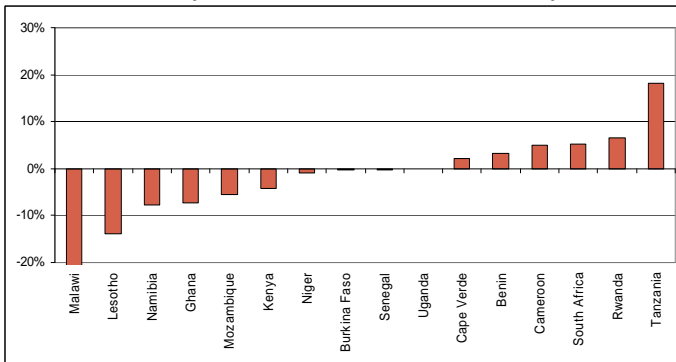


Figure IV.23b. Annual compound decrease in operating expenses covered by revenues, %, from earliest year available 2000-03 to latest year available 2004-06



Annex I. Sources of Data

Data for the ASK database were sourced from published databases or statistics as well as directly from utilities via surveys and questionnaires. For the technical and commercial indicators of this benchmarking study, most of the data was gleaned from the following three sources: Africa Infrastructure Country Diagnostic, the Africa Power Sector Data Bank and the ASK Team Input Data for Electric Utilities Key Performance Indices; all three source databases were created at the World Bank.

1. International:

Demographic and Health Surveys, MEASURE DHS, ICF Macro, 1990-2006, http://www.measuredhs.com/aboutsurveys/search/search_survey_main.cfm?SrvyTp=type&listtypes=1

Economic Indicators and Energy Balances of Non-OECD Countries, IEA (International Energy Agency), 2006

Energy Information Administration (EIA), International Energy Data, US Department of Energy, various years, <http://www.eia.doe.gov/emeu/international>

Energy Statistics Database. IEA (International Energy Agency), <http://www.iea.org>

Southern African Power Pool (SAPP) annual reports, various years

World Energy Outlook, International Energy Agency, (IEA), various years

2. World Bank:

Africa Development Indicators, World Bank, 2006

Africa Infrastructure Country Diagnostic, Power sector database, World Bank, 2009

Gassner, K., A. Popov and N. Pushak, An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing Countries, Washington, DC, World Bank, 2008.

IDA-14 Results Measurement System database, World Bank, 2009

Sub-Saharan Utility Performance and Benchmarking Study, Data Book, World Bank, 2006

The Little Data Book on Africa, World Bank, 2006

Development Data Platform (DDP) database, World Bank, 1990-2009

World Bank Group Enterprise Survey database, <http://www.enterprisesurveys.org>.

World Development Indicators, World Bank, various years

3. Country and utility:

Cote d'Ivoire's electricity sector financial model, mimeo

Eskom annual reports, South Africa, 2000-2006

Ethiopia Electric Power Corporation (EEPCo) website, <http://www.eepco.gov.et>

Ghana Energy Development and Access Project (GEDAP) publications

Power Holding Company of Nigeria (PHCN) financial model, mimeo

Sierra Leone electricity sector data sheet, mimeo

Société Nationale d'Electricité (SENELEC) website, <http://www.senelec.sn>

Annex II. Indicators of Power Utility Performance in Literature

Literature review covers recent publications on electric utility performance benchmarking in SSA and other developing countries, concentrating on the selection of performance indicators used for comparative assessment of utilities as well as in gauging the impacts of sector reform on performance.

A2. 1. Africa Infrastructure Country Diagnostic (AICD), Flagship Report, World Bank, 2009

The study involved creation of the electricity sector database for SSA countries that are currently undergoing power sector reform. Data for the study were collected in 2006-7. The study utilized a core set of indicators shown in Table A2.1 below.

Table A2. 1. Indicators in the Africa Infrastructure Country Diagnostic study

Category	Indicators
Technical Efficiency	Electricity connections per employee (number)
	Electricity purchased from IPPs (% of generated)
	Electricity purchased from IPPs, annual (GWh)
	Emergency generation capacity (% of operating)
	Emergency generation capacity (MW)
	Generation technology: coal (% of total)
	Generation technology: gas (% of total)
	Generation technology: hydro (% of total)
	Generation technology: oil (% of total)
	Installed generation capacity (MW)
	Installed generation capacity per mln. population (MW/mln popul.)
	Length of HV lines (66kV and above) (km)
	Length of LV lines (<34.5 kV) (km)
	Length of MV lines (34.5 kV to 66 kV) (km)
	Load served, on-grid, annual (GWh)
	Net electricity generated per capita, annual (kWh/capita)
	Net electricity generated, annual (GWh)
	Net import, annual (GWh)
	Operating generation capacity (% of installed)
	Operating generation capacity (MW)

Category	Indicators
	Peak demand (MW) Peak demand on interconnected system (MW) Prepayment meters (% of operating meters) Reserve margin (%) Residential (LV) customers with operating meters (% of residential customers) Self generation capacity (MW) Self-generated capacity (% of operating) Self-sufficiency ratio (%) System capacity factor (%) System losses (% of generation)
Coverage	Population with access to power (% of pop. in utility service area) High and medium voltage customers (% of total number of customers) Number of high voltage customers (number) Number of high and medium customers (number) Number of low voltage customers (number) Number of all customers (number) Number of medium voltage customers (number)
Usage	Electricity billed per high voltage customer (kWh/customer) Electricity billed per low voltage customer (kWh/customer) Electricity billed per medium voltage customer (kWh/customer) Electricity billed to commercial (MV) customer (GWh/year) Electricity billed to industrial (HV) customer (GWh/year) Electricity billed to residential (LV) customer (GWh/year)
Quality	Outages, duration, annual (hours/year) Outages, number, annual (number/year) Outages, volume load shed, annual (GWh/year)
Pricing	Average residential connection charge (LCU/connection) Average residential connection charge (USD/connection) Effective tariff, consumption 100kWh/mo (US cents/kWh) Effective tariff, consumption 150kWh/mo. (US cents/kWh) Effective tariff, consumption 200kWh/mo. (US cents/kWh) Effective tariff, consumption 300kWh/mo. (US cents/kWh) Effective tariff, consumption 400kWh/mo. (US cents/kWh) Effective tariff, consumption 500kWh/mo. (US cents/kWh) Effective tariff, consumption 50kWh/mo. (US cents/kWh)

Category	Indicators
Financial Efficiency	<p>Average cost of electricity, capital, historical (US cents/kWh)</p> <p>Average cost of electricity, operating, historical (US cents/kWh)</p> <p>Average cost of electricity, total, historical (US cents/kWh)</p> <p>Average cost of electricity, total, incremental, trade expansion scenario (US cents/kWh)</p> <p>Average cost of electricity, total, incremental, trade stagnation scenario (US cents/kWh)</p> <p>Average operational expenses, annual (LCU/kWh)</p> <p>Average operational expenses, annual (US cents/kWh)</p> <p>Average revenue, annual (US cents/kWh)</p> <p>Breakeven consumption based on operational cost (kWh)</p> <p>Breakeven consumption based on total cost (kWh)</p> <p>Collection ratio (% of billing)</p> <p>Historical cost recovery ratio (%)</p> <p>Household payment ratio (%)</p> <p>Implicit collection ratio (%)</p> <p>Incremental cost recovery ratio (%)</p> <p>Labor costs (% of operational costs)</p> <p>Labor costs, annual (LCU/year)</p> <p>Labor costs, annual (USD/year)</p> <p>Under-collection (% of GDP)</p> <p>Under-collection (% of revenue)</p> <p>Under-collection (% of total hidden costs)</p> <p>Operational costs (LCU/year)</p> <p>Operational expenses, total (USD/year)</p> <p>Revenue per HV customer, annual (USD/customer)</p> <p>Revenue per LV customer, annual (USD/customer)</p> <p>Revenue per MV customer, annual (USD/customer)</p> <p>Revenues (LCU/year)</p> <p>Revenues (USD/year)</p> <p>Sales to all customers (USD/year)</p> <p>Sales to commercial (MV) customers (LCU/year)</p> <p>Sales to commercial (MV) customers (USD/year)</p> <p>Sales to high and medium voltage customers (USD/year)</p> <p>Sales to high and medium voltage customers (% of total sales)</p> <p>Sales to industrial (HV) customers (LCU/year)</p> <p>Sales to industrial (HV) customers (USD/year)</p> <p>Sales to residential (LV) customers (LCU/year)</p>

Category	Indicators
	Sales to residential (LV) customers (USD/year) System losses (% of GDP) System losses (% of revenue) System losses (% of total hidden costs) Total hidden costs (% of GDP) Total hidden costs (% of revenue) Under-pricing (% of GDP) Under-pricing (% of revenue) Under-pricing (% of total hidden costs)
General Information	Household size in service area (number) Population (number of people) Population in service area (number of people)

A2. 2. Benchmarking Analysis of the Electricity Distribution Sector in the Latin American and Caribbean Region, World Bank Report, 2007

This study benchmarked 249 utilities in 25 Latin American and Caribbean countries representing about 88% of the electricity sector in the region. The assessments were made at three levels, i.e., regional, country and utility, in determining performance levels and achievements of utilities. In the latter case, the 249 utilities were ranked according to their scores as being in the top 10%, middle 80%, or bottom 10% depending on the indicator being measured. Table A2.2 lists the core indicators used in the study.

Table A2. 2. Core Indicators for the Latin America and Caribbean Region Benchmarking Study

Category	Indicator	Description
Technical and Operational	Energy Losses in Distribution per Year (%)	Total Energy losses. Consist of technical and non-technical (commercial) losses.
Technical and Operational	Energy Losses in Distribution per Year due to Non-technical Losses (Illegal Connections) (%)	Non-technical or commercial losses (i.e. theft (illegal connections) and losses due to failure in the billing system)
Technical and Operational	Energy Losses in Distribution per Year due to Technical Losses (%)	Energy losses due to technical reasons (i.e. Dissipation of power in electrical system components)

Category	Indicator	Description
Technical and Operational	Energy Sold per Connection per Year (MWh)	Ratio of Total energy sold per year to total number of connections
Technical and Operational	Energy Sold per Employee (MWh)	Ratio of the energy sold in MWh by the number of employees
Technical and Operational	Length of Distribution Network (Km)	Length (km) of the network reported by voltage
Technical and Operational	Number of Residential Connections per Employee (Number)	Ratio of the number of residential connections by the number of employees
Technical and Operational	Total Electricity Sold per Year (MWh)	Total electricity supplied in MWh or the amount of electricity that was put on the network
Technical and Operational	Total number of employees (Number)	Total number of employees related to electricity distribution activities
Quality	Average Duration of Interruptions per Subscriber (Hours/year)	Number of hours-subscriber the system was without power in a year, divided by the total number of subscribers. The equivalent is SAIDI, System Average Interruption Duration Index calculated by dividing the sum of all customer interruption durations, in minutes, by the total number of customers served
Quality	Average Frequency of Interruptions per Subscriber (Interruptions/year)	Average number of interruptions experienced by a consumer unit during one year. The equivalent is SAIFI, System Average Interruption Frequency Index calculated by dividing the total number of sustained customer interruptions by the total number of customers served
Access	Number of Residential Subscribers per 100 Households in the Concession Area (Residential Coverage)	Percentage of households connected in each concession area (residential service coverage = residential connection / number of households)
Access	Total Number of Connections (number)	Total number of connections (subscribers) in the utility area (i.e. Number of residential and non-residential connections)
Access	Total Number of Residential Connections (number)	Total number of residential connections (subscribers) in the utility area
Financial	Average Industrial Tariff (\$/MWh)	Average price per MWh of electricity sold to industrial consumers, including both fixed and variable components, in local nominal currency

Category	Indicator	Description
Financial	Average Residential Tariff (\$/MWh)	Average price per MWh of electricity sold to residential consumers, including both fixed and variable components, in local nominal currency.
Financial	CAPEX (capital expenditures) of the distribution services per connection (\$)	Expenditures to acquire, expand, repair, or renovate fixed assets, implying the purchase of goods and services whose benefits extend beyond the year and add to the company's assets
Financial	CAPEX of the distribution services per MWh sold (\$)	Same CAPEX definition than above but divided by the total energy sold (in MWhs)
Financial	OPEX (operation expenditures) of the distribution services per connection (\$)	Operating and maintenance costs, customer service and accounts expenses, sales expenses, administrative and general expenses
Financial	OPEX of the distribution services per MWh sold. (\$)	Same OPEX definition than above but divided by the total energy sold
Financial	TOTEX (total expenditures) of the distribution services per connection (\$)	Sum of OPEX and CAPEX (TOTEX = OPEX + CAPEX)
Financial	TOTEX of the distribution services per MWh sold (\$)	Same TOTEX definition than above but divided by the total energy sold (in MWhs)

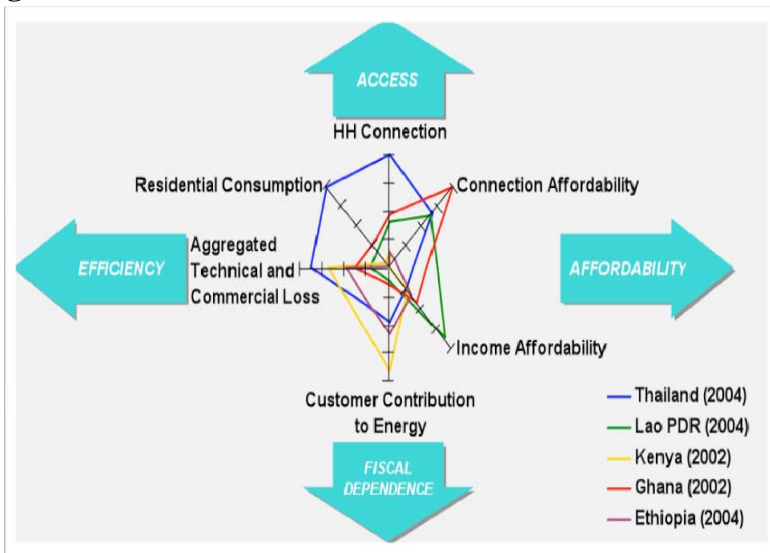
A2. 3. Preparation of Electricity Sector Core Performance Indicators, Report, TEPCO and PA Consulting, World Bank, 2007

The study identified a core set of 10 electricity performance indicators from a short list of 22 commonly used indicators in utility benchmarking studies. Selection of core indicators was based on rating each for simplicity, comparability, relevance and flexibility, as well as on the inputs of utility managers and data availability in five utilities in Africa and Asia that were surveyed for the benchmarking study. The indicators were categorized into four broad areas, namely, Access, Affordability, Fiscal Dependence, and Efficiency. Table A2.3 lists the indicators selected for the study. Figure A2.3 shows a comparative chart constructed from the core performance indices and data for five selected countries.

Table A2.3. Indicators Selected for the TEPCO/PA Consulting Study

Indicator	Description
Household Electrification Rate (%)	Number of Households with a Commercial Connection / Total households
Residential Consumption / Consumption Access (kWh/person/year)	National Residential Electricity Consumption per Year / Total Population
Connection Affordability (%)	National Weighted Average Connection Fee / Poverty Level HH Income
Income Affordability (%)	Cost of Subsistence Electricity / Poverty Income Level
System Affordability (km)	Population Weighted Distance of Un-electrified Villages from the Grid
Customers Contribution to Energy (\$/kWh sent out)	Collections from Customers / Energy Sent Out from Power Stations.
Return on Capital Employed (%)	Operating return / Capital Employed
Aggregated Technical and Commercial Losses (index)	1- Performance Verification Index (PVI); PVI= Revenue recovered/ energy units received in the system
Global Environmental Cost (kg C02 / kWh consumed)	Carbon Dioxide Emissions / Electricity Consumed
Electricity Elasticity of GDP(number)	$d(\text{Total Annual Electricity Consumption}) / d(\text{GDP})$

Figure A2.3. Core Performance Indices of Five Countries



A2.4. Jamasb, Tooraj, Newbery, Davis and Pollitt, Michael, Core Indicators for Determining Performance of the Electricity Sector in Developing Countries, World Bank Policy Research Working Paper #3599, 2005

The study provides a framework for benchmarking and analyzing utilities in developing countries undergoing sector reform. A set of core indicators spanning economic, social, technological and environmental aspects of sector reform is proposed. The indicators were chosen for their measurability, comparability and consistency as well as essentiality and complementarity in capturing reform impact on the utilities. Table A2.4 presents the indicators by category.

The framework and core of indicators proposed in this study, while broad and exhaustive, are more useful for analyzing the impacts of utility deregulation. The study provided, however, useful insights, in particular, in relation to inclusion of economic, social and environmental dimensions into benchmarking studies in developing countries.

Table A2.4. Core Indicators for Determinants and Performance of Electricity Sector in Developing Countries

<i>Category</i>	<i>Indicators</i>
Electric Sector Endowment and Characteristics	Electricity Generation Mix, Electricity Consumption Electricity Production Un-served Demand Electricity Intensity of GDP Number of Customers System Price to Cost ratio
Sector Reform	Date of Enactment of Reform Law State of Corporatization State of Privatization Unbundling of Generation, Transmission and Distribution Private Sector Participation Status of Retail Competition
Market Structure	Degree of Vertical Integration Number of Generation, Transmission and Distribution units Ownership of Generation, Transmission and Distribution units Wholesale Market Type and Size Access to Transmission Degree of Openness to Retail Marketing Role of IPPs, Type and Sizes
Regulation, Governance and Institution	Start Date of Regulator Transmission and Distribution Regulation

<i>Category</i>	<i>Indicators</i>
	Open Access Market Structure Regulation Type of Regulator (Budget, Appointment, etc) Power and Transparency of Regulators
Sector Performance	System Load Factor Plant Availability Factor Technical/Non-Technical Losses in T & D Reliability and Security of Service End-user Prices
Firm-Level Indicators	Energy Sold Maximum Demand Total Number of Customers Total Network Length Total Energy Loss Quality of Service (Reliability and Security) Total Costs (Capital, O&M, etc), Revenues Generation Capacity (by type, fuel type, etc) Energy Production (by type, fuel type, etc) Load Factor (avg. load/max capacity)
Macro-Level Indicators	GDP Energy and Electricity Intensity per GDP Status of Economic Liberalization Country Risk Index Institutional, Political, Judicial Strength Foreign Aid Ratio of GDP Literacy Rate
Economic Impacts	Source and Size of Investments in G, T, and D Government Investment in G,T,D as % of public budget
Social Impacts	End-user Prices Level of Electrification (households connected) Consumption per Capita
Environment	CO ₂ Emission by Sector Pollutant Emissions (SO ₂ , NO _x , Particulates, VOC, etc.)

A2. 5. Selection of Utility Distribution Key Performance Measures, Study Summary, PA Consulting Group and USAID-AFTEG, 2004

The study lists 25 key performance indicators grouped in three categories, namely, Technical, Commercial and Financial as shown Table A2.5. The study demonstrates in detail how each key indicator is computed from the data available at utilities. The study compares the KPIs of a subject utility with those of its peer, regional, best-in-class and benchmark utilities.

**Table A2.5. Key Performance Indicators Selected for the
USAID/AFTEG Study**

<i>Indicators</i>	<i>Description</i>
<i>Technical</i>	
Peak Demand Shortage (MVA)	Estimated demand of the un-served load at the time of the system peak, i.e., the maximum one-hour demand of the load that was not served since load shedding was in effect at the time of the system peak.
Energy Forecast Mismatch (MWh)	If positive, the excess capacity that was forecast and not used; If negative, the additional load that was served in excess of the load that was planned.
Power Availability (%)	Percentage of time when power is available to the distribution company.
Electricity Consumption Per Capita (kWh)	Per Capita Consumption
Load Factor (Per Unit)	Ratio of actual energy delivered per hour on the average to maximum hourly demand.
Transformer Failure Rate (%)	Ratio of the number of transformers that were damaged or failed to the average inventory during the year.
Overhead Line Failure Rate (Per Unit)	Ratio of faults during the year to the average circuit length for the year.
Billing Meter Failure Rate (%)	Billing meter failure rate, i.e., Ratio of the number of billing meters that were discovered failed during the year to the average meter inventory for the year.
Overhead "HT : LT" Ratio (Ratio)	HT:LT Ratio, i.e., Ratio of the length of the primary circuits to the length of the secondary circuits.
<i>Commercial</i>	
Number of Households with Access to Electricity (MVA)	Households with access to electricity
Energy Accounting (MWh)	Commercial Losses (kWh)
Collection Efficiency (%)	The ratio of the amount of money collected to the amount of money billed to customers; for the sales and use of electricity, not for other regulated or un-regulated charges or businesses.
Bad Debt on Collections (% of billed)	The ratio of the debt written off by the Financial Department to the total amount of money billed to customers for the sale of electricity.
Company Productivity Ratio 1	Number of customers per FTEE (Cust. per FTEE)
Company Productivity Ratio 2	Circuit length of Network (Km per FTEE)
Company Productivity Ratio 3	Total Peak Demand (unrestricted) per FTEE (MVA per FTEE)

<i>Indicators</i>	<i>Description</i>
Company Productivity Ratio 4	Sales per FTEE (LCU per FTEE)
Average Elapsed Time to Provide New Residential Connection (Days)	Average time to provide residential connection, i.e., the ratio of the total time to install all the new residential connections to the number of residential new connections
Response to supply complaints (Hours)	Average hours to respond to supply-related complaints, i.e., the ratio of the total time elapsed to resolve all the supply-related complaints to the total number of cases
Response to meter complaints (Days)	Average time to attend to meter problem, i.e., the ratio of the total number of cases to the total response time elapsed to attend to all meter complaints
Employee Training Index (Hours)	Average training hours per full time employee, the ratio of the total training hours to the average number of employees
<i>Financial</i>	
Capital Utilization (%)	Return on capital employed, i.e., the ratio of profit before interest and tax to the capital employed.
Financial Leverage (Ratio)	Debt to equity ratio, i.e., the ratio of total long-term liabilities to total shareholders' capital.
Short Term Debt Servicing (Ratio)	Current ratio, i.e., ratio of current assets to current liabilities.
R&M Expense (LCU)	Repair & Maintenance Expenses as % of Fixed Asset
R&M Expense (LCU)	Repair & Maintenance Expenses per 100 circuit miles
Administrative Expense (LCU)	Administrative & General Expenses per 1000 consumers
O&M Expense (%)	Return on capital employed, i.e., the ratio of profit before interest & tax to the capital employed.
Debt Service Capability (Ratio)	Debt to equity ratio, i.e., ratio of total long-term liabilities to total shareholders' capital.

A2.6. Performance Monitoring & Benchmarking in an Electricity Sector in Transition, Presentation by J. O. Makoju, Power Holding Company of Nigeria Plc., World Bank, March 6-10, 2006

The presentation focused on the need for performance monitoring and benchmarking in Nigeria, which, at the time, was unbundling its Electric Power Authority (NEPA) into regional holding companies and business units. The objective was to create the benchmarking framework that will be used to compare and contrast the performance of holding companies and utility business units. Table A2.6 lists some of the KPIs of the study, which

were selected in the context of utilities undergoing transition, as in the case in Nigeria. The KPIs are categorized according to each type of business unit, i.e., generation, transmission and distribution.

Table A2.6. Key Performance Indicators: Electricity Sector in Transition, Nigeria

<i>Indicator</i>	<i>Description</i>
Generation Business Units	
Generation Unit Cost (Naira/KWh)	Total Expenditure/Total Energy Delivered
Generation Utilization Index (ratio)	Actual Generation (MW)/Available Capacity (MW)
Capacity Utilization Index (ratio)	Availability (MW)/Installed Capacity (MW)
Fuel Cost per unit Generation (Naira/MWh)	Total Cost of Fuel/Total Energy Generated
Staff Cost Index (Naira/employee)	Total Expenditure/Number of Employees
Staff Productivity Index (MWh/employee)	Total Energy Delivered/Number of Employees
Breakdown Mtce. Index (ratio)	No. of Breakdowns rectified/reported
Plant Reliability Index (ratio)	Time of Reporting Period/Total Downtime of Unavailable Units
Transmission Business Units	
Grid Loss Ratio (ratio)	Energy Dispatched to Distribution/Energy Received from Generation
Transformer Capacity Utilization Index (ratio)	Transformer Max Load/Installed Capacity
Transmission Cost Index (ratio)	Total Monthly Expenditure/Energy Received from Generation
Staff Productivity (MWh/employee)	Energy Received from Generation/Average Number of Employees
Dispatch Unit Cost (Naira/MWh)	Total Operation Expenditure/Energy Delivered to Distribution
Transmission Losses (ratio)	(Energy from Power Stations-Energy Delivered)/Energy from Power Stations
Distribution Business Units	
Fault Clearance Index - (ratio)	Total Faults Cleared/Total Faults Reported
Collection Efficiency (ratio)	Total Monthly Cash Collection (Naira)/Monthly Billing Revenue (Naira)
Capacity Utilization Index (ratio)	Maximum Monthly Load (MW)/Installed Capacity (MW)
Metering Ratio (ratio)	Total Number of Customers Metered/Total Number of Customers
Customer Complaints Response Time (ratio)	Time from Customer Enquiries/Time to Resolution

Annex III. Glossary of indicators and terms

I. Power system indicators and terms

Distribution feeders, Length, Low voltage (up to 415V) (km)

Total cumulative length of all feeders below 415V.

Distribution feeders, Length, Medium voltage (415V to 11kV) (km)

Total cumulative length of all feeders from 415V to 11kV.

Distribution feeders, Total (number)

Total number of feeders installed in the network.

Distribution network length, All voltages (km)

Total length of transmission and distribution networks in kilometers.

NOTE: The figures may vary because some systems do not report lowest voltage networks. Categorizations for network voltage levels vary by source (e.g., some consider LV to be only up to 11kV or even lower).

Distribution network length, Low voltage (<34.5kV) (km)

Total length of distribution network below 34.5 kV.

NOTE: Categorizations for network voltage levels vary by source (e.g., some consider LV to be only up to 11kV or even lower).

Distribution network length, Medium voltage (34.5 to 66kV) (km)

Total length of distribution network from 34.5 to 66 kV.

NOTE: Categorizations for network voltage levels vary by source (e.g., some consider LV to be only up to 11kV or even lower).

Distribution transformers, Average capacity (kVA)

Total capacity of all distribution transformers divided by the number of distribution transformers.

Distribution transformers, Total number, all ratings (number)

Total number of distribution transformers installed of all ratings.

Installed capacity, Coal-fired (MW)

Total installed capacity of all coal-fired generation units.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Conventional thermal (MW)

The combined installed capacity of all conventional thermal generation units (oil, gas, coal).

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Gas-fired (MW)

Total installed capacity of all gas-fired generation units.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Hydro-electric (MW)

Total installed capacity of all hydro power units.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Nuclear (MW)

Total installed capacity of all nuclear plants.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Off-grid (MW)

Total installed capacity of all of the isolated power plants or local grids that are not part of an interconnected network. Off-grid generation capacity does not include captive generation (industrial or commercial "inside the fence" capacity, e.g. mines, factories, etc.).

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Oil-fired (MW)

Total installed capacity of oil-fired generation units.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, On-grid (MW)

Total installed capacity of all units in the interconnected network(s).

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Other renewables (MW)

Total installed capacity of all non-hydro renewable generation units.

See "Installed capacity, Total (MW)" for definition of installed capacity.

Installed capacity, Total (MW)

The maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator nameplate capacity is commonly expressed in megawatts (MW) and is usually indicated on a nameplate physically attached to the generator. The series include installed IPP generation capacity but excludes captive generation and self-generation capacities.

NOTE: Available operating capacity may be significantly lower than installed capacity.

Operating capacity, Total (MW)

The average amount of generation capacity in functional condition, available for production. Operating generation capacity includes capacity under planned maintenance. The IEA defines operating capacity as "the sum of all individual plants' maximum capacities available during a period of at least 15 hours per day."

Rural isolated networks, Number of (number)

The number of isolated networks in the rural areas. This includes local village networks, etc.

Rural isolated networks, People served (thousands)

Total number of people served by the rural isolated networks.

Substations, Total number, all voltage levels (number)

Total number of substations of all voltage levels.

Transmission network length, High voltage (>66kV) (km)

Total length of transmission network above 66 kV.

NOTE: Categorizations for network voltage levels vary by source (e.g., some consider LV to be only up to 11kV or even lower).

II. Operational indicators and terms

Capacity factor, Annual (%)

Electricity generation, Net (MWh) divided by Installed Capacity (MW) times 8760 hours, expressed as a percentage. The ratio of a power plant's actual generation to its maximum potential generation over a certain time period. The "maximum potential" generation is determined by assuming continuous output at the power plant's rated capacity. For example, a 10 MW plant operating for 10 hours would have maximum potential generation of 100 MWh; if it instead generated 50 MWh, it would have a capacity factor of 50 percent.

Connections per employee (number)

The number of connections divided by the number of full time equivalent employees.

Demand, Annual on-grid (GWh)

Total load served in the interconnected network(s) during the year in question. It is calculated as: "Electricity generation, net" plus "Electricity imported" and thus includes system losses.

Demand, Daily average (GWh)

This can be calculated as Total energy served in a year divided by 365 days.

Electricity exported (GWh)

Total electricity sold to foreign countries.

See "Electricity traded" for information on wheeling.

Electricity generation, Net, Coal-fired (GWh)

Net electricity generated by all oil-fired generation units.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Conventional thermal (GWh)

Net electricity generation of all conventional thermal generation units (oil, gas, coal).

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Gas-fired (GWh)

Net electricity generated by all coal-fired generation units.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Hydro-electric (GWh)

Net electricity generated by all hydro power units.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Nuclear (GWh)

Net electricity generated by all nuclear plants.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Off-Grid (GWh)

Net electricity generated by the isolated power plants or local grids that are not part of an interconnected network. Off-grid generation does not include captive generation (industrial or commercial "inside the fence" capacity, e.g. mines, factories, etc.).

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Oil-fired (GWh)

Net electricity generated by all gas-fired generation units.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, On-Grid (GWh)

Net electricity generated by all units in the interconnected network(s).

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Other renewables (GWh)

Net electricity generated by all non-hydro renewable generation units.

See "Electricity generation, Net, Total (GWh)" for details on net generation.

Electricity generation, Net, Total (GWh)

Total electricity generated by the utility or generation company and Independent Power Producers (IPPs) excluding captive generation (industrial or commercial "inside the fence" capacity, e.g. mines, factories, etc.). Net generation (as opposed to gross generation) excludes the energy consumed by the generating units and also excludes generation from hydroelectric pumped storage. The International Energy Agency (IEA) notes that "The difference between gross and net production is generally calculated as 7 per cent for conventional thermal stations, 1 per cent for hydro stations, and 6 per cent for nuclear, geothermal and solar stations. Hydro stations' production includes production from pumped storage plants."

Electricity imported (GWh)

Total electricity bought from foreign countries. See "Electricity traded" for information on wheeling.

Electricity purchased from IPPs (GWh)

Total amount of electricity purchased by the national generation and distribution companies from independent power producers (IPPs).

Electricity purchased, Total (GWh)

Total amount of electricity purchased by the national generation and distribution companies from independent power producers (IPPs) and foreign countries (net of exports).

Electricity sold, High voltage industrial (GWh)

Volume of electricity sales billed to high voltage (HV) industrial customers.

See "Electricity sold, Total (GWh)" for details.

Electricity sold, Medium voltage commercial (GWh)

Volume of electricity sales billed to medium voltage (MV) commercial customers.

See "Electricity sold, Total (GWh)" for details.

Electricity sold, Residential and low voltage business (GWh)

Volume of electricity sales billed to residential and low-voltage (LV) commercial customers.

See "Electricity sold, Total (GWh)" for details.

Electricity sold, Total (GWh)

The total volume (GWh) of electricity billed to national customers.

NOTE: Might differ from power consumption, as the latter could be calculated to include non-technical losses.

Electricity traded (GWh)

Electricity imported minus Electricity exported. Amounts are considered imported or exported when they have crossed the national territorial boundaries of the country. If electricity is "wheeled" or transited through a country, the amount is shown as both import and export.

Employees, Total full time equivalent (number)

The number of full time equivalent employees is calculated as number of hours worked by full-time and part time employees divided by the number of hours in a full working day. Thus, employees working half time are to be counted as half an employee and so on.

Load factor, Annual (%)

Electricity generation, Net (MWh) divided by Peak demand (MW) times 8760 hours, expressed as a percentage. The load factor gives an idea of how the operating capacity of the generation companies is used.

Losses, Distribution (%)

Electricity delivered for national distribution minus Electricity billed (expressed as percentage). Thus, it is energy lost in distribution as percentage of energy delivered for distribution.

Losses, Non-technical (%)

Consist mainly of unmetered and unbilled consumption, including consumption through illegal connections and incorrect estimation of legal consumption due to tempering with meters and inadequate fixed billing (expressed as percentage of Net generation).

NOTE: Non-technical losses can also be referred to as commercial losses.

NOTE: Non-technical losses are difficult to measure separately from technical losses.

Losses, Technical (%)

Technical losses consist of resistance and iron core losses, which occur during the transmission and distribution process.

NOTE: Technical losses are difficult to measure separately from non-technical losses.

Losses, Total system (%)

Total load served (GWh) minus Electricity billed (GWh) divided by Total load served (GWh) (expressed as percentage). Total system losses is total amount of energy lost during transmission and distribution of electricity. System losses can be divided into technical and non-technical losses, the latter including theft, commercial and metering losses. They do not account for non-payment by end users. For technical losses, see "Losses, Technical (%)".

Losses, Transmission (%)

Total load served minus Electricity delivered for distribution divided by Total load served (expressed as percentage). Thus, it is energy lost in transmission as percentage of energy transmitted.

Operating meters rate, Residential and low voltage business (%)

Percentage of residential or low-voltage customers that have an operating meter. In practice, this may be approximated by percentage of customers who are billed based on metering (including prepayment metering) as opposed to consumption estimation.

Operating-to-installed capacity ratio (%)

Operating capacity divided by installed capacity, expressing as a percentage. Indicates the extent to which plant installed capacity is maintained for operation.

Peak load, Annual, On-grid (MW)

The maximum load of the interconnected system(s) during the year question. In case a country has multiple interconnected systems it is the sum of peak demands of each of these systems.

Prepayment meters rate (%)

The number of customers who have prepayment meters divided by the number of customers with operating meters (expressed as percentage).

Reserve margin (%)

Installed capacity less peak load, as a percentage of peak load.

Sales per employee (MWh/employee)

Total electricity sold divided by the full-time equivalent number of employees.

III. Financial indicators and terms

Accounts receivable (days)

Average number of days the utility takes to collect outstanding accounts receivable considering past year's experience with the average number of days between service provision and payment receipt. Calculated as: $[365 \text{ Days} / (\text{Annual Operating Revenues} / \text{Year-end Accounts Receivable})]$.

Average annual revenue per residential or low voltage customer (LCU)

See the corresponding series in USD for a description.

Average annual revenue per residential or low voltage customer (USD)

"Revenues from electricity billed" divided by "Customers, Residential or low voltage business (thousands)".

Average connection charge, Residential customers (LCU)

See the corresponding series in USD for a description.

Average connection charge, Residential customers (USD)

The average connection charge is calculated by dividing total connection charges by the number of new customers. The difference between number of customers in a given year and the year before can be used as the number of new customers if the actual number of new connections is not available.

Average electricity tariff, All customers (LCU/kWh)

See the corresponding series in USD for a description.

Average electricity tariff, All customers (USD/kWh)

Total revenue from electricity billed divided by electricity billed (kWh).

Average electricity tariff, Residential customers and low voltage business (LCU/kWh)

See the corresponding series in USD for a description.

Average electricity tariff, Residential customers and low voltage business (USD/kWh)

Revenue from residential customers divided by electricity billed to residential customers (kWh).

Average operating expenses per kWh (LCU/kWh)

See the corresponding series in USD for a description.

Average operating expenses per kWh (USD/kWh)

Operating expenses divided by Total load served.

Capital expenditure, Total (LCU, millions)

See the corresponding series in USD for a description.

Capital expenditure, Total (USD, millions)

Capital expenditure includes all investments made by the company in plant property, equipment, and other infrastructure.

Collection ratio (%)

Revenue as percentage of billings. Calculated as: [Accounts receivables (year opening) + Revenue - Accounts receivables (year closing)] / Billings.

Current ratio (number)

Total current assets divided by total current liabilities.

Debt-equity ratio (number)

Total liabilities divided by total equity.

Debt-service coverage ratio (number)

Cash income divided by debt service liability.

Effective residential tariff at 100 kWh/month consumption level

Price paid for 1 kWh if 100 kWh is consumed per month. The indicator is calculated using tariff schedules and includes fixed and volume-based electricity charges.

Gross fixed assets, Book value (LCU, millions)

See the corresponding series in USD for a description.

Gross fixed assets, Book value (USD, millions)

Total value of fixed assets as reflected in the balance sheet at the end of the year, excluding depreciation.

Gross fixed assets, Date of last revaluation (year)

The year when fixed assets were last revalued.

Historical Cost Recovery Ratio (%)

Ratio of the effective residential tariff to the historical normative cost, expresses as percentage.

Labor costs, Total (LCU, millions)

See the corresponding series in USD for a description.

Labor costs, Total (USD, millions)

Wages, expenses, and benefits of employees.

Operating expenses covered by revenues (%)

Operating expenses divided by revenues billed, expressed as percentage.

Operating expenses, Total (LCU, millions)

See corresponding series in USD for a description.

Operating expenses, Total (USD, millions)

Comprises all recurrent costs plus depreciation plus financial costs (such as debt service and interest charges, foreign exchange losses), before taxes.

Operating ratio (%)

Operating expenses as percentage of total revenue.

Return on assets (%)

Annual earnings divided by total assets, expressed as percentage.

Return on equity (%)

Net income divided by total equity, expressed as percentage.

Revenue per employee (USD/employee)

Total revenues divided by number of full-time equivalent employees.

Revenue, Annual, Average (US cents/kWh)

Revenues from electricity billed per unit of electricity (kWh) billed

Revenues from electricity billed (LCU, millions)

See the corresponding series in USD for a description.

Revenues from electricity billed (USD, millions)

Revenue from electricity sales only. Does not include revenue from connection charges or other services fees, or revenues from non-electricity activities.

Revenues from electricity billed, High voltage industrial (LCU, millions)

See the corresponding series in USD for a description.

Revenues from electricity billed, High voltage industrial (USD, millions)

Revenue from electricity billed to high voltage customers, the majority of whom are industrial customers.

Revenues from electricity billed, Medium voltage commercial (LCU, millions)

See the corresponding series in USD for a description.

Revenues from electricity billed, Medium voltage commercial (USD, millions)

Revenues from electricity billed to medium voltage customers, the majority of whom are commercial customers.

Revenues from electricity billed, Residential and low voltage business (LCU, millions)

See the corresponding series in USD for a description.

Revenues from electricity billed, Residential and low voltage business (USD, millions)

Revenues from electricity billed to residential and other low voltage customers (e.g., commercial).

Revenues, Total (LCU, millions)

See the corresponding series in USD for a description.

Revenues, Total (USD, millions)

Total revenue of the utility before indirect taxes

Value of sales to commercial/MV customers, LCU/year

Total annual value of electricity sales to commercial/MV customers, LCU

Value of sales to commercial/MV customers, USD/year

Total annual value of electricity sales to commercial/MV customers, USD

IV. Service indicators and terms

Access to electricity, Households, National (%)

Household access to electricity, derived from household surveys' data, national level.

Also referred to as household electrification rate.

Access to electricity, Households, Rural (%)

Household access to electricity, derived from household surveys' data, rural households.

Access to electricity, Households, Urban (%)

Household access to electricity, derived from household surveys' data, urban households.

Access to electricity, Households, utility data (%)

Household access to electricity, derived from utility customer data, calculated as Residential customers divided by Population in the utility service area times

Complaints about deficient service (number/year)

The total number of complaints related to deficient service during the year in question.

Customers, High voltage industrial (thousands)

Number of high voltage connections (mainly supplying industrial customers).

Customers, Medium voltage commercial (thousands)

Number of medium voltage connections (mainly supplying commercial customers).

Customers, Non-residential (thousands)

Number of non-residential connections.

Customers, Residential or low voltage business (thousands)

Number of residential connections.

Customers, Total (thousands)

Total number of utility connections.

Delay in Obtaining an Electrical Connection for businesses (days)

Average delay for businesses to obtain connection, derived from enterprise surveys.

Electricity consumption, Annual per capita of total consumption (kWh/person)

Total electricity consumption divided by country population.

Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)

Electricity billed to residential and low-voltage customers divided by the number of residential and low voltage customers, divided by twelve to convert from annual to monthly data.

Electricity consumption, Residential (GWh)

Consumption of electricity by residential users (GWh). Energy Statistics Database, International Energy Agency.

Electricity consumption, Total (GWh)

Electric power consumption measures production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants.

Energy Statistics and Balances of Non-OECD Countries and Energy Statistics of OECD Countries, International Energy Agency.

Outages for firms (days per year)

Average number of days without electricity for commercial (business) customer per year, derived from enterprise surveys.

Outages, Frequency rate (number/year)

Average number of outages per customer, utility data.

Outages, number in a typical month (number)

Average number of outages per commercial (business) customer in a typical month, derived from enterprise surveys.

Population with electricity (millions)

Population with access to electricity.

World Energy Outlook, International Energy Agency: data compiled from national and international sources.

Population without electricity (millions)

Population without access to electricity.

World Energy Outlook, International Energy Agency: data compiled from national and international sources.

Value lost due to power outages (% of sales)

Value of sales lost due to power outages (based on Enterprise surveys)

V. General indicators and terms

Country GDP (in current USD million)

GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used. World Bank national accounts data, and OECD National Accounts data files.

Country GDP per capita (constant 2000 US\$)

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any

product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars. World Bank national accounts data, and OECD National Accounts data files.

Country population (millions)

Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are midyear estimates. World Bank staff estimates from various sources including census reports, the United Nations Population Division's World Population Prospects, national statistical offices, household surveys conducted by national agencies, and Macro International.

Exchange rate (LCU/USD, market rate, annual average)

Average market exchange rate in the period in local currency per US dollar (from IMF).

Household average size (number)

The national average household size based on household survey data.

Population density (people per sq. km)

Number of people per square kilometer.

Population using biomass as primary cooking fuel (%)

Percentage of population using biomass as their primary energy source for cooking fuel.

Annex IV. ASK Database: Country Data Tables

NOTES REGARDING DATABASE APPROACH, SELECTION OF ASK DATA FOR THE COUNTRY DATA TABLES AND THE TABLE LABELS:

The approach used by the authors of the ASK database is to collect and presents non-edited data, replicating the original sources. Data from one source might be inconsistent with data from other sources. The ASK database authors did not aim at increasing data consistency by editing or eliminating any of the data series or data points, but rather made an effort to create a fully inclusive database.

At the same time, when the same indicator was available from more than one source, database authors selected one of these sources as primary, based on a combined criterion of data reliability, length of time series, and source accessibility for users. When an indicator was available from one source, this source was also marked as primary. Tables below contain data from primary sources.

“New data” column is left blank to be used by the reader as a journal: for filling out with the data collected, e.g., during missions.

“na” means “not available”.

Angola

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	12	2000	15	2004		
Capacity factor, Annual (%)	na	na	41	2005		
Country GDP (in current USD mln)	10,260	1990	58,547	2007		
Country GDP per capita (constant 2000 USD)	803	1990	1,284	2007		
Country population (mln)	10.5	1990	17.0	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	60	2006		
Electricity consumption, Annual per capita of total (kWh/person)	60	1990	141	2005		
Electricity consumption, Residential (GWh)	437	1992	1,236	2004		
Electricity consumption, Total (GWh)	630	1990	2,269	2005		
Electricity generation, Net, Conventional thermal (GWh)	451	1992	855	2005		
Electricity generation, Net, Hydro (GWh)	832	1992	1,730	2005		
Electricity generation, Net, Total (GWh)	1,284	1990	2,590	2005		
Household average size (number)	na	na	6.2	2005		
Installed capacity, Conventional thermal (MW)	205	1992	332	2005		
Installed capacity, Hydro (MW)	412	1992	497	2005		
Installed capacity, Total (MW)	617	1992	830	2005		
Losses, Total system (%)	25	1990	14	2005		
Outages, Number in a typical month (number)	na	na	7.8	2006		
Peak load, Annual, On-grid (MW)	na	na	397	2005		
Population density (people per sq. km)	8.5	1990	13.3	2006		
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Population with electricity (mln)	1.6	2000	2.4	2004		
Population without electricity (mln)	12	2000	14	2004		
Value lost due to power outages (% of sales)	na	na	3.7	2006		

Benin

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	15	1996	29	2003		
Access to electricity, Households, Rural (%)	2.0	1996	12	2003		
Access to electricity, Households, Urban (%)	35	1996	55	2003		
Accounts receivable (days)	na	na	184	2005		
Average operating expenses per kWh (LCU/kWh)	na	na	11	2005		
Average operating expenses per kWh (USD/kWh)	na	na	0.02	2005		
Capacity factor, Annual (%)	na	na	21	2005		
Connections per employee (number)	na	na	148	2005		
Country GDP (in current USD mln)	1,845	1990	5,428	2007		
Country GDP per capita (constant 2000 USD)	273	1990	328	2007		
Country population (mln)	5.2	1990	9.0	2007		
Customers, High voltage industrial (thousands)	0	2000	0	2005		
Customers, Medium voltage commercial (thousands)	0.46	2000	0.48	2005		
Customers, Residential or low voltage business (thousands)	199	2000	306	2005		
Debt-service coverage ratio (number)	na	na	5.9	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	72	2004		
Distribution network length, Low voltage (<34.5kV) (km)	2,788	2000	3,428	2005		
Distribution network length, Medium voltage (34.5-66kV) (km)	1,339	2000	1,762	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	14	2003		
Electricity consumption, Annual per capita of total cons. (kWh/person)	34	1990	69	2005		
Electricity consumption, Average monthly sales to residential and low voltage business customers (kWh/month)	618	2000	415	2005		
Electricity consumption, Residential (GWh)	81	1992	225	2004		
Electricity consumption, Total (GWh)	174	1990	589	2005		
Electricity generation, Net, Conventional thermal (GWh)	23	1992	104	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	1	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity generation, Net, Total (GWh)	23	1992	105	2005		
Electricity imported (GWh)	255	1995	595	2005		
Electricity sold, High voltage industrial (GWh)	na	na	7	2005		
Electricity sold, Medium voltage commercial (GWh)	123	2000	127	2005		
Electricity sold, Residential and low voltage business (GWh)	123	2000	127	2005		
Electricity traded (GWh)	255	1995	595	2005		
Employees, Total full time equivalent (number)	1,684	2000	2,070	2005		
Gross fixed assets, Book value (LCU, mln)	na	na	464	2005		
Gross fixed assets, Book value (USD, mln)	na	na	0.9	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	99	2005		
Household average size (number)	na	na	4.9	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	15	1992	55	2005		
Installed capacity, Gas (% of total)	0	1992	0	2005		
Installed capacity, Hydro (MW)	67	1995	67	2005		
Installed capacity, Hydro (% of total)	na	na	0	2005		
Installed capacity, Off-grid (MW)	18	2000	36	2005		
Installed capacity, Oil (% of total)	na	na	100	2005		
Installed capacity, Total (MW)	15	1992	122	2005		
Labor costs, Total (LCU, mln)	na	na	6,880	2005		
Labor costs, Total (USD, mln)	na	na	13	2005		
Losses, Non-technical (%)	15	2000	13	2005		
Losses, Total system (%)	14	2000	18	2005		
Operating capacity, Total (MW)	39	2000	44	2005		
Operating expenses covered by revenue (%)	na	na	69	2005		
Operating expenses, Total (LCU, mln)	na	na	35,778	2005		
Operating expenses, Total (USD, mln)	na	na	68	2005		
Operating-to-Installed capacity ratio (%)	33	2000	36	2005		
Peak load, Annual, On-grid (MW)	95	2000	120	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Population density (people per sq. km)	47	1990	79	2006	
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Population with electricity (mln)	1.4	2000	1.8	2004		
Population without electricity (mln)	4.9	2000	6.5	2004		
Prepayment meters rate (%)	na	na	6.8	2005		
Revenue, Annual, Average (US cents/kWh)	na	na	14	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	na	na	na	na		
Revenue from electricity billed, High voltage industrial (USD, mln)	na	na	na	na		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	na	na	na	na		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	na	na	na	na		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	na	na	na	na		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	na	na	na	na		
Rural isolated networks, People served (thousands)	na	na	na	na		
Transmission network length, High voltage (>66kV) (km)	111	2000	111	2005		
Value lost due to power outages (% of sales)	na	na	6.5	2004		

Botswana

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	22	2000	39	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.04	2007		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	na	na	0.10	2003		
Capacity factor, Annual (%)	na	na	84	2005		
Connections per employee (number)	960	2000	1,031	2003		
Country GDP (in current USD mln)	3,792	1990	11,781	2007		
Country GDP per capita (constant 2000 USD)	2,483	1990	4,625	2007		
Country population (mln)	1.4	1990	1.9	2007		
Customers, Total (thousands)	54	1997	109	2003		
Delay in obtaining an electrical connection for businesses (days)	na	na	25	2006		
Distribution network length, All voltages (km)	408	1996	1,415	2003		
Electricity consumption, Annual per capita of total consumption (kWh/person)	724	1990	1,406	2005		
Electricity consumption, Residential (GWh)	97	1992	540	2004		
Electricity consumption, Total (GWh)	990	1990	2,581	2005		
Electricity generation, Net, Conventional thermal (GWh)	1,088	1992	912	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	906	1990	971	2005		
Electricity imported (GWh)	340	1995	1,754	2005		
Electricity purchased, Total (GWh)	278	1992	1,606	2003		
Electricity sold, Residential and low voltage business (GWh)	95	1992	420	2003		
Electricity sold, Total (GWh)	941	1992	2,150	2003		
Electricity traded (GWh)	340	1995	1,754	2005		
Employees, Total full time equivalent (number)	1,740	2000	2,086	2003		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Installed capacity, Conventional thermal (MW)	217	1992	132	2005	
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	217	1992	132	2005		
Losses, Distribution (%)	6.4	1994	12	2003		
Losses, Total system (%)	na	na	20	2004		
Operating expenses, Total (LCU, mln)	na	na	538	2003		
Outages, Number in a typical month (number)	na	na	1.7	2006		
Peak load, Annual, On-grid (MW)	na	na	434	2005		
Population density (people per sq. km)	2.4	1990	3.3	2006		
Population with electricity (mln)	0.3	2000	0.7	2004		
Population without electricity (mln)	1.2	2000	1.1	2004		
Revenue from electricity billed (LCU, mln)	na	na	506	2003		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	na	na	118	2003		
Revenue, Total (LCU, mln)	na	na	507	2003		
Value lost due to power outages (% of sales)	na	na	1.4	2006		

Burkina Faso

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data
	Data	Year	Data	Year	
	Access to electricity, Households, National (%)	6.1	1992	11	
Access to electricity, Households, Rural (%)	0.6	1992	0.8	2003	
Access to electricity, Households, Urban (%)	29	1992	52	2003	
Accounts receivable (days)	235	2000	145	2005	
Average annual revenue per residential or low voltage customer (USD)	154	2000	262	2005	
Average connection charge, Residential customers (LCU)	na	na	210,000	2005	
Average connection charge, Residential customers (USD)	na	na	398	2005	
Average operating expenses per kWh (LCU/kWh)	95	2000	89	2005	
Average operating expenses per kWh (USD/kWh)	0.13	2000	0.17	2005	
Capacity factor, Annual (%)	na	na	33	2005	
Collection ratio (%)	70	2000	96	2005	
Connections per employee (number)	na	na	156	2005	
Country GDP (in current USD mln)	3,101	1990	6,767	2007	
Country GDP per capita (constant 2000 USD)	175	1990	260	2007	
Country population (mln)	8.9	1990	15	2007	
Customers, High voltage industrial (thousands)	0	2000	0	2005	
Customers, Medium voltage commercial (thousands)	0.61	2000	0.75	2005	
Customers, Non-residential (thousands)	0.5	1992	0.7	2003	
Customers, Residential or low voltage business (thousands)	181	2000	255	2005	
Customers, Total (thousands)	70	1992	256	2005	
Debt-service coverage ratio (number)	6.2	2000	0.6	2005	
Delay in obtaining an electrical connection for businesses (days)	na	na	20	2006	
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	1,019	2000	1,623	2005	
Distribution feeders, Total (number)	104	2000	107	2005	
Distribution network length, All voltages (km)	1,929	1992	4,393	2003	
Distribution network length, Low voltage (<34.5kV) (km)	3,722	2000	4,892	2005	
Distribution network length, Medium voltage (34.5..66kV) (km)	1,019	2000	1,623	2005	
Distribution transformers, Total including all ratings (number)	1,105	2000	1,517	2005	

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	20	2006		
Electricity consumption, Average monthly sales to residential and low voltage business customers (kWh/month)	1,073	2000	1,329	2005		
Electricity generation, Net, Conventional thermal (GWh)	170	1992	415	2005		
Electricity generation, Net, Hydro (GWh)	20	1992	100	2005		
Electricity generation, Net, Off-grid (GWh)	27	2000	59	2005		
Electricity generation, Net, Total (GWh)	191	1992	516	2005		
Electricity purchased, Total (GWh)	na	na	125	2005		
Electricity sold, High voltage industrial (GWh)	0	2000	0	2005		
Electricity sold, Medium voltage commercial (GWh)	136	2000	198	2005		
Electricity sold, Residential and low voltage business (GWh)	195	2000	339	2005		
Electricity sold, Total (GWh)	331	2000	537	2005		
Employees, Total full time equivalent (number)	1,325	2000	1,428	2005		
Gross fixed assets, Book value (LCU, mln)	105,638	2000	151,900	2005		
Gross fixed assets, Book value (USD, mln)	148	2000	288	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	85	2005		
Household average size (number)	na	na	6.4	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	64	1992	148	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	25	2005		
Installed capacity, Hydro (MW)	14	1992	32	2005		
Installed capacity, Off-grid (MW)	31	2000	47	2005		
Installed capacity, Oil (% of total)	na	na	75	2005		
Installed capacity, Total (MW)	78	1992	180	2005		
Labor costs, Total (LCU, mln)	6,101	2000	8,670	2005		
Labor costs, Total (USD, mln)	8.6	2000	16	2005		
Losses, Distribution (%)	na	na	11	2005		
Losses, Non-technical (%)	12	2000	13	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Losses, Total system (%)	na	na	8.0	2004		
Operating capacity, Total (MW)	764	1994	180	2005		
Operating expenses covered by revenue (%)	na	na	86	2005		
Operating expenses, Total (LCU, mln)	31,432	2000	47,894	2005		
Operating expenses, Total (USD, mln)	44	2000	91	2005		
Operating-to-Installed capacity ratio (%)	100	2000	100	2005		
Outages, Number in a typical month (number)	na	na	10	2006		
Peak load, Annual, On-grid (MW)	na	na	105	2005		
Population density (people per sq. km)	32	1990	52	2006		
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Population with electricity (mln)	1.6	2000	0.9	2004		
Population without electricity (mln)	10	2000	12	2004		
Prepayment meters rate (%)	10	2000	10	2005		
Revenue, Annual, Average (US cents/kWh)	na	na	20	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	0	2000	0	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	0	2000	0	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	11,672	2000	20,672	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	16	2000	39	2005		
Revenue from electricity billed, Resid. & low voltage business (LCU, mln)	19,874	2000	35,198	2005		
Revenue from electricity billed, Resid. & low voltage business (USD, mln)	28	2000	67	2005		
Rural isolated networks, People served (thousands)	na	na	300	2007		
Substations, Total including all voltage levels (number)	1,105	2000	1,517	2005		
Transmission network length, High voltage (>66kV) (km)	425	2000	588	2005		
Value lost due to power outages (% of sales)	na	na	3.9	2006		

Burundi

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	3.9	1998	na	na		
Access to electricity, Households, Rural (%)	0.9	1998	na	na		
Access to electricity, Households, Urban (%)	61	1998	na	na		
Country GDP (in current USD mln)	1,132	1990	974	2007		
Country GDP per capita (constant 2000 USD)	152	1990	101	2007		
Country population (mln)	5.7	1990	8.5	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	24	2006		
Electricity generation, Net, Conventional thermal (GWh)	2.0	1992	2.0	2005		
Electricity generation, Net, Hydro (GWh)	104	1992	135	2005		
Electricity generation, Net, Total (GWh)	106	1992	137	2005		
Electricity imported (GWh)	29	1995	34	2005		
Electricity traded (GWh)	29	1995	34	2005		
Household average size (number)	na	na	4.9	2005		
Installed capacity, Conventional thermal (MW)	11	1992	12	2005		
Installed capacity, Hydro (MW)	32	1992	45	2005		
Installed capacity, Total (MW)	43	1992	57	2005		
Losses, Total system (%)	na	na	15	2004		
Outages, Number in a typical month (number)	na	na	12	2006		
Population density (people per sq. km)	222	1990	318	2006		
Population using biomass as primary cooking fuel (%)	na	na	99	2004		
Value lost due to power outages (% of sales)	na	na	11	2006		

Cameroon

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Access to electricity, Households, National (%)	29	1991	47	2004	
Access to electricity, Households, Rural (%)	8.7	1991	16	2004		
Access to electricity, Households, Urban (%)	63	1991	77	2004		
Accounts receivable (days)	100	2000	74	2004		
Average annual revenue per residential or low voltage customer (USD)	100	2000	299	2005		
Average connection charge, Residential customers (LCU)	na	na	150,000	2004		
Average connection charge, Residential customers (USD)	211	2000	283	2004		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	53	1992	61	2003		
Average operating expenses per kWh (LCU/kWh)	18	2000	67	2005		
Average operating expenses per kWh (USD/kWh)	0.03	2000	0.13	2005		
Capacity factor, Annual (%)	52	2000	50	2005		
Collection ratio (%)	78	2000	94	2005		
Connections per employee (number)	na	na	180	2005		
Country GDP (in current USD mln)	11,152	1990	20,644	2007		
Country GDP per capita (constant 2000 USD)	718	1990	695	2007		
Country population (mln)	12	1990	19	2007		
Customers, High voltage industrial (thousands)	0.03	2000	0.03	2005		
Customers, Medium voltage commercial (thousands)	1.12	2000	1.26	2005		
Customers, Non-residential (thousands)	1.1	1992	1.2	2003		
Customers, Residential or low voltage business (thousands)	495	2000	527	2005		
Customers, Total (thousands)	369	1992	505	2003		
Delay in obtaining an electrical connection for businesses (days)	na	na	79	2006		
Distribution network length, Low voltage (<34.5kV) (km)	10,116	2000	10,560	2005		
Distribution network length, Medium voltage (34.5-.66kV) (km)	10,392	2000	11,135	2005		
Distribution transformers, Total including all ratings (number)	6,760	2000	6,874	2005		
Effective residential tariff at 100 kWh/month cons. level (US cents)	na	na	14	2003		
Electricity consumption, Annual per capita of total consumption	192	1990	196	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
(kWh/person)						
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	1,318	2000	2,035	2005		
Electricity consumption, Residential (GWh)	340	1992	548	2004		
Electricity consumption, Total (GWh)	2,345	1990	3,490	2005		
Electricity generation, Net, Conventional thermal (GWh)	71	1992	216	2005		
Electricity generation, Net, Hydro (GWh)	2,624	1992	3,874	2005		
Electricity generation, Net, Off-grid (GWh)	28	2000	52	2005		
Electricity generation, Net, Total (GWh)	2,697	1992	4,090	2005		
Electricity sold, High voltage industrial (GWh)	1,482	2000	1,444	2005		
Electricity sold, Medium voltage commercial (GWh)	583	2000	748	2005		
Electricity sold, Residential and low voltage business (GWh)	653	2000	1,072	2005		
Electricity sold, Total (GWh)	2,718	2000	3,264	2005		
Employees, Total full time equivalent (number)	4,015	2000	2,934	2005		
Gross fixed assets, Date of last revaluation (year)	2001	2001	na	na		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	101	2005		
Household average size (number)	na	na	3	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	97	1992	94	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	80	2005		
Installed capacity, Hydro (MW)	530	1992	808	2005		
Installed capacity, Off-grid (MW)	24	2000	24	2005		
Installed capacity, Oil (% of total)	na	na	20	2005		
Installed capacity, Total (MW)	627	1992	902	2005		
Labor costs, Total (LCU, mln)	15,647	2000	40,492	2005		
Labor costs, Total (USD, mln)	22	2000	77	2005		
Losses, Distribution (%)	32	2000	24	2005		
Losses, Total system (%)	36	2000	31	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Losses, Transmission (%)	3.0	2000	5.1	2005		
Operating capacity, Total (MW)	46	1994	902	2005		
Operating expenses covered by revenue (%)	na	na	117	2005		
Operating expenses, Total (LCU, mln)	49,100	2000	219,086	2005		
Operating expenses, Total (USD, mln)	69	2000	415	2005		
Operating meters rate, Residential and low voltage business (%)	80	2000	85	2005		
Operating-fo-Installed capacity ratio (%)	93	2000	100	2005		
Outages, Number in a typical month (number)	na	na	13	2006		
Population density (people per sq. km)	26	1990	39	2006		
Population using biomass as primary cooking fuel (%)			83	2004		
Population with electricity (mln)	3.0	2000	7.7	2004		
Population without electricity (mln)	12	2000	8.7	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	11	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	10,470	2000	9,916	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	15	2000	19	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	22,700	2000	45,599	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	32	2000	86	2005		
Revenue from electricity billed, Resid. and low voltage business (LCU, mln)	35,200	2000	83,110	2005		
Revenue from electricity billed, Resid. and low voltage business (USD, mln)	49	2000	158	2005		
Rural isolated networks, People served (thousands)	na	na	808	2007		
Substations, Total including all voltage levels (number)	6,781	2000	6,603	2005		
Transmission network length, High voltage (>66kV) (km)	1,881	2000	1,881	2005		
Value lost due to power outages (% of sales)	na	na	3.9	2006		

Cape Verde

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	45	2001		
Access to electricity, Households, Rural (%)	na	na	18	2001		
Access to electricity, Households, Urban (%)	na	na	83	2001		
Accounts receivable (days)	120	2000	123	2005		
Average annual revenue per residential or low voltage customer (USD)	153	2000	247	2005		
Average connection charge, Residential customers (LCU)	na	na	10,000	2005		
Average connection charge, Residential customers (USD)	86	2000	113	2005		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.15	1998	0.16	2004		
Average operating expenses per kWh (LCU/kWh)	18	2000	18	2005		
Average operating expenses per kWh (USD/kWh)	0.15	2000	0.21	2005		
Capacity factor, Annual (%)	10	2000	6.5	2005		
Capital expenditure, Total (LCU, mln)	100	1998	427	2004		
Capital expenditure, Total (USD, mln)	1.0	1998	4.8	2004		
Collection ratio (%)	99	2000	91	2005		
Connections per employee (number)	na	na	112	2005		
Country GDP (in current USD mln)	339	1990	1,434	2007		
Country GDP per capita (constant 2000 USD)	852	1990	1,447	2007		
Country population (mln)	0.4	1990	0.5	2007		
Customers, High voltage industrial (thousands)	0	2000	0	2005		
Customers, Medium voltage commercial (thousands)	0.89	2000	2.26	2005		
Customers, Residential or low voltage business (thousands)	44	2000	71	2005		
Customers, Total (thousands)	26	1997	78	2005		
Debt-service coverage ratio (number)	(3.1)	2000	2.1	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	7.8	2006		
Distribution network length, Low voltage (<34.5kV) (km)	537	2000	889	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	293	2000	536	2005		
Distribution transformers, Average capacity (kVA)	250	2000	250	2005		
Effective residential tariff at 100 kWh/month consumption level	na	na	26	2006		
Electricity consumption, Average monthly sales to Residential and low	1,156	2000	1,127	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
voltage business customers (kWh/month)						
Electricity generation, Net, Conventional thermal (GWh)	141	1992	233	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	142	2000	236	2005		
Electricity sold, High voltage industrial (GWh)	6.3	2000	20	2005		
Electricity sold, Medium voltage commercial (GWh)	31	2000	61	2005		
Electricity sold, Residential and low voltage business (GWh)	51	2000	80	2005		
Electricity sold, Total (GWh)	88	2000	162	2005		
Employees, Total full time equivalent (number)	686	2000	659	2005		
Gross fixed assets, Book value (LCU, mln)	664	2000	15	2005		
Gross fixed assets, Book value (USD, mln)	5.6	2000	0.17	2005		
Gross fixed assets, Date of last revaluation (year)	1999	2000	na	na		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	111	2005		
Household average size (number)	na	na	4.9	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	20	1992	78	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	0	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Off-grid (MW)	na	na	2.3	2005		
Installed capacity, Oil (% of total)	na	na	95	2005		
Installed capacity, Other renewables (MW)	2.0	2000	2.0	2005		
Installed capacity, Total (MW)	20	1992	78	2005		
Labor costs, Total (LCU, mln)	na	na	450	2003		
Labor costs, Total (USD, mln)	na	na	4.6	2003		
Losses, Distribution (%)	14	1998	19	2004		
Losses, Non-technical (%)	2.0	2000	5.0	2005		
Losses, Technical (%)	12	2000	12	2005		
Losses, Total system (%)	14	2000	17	2005		
Operating capacity, Total (MW)	42	2000	78	2005		
Operating expenses covered by revenue (%)	na	na	120	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Operating expenses, Total (LCU, mln)	1,544	2000	2,941	2005		
Operating expenses, Total (USD, mln)	13	2000	33	2005		
Operating-to-Installed capacity ratio (%)	100	2000	100	2005		
Outages, Number in a typical month (number)	na	na	13	2006		
Peak load, Annual, On-grid (MW)	27	2000	44	2005		
Population density (people per sq. km)	88	1990	129	2006		
Revenue per employee (USD/employee)	16,429	2000	42,471	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	18	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	91	2000	318	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	0.8	2000	3.6	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	405	2000	896	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	3.4	2000	10	2005		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	810	2000	1,559	2005		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	7	2000	18	2005		
Substations, Total including all voltage levels (number)	2.0	2000	5.0	2005		
Value lost due to power outages (% of sales)	na	na	4.3	2006		

Central African Republic

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	3.0	1994	na	na		
Access to electricity, Households, Rural (%)	0.3	1994	na	na		
Access to electricity, Households, Urban (%)	8.0	1994	na	na		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	51	1992	na	na		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.19	1992	na	na		
Connections per employee (number)	129	1992	na	na		
Country GDP (in current USD mln)	1,488	1990	1,712	2007		
Country GDP per capita (constant 2000 USD)	271	1990	228	2007		
Country population (mln)	3.0	1990	4.3	2007		
Electricity generation, Net, Conventional thermal (GWh)	17	1992	24	2005		
Electricity generation, Net, Hydro (GWh)	77	1992	85	2005		
Electricity generation, Net, Total (GWh)	94	1992	109	2005		
Electricity sold, Total (GWh)	62	1992	na	na		
Employees, Total full time equivalent (number)	477	1992	na	na		
Installed capacity, Conventional thermal (MW)	21	1992	21	2005		
Installed capacity, Hydro (MW)	22	1992	18	2005		
Installed capacity, Total (MW)	43	1992	39	2005		
Labor costs, Total (LCU, mln)	707	1992	na	na		
Labor costs, Total (USD, mln)	2.7	1992	na	na		
Losses, Total system (%)	na	na	6.0	2004		
Outages, Frequency rate (number/year)	61	1998	na	na		
Population density (people per sq. km)	4.8	1990	6.9	2006		

Chad

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Access to electricity, Households, National (%)	2.3	1996	3.5	2004	
Access to electricity, Households, Rural (%)	0.1	1996	0.3	2004		
Access to electricity, Households, Urban (%)	9.4	1996	16.4	2004		
Average annual revenue per residential or low voltage customer (USD)	na	na	996	2005		
Average operating expenses per kWh (LCU/kWh)	na	na	407	2005		
Average operating expenses per kWh (USD/kWh)	na	na	0.77	2005		
Capacity factor, Annual (%)	na	na	46	2005		
Collection ratio (%)	90	2000	83	2005		
Connections per employee (number)	na	na	43	2005		
Country GDP (in current USD mln)	1,739	1990	7,085	2007		
Country GDP per capita (constant 2000 USD)	181	1990	260	2007		
Country population (mln)	6.1	1990	10.8	2007		
Customers, High voltage industrial (thousands)	na	na	0	2005		
Customers, Medium voltage commercial (thousands)	na	na	0.07	2005		
Customers, Residential or low voltage business (thousands)	na	na	20	2005		
Debt-service coverage ratio (number)	na	na	3.6	2005		
Distribution network length, Low voltage (<34.5kV) (km)	223	2000	243	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	108	2000	124	2005		
Distribution transformers, Average capacity (kVA)	160	2000	250	2005		
Distribution transformers, Total including all ratings (number)	149	2000	168	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	30	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	na	na	2,459	2005		
Electricity generation, Net, Conventional thermal (GWh)	79	1992	95	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity generation, Net, Off-grid (GWh)	8.0	2000	11.0	2005		
Electricity generation, Net, Total (GWh)	79	2000	95	2005		
Electricity sold, High voltage industrial (GWh)	na	na	0	2005		
Electricity sold, Medium voltage commercial (GWh)	na	na	28	2005		
Electricity sold, Residential and low voltage business (GWh)	na	na	49	2005		
Electricity sold, Total (GWh)	na	na	78	2005		
Employees, Total full time equivalent (number)	na	na	471	2005		
Gross fixed assets, Book value (LCU, mln)	na	na	35,387	2005		
Gross fixed assets, Book value (USD, mln)	na	na	67	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	36	2005		
Household average size (number)	na	na	5.9	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	29	1992	29	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	0	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Oil (% of total)	na	na	100	2005		
Installed capacity, Off-grid (MW)	5.0	2000	5.0	2005		
Installed capacity, Total (MW)	29	1992	29	2005		
Labor costs, Total (LCU, mln)	na	na	2,251	2005		
Labor costs, Total (USD, mln)	na	na	4.3	2005		
Losses, Total system (%)	na	na	33	2005		
Operating capacity, Total (MW)	29	1995	29	2005		
Operating expenses covered by revenue (%)	na	na	240	2005		
Operating expenses, Total (LCU, mln)	na	na	31,741	2005		
Operating expenses, Total (USD, mln)	na	na	60	2005		
Operating-to-Installed capacity ratio (%)	100	2000	100	2005		
Population density (people per sq. km)	4.9	1990	8.3	2006		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	32	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	na	na	0	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	na	na	0	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	na	na	4,995	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	na	na	8.2	2005		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	na	na	10,558	2005		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	na	na	20	2005		
Transmission network length, High voltage (>66kV) (km)	0	2000	0	2005		

Comoros

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	29	1996	45	2002		
Access to electricity, Households, Rural (%)	20	1996	33	2002		
Access to electricity, Households, Urban (%)	52	1996	75	2002		
Country GDP (in current USD mln)	250	1990	449	2007		
Country GDP per capita (constant 2000 USD)	416	1990	371	2007		
Country population (mln)	0.4	1990	0.6	2007		
Electricity generation, Net, Conventional thermal (GWh)	13	1992	18	2005		
Electricity generation, Net, Hydro (GWh)	2	1992	2	2005		
Electricity generation, Net, Total (GWh)	15	1992	20	2005		
Installed capacity, Conventional thermal (MW)	4	1992	4	2005		
Installed capacity, Hydro (MW)	1	1992	1	2005		
Installed capacity, Total (MW)	5	1992	5	2005		
Losses, Total system (%)	na	na	5	2004		
Population density (people per sq. km)	234	1990	330	2006		

Congo, Dem. Rep.

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	10	2005		
Access to electricity, Households, Rural (%)	na	na	1.5	2005		
Access to electricity, Households, Urban (%)	na	na	34	2005		
Average annual revenue per residential or low voltage customer (USD)	na	na	74	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.03	2004		
Capacity factor, Annual (%)	na	na	82	2005		
Country GDP (in current USD mln)	9,350	1990	8,955	2007		
Country GDP per capita (constant 2000 USD)	202	1990	94	2007		
Country population (mln)	38	1990	62	2007		
Customers, High voltage industrial (thousands)	na	na	0.01	2004		
Customers, Medium voltage commercial (thousands)	na	na	1.2	2004		
Customers, Residential or low voltage business (thousands)	na	na	359	2004		
Delay in obtaining an electrical connection for businesses (days)	na	na	21	2006		
Distribution network length, Low voltage (<34.5kV) (km)	11,653	2000	16,433	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	3,096	2000	4,470	2005		
Distribution transformers, Total including all ratings (number)	2,797	2000	2,847	2004		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	4.0	2005		
Electricity consumption, Annual per capita of total cons. (kWh/person)	119	1990	91	2005		
Electricity consumption, Total (GWh)	4,530	1990	5,350	2005		
Electricity exported (GWh)	196	1995	1,800	2005		
Electricity generation, Net, Conventional thermal (GWh)	18	1992	19	2005		
Electricity generation, Net, Hydro (GWh)	5,993	1992	7,332	2005		
Electricity generation, Net, Off-grid (GWh)	na	na	125	2005		
Electricity generation, Net, Total (GWh)	6,011	1990	7,341	2005		
Electricity imported (GWh)	58	1995	6.0	2005		
Electricity sold, High voltage industrial (GWh)	1,127	2000	854	2005		
Electricity sold, Medium voltage commercial (GWh)	900	2000	844	2005		
Electricity sold, Total (GWh)	na	na	5,742	2005		
Electricity traded (GWh)	(138)	1995	(1,794)	2005		
Employees, Total full time equivalent (number)	5,200	2000	6,142	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	12	2005		
Household average size (number)	na	na	5.3	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	59	1992	33	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	96	2005		
Installed capacity, Hydro (MW)	2,772	1992	2,410	2005		
Installed capacity, Off-grid (MW)	91	2000	91	2005		
Installed capacity, Oil (% of total)	na	na	3.6	2005		
Installed capacity, Total (MW)	2,831	1992	2,443	2005		
Losses, Distribution (%)	31	2000	35	2005		
Operating capacity, Total (MW)	na	na	1,000	2005		
Operating-to-Installed capacity ratio (%)	na	na	46	2004		
Outages, Number in a typical month (number)	na	na	18	2006		
Peak load, Annual, On-grid (MW)	na	na	1,012	2005		
Population density (people per sq. km)	17	1990	27	2006		
Population with electricity (mln)	3.4	2000	9.1	2004		
Population without electricity (mln)	47.5	2000	46.9	2002		
Revenue, Annual, Average (US cents/kWh)	na	na	4.3	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	na	na	11,741	2004		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	na	na	30	2004		
Revenue from electricity billed, Resid. & low voltage business (LCU, mln)	na	na	10,551	2004		
Revenue from electricity billed, Resid. and low volt. business (USD, mln)	na	na	27	2004		
Substations, Total including all voltage levels (number)	49	2000	49	2004		
Transmission network length, High voltage (>66kV) (km)	5,547	2000	5,547	2004		
Value lost due to power outages (% of sales)	na	na	5.6	2006		

Congo, Rep.

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	34	2005		
Access to electricity, Households, Rural (%)	na	na	15	2005		
Access to electricity, Households, Urban (%)	na	na	51	2005		
Country GDP (in current USD mln)	2,799	1990	7,646	2007		
Country GDP per capita (constant 2000 USD)	1,154	1990	1,103	2007		
Country population (mln)	2.4	1990	3.8	2007		
Electricity consumption, Annual per capita of total consumption (kWh/person)	169	1990	160	2005		
Electricity consumption, Total (GWh)	410	1990	576	2005		
Electricity generation, Net, Conventional thermal (GWh)	3.0	1992	1.0	2005		
Electricity generation, Net, Hydro (GWh)	421	1992	351	2005		
Electricity generation, Net, Total (GWh)	493	1990	356	2005		
Electricity imported (GWh)	115	1995	418	2005		
Electricity traded (GWh)	115	1995	418	2005		
Household average size (number)	na	na	5.1	2005		
Installed capacity, Conventional thermal (MW)	29	1992	29	2005		
Installed capacity, Hydro (MW)	89	1992	92	2005		
Installed capacity, Total (MW)	118	1992	121	2005		
Losses, Total system (%)	20	1990	56	2005		
Population density (people per sq. km)	7.1	1990	10.8	2006		
Population using biomass as primary cooking fuel (%)	na	na	84	2004		
Population with electricity (mln)	0.6	2000	0.8	2004		
Population without electricity (mln)	2.4	2000	3.2	2004		

Cote d'Ivoire

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	37	1994	59	2005		
Access to electricity, Households, Rural (%)	14	1994	37	2005		
Access to electricity, Households, Urban (%)	70	1994	86	2005		
Average annual revenue per residential or low voltage customer (USD)	169	2000	253	2005		
Average operating expenses per kWh (LCU/kWh)	133	2000	133	2003		
Average operating expenses per kWh (USD/kWh)	0.19	2000	0.23	2003		
Capacity factor, Annual (%)	na	na	58	2005		
Capital expenditure, Total (LCU, mln)	32,475	1996	na	na		
Capital expenditure, Total (USD, mln)	63	1996	na	na		
Connections per employee (number)	na	na	57	2005		
Country GDP (in current USD mln)	10,796	1990	19,570	2007		
Country GDP per capita (constant 2000 USD)	649	1990	548	2007		
Country population (mln)	13	1990	19	2007		
Customers, Medium voltage commercial (thousands)	2.50	2000	2.59	2005		
Customers, Residential or low voltage business (thousands)	763	2000	876	2005		
Customers, Total (thousands)	435	1994	879	2005		
Distribution network length, Low voltage (<34.5kV) (km)	11,500	2000	14,900	2005		
Distribution network length, Medium voltage (34.5-.66kV) (km)	15,500	2000	17,300	2005		
Distribution transformers, Total including all ratings (number)	6,738	2000	7,263	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	12	2006		
Electricity consumption, Annual per capita of total consumption (kWh/person)	150	1990	170	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	1,802	2000	1,759	2005		
Electricity consumption, Total (GWh)	1,913	1990	3,165	2005		
Electricity exported (GWh)	315	1995	750	2007		
Electricity generation, Net, Conventional thermal (GWh)	628	1992	3,882	2005		
Electricity generation, Net, Hydro (GWh)	1,038	1992	1,423	2005		
Electricity generation, Net, Off-grid (GWh)	12	2000	4.0	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity generation, Net, Total (GWh)	2,899	1995	5,376	2007		
Electricity imported (GWh)	34	1995	0	2005		
Electricity purchased from IPPs (GWh)	2,949	2000	3,809	2005		
Electricity sold, High voltage industrial (GWh)	1,517	2000	1,463	2005		
Electricity sold, Medium voltage commercial (GWh)	1,517	2000	1,463	2005		
Electricity sold, Residential and low voltage business (GWh)	1,375	2000	1,541	2005		
Electricity sold, Total (GWh)	1,490	2000	1,541	2005		
Electricity traded (GWh)	34	1995	(1,397)	2005		
Employees, Total full time equivalent (number)	2,939	1994	1,400	2001		
Household average size (number)	na	na	5.3	2005		
Installed capacity, Conventional thermal (MW)	278	1992	480	2005		
Installed capacity, Gas (% of total)	na	na	46	2005		
Installed capacity, Hydro (% of total)	na	na	42	2005		
Installed capacity, Hydro (MW)	895	1992	604	2005		
Installed capacity, Oil (% of total)	na	na	11	2005		
Installed capacity, Off-grid (MW)	7.0	2000	6.4	2003		
Installed capacity, Total (MW)	1,173	1992	1,084	2005		
Losses, Distribution (%)	na	na	22.3	2007		
Losses, Total system (%)	na	na	22.6	2007		
Losses, Transmission (%)	na	na	4.4	2007		
Operating capacity, Total (MW)	456	1995	1,084	2005		
Operating expenses covered by revenue (%)	na	na	142	2003		
Operating expenses, Total (LCU, mln)	198,549	2000	203,196	2003		
Operating expenses, Total (USD, mln)	279	2000	350	2003		
Operating-to-Installed capacity ratio (%)	na	na	100	2007		
Peak load, Annual, On-grid (MW)	na	na	606	2005		
Population using biomass as primary cooking fuel (%)	na	na	74	2004		
Population with electricity (mln)	8.0	2000	3.3	2004		
Population without electricity (mln)	8.0	2000	54	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Revenue per employee (USD/employee)	125,805	1995	na	na		
Revenue, Annual, Average (US cents/kWh)	na	na	1.00	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	na	na	44,783	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	na	na	85	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	74,772	2000	87,649	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	105	2000	166	2005		
Revenue from electricity billed, Resid. and low voltage business (LCU, mln)	91,881	2000	116,820	2005		
Revenue from electricity billed, Resid. and low voltage business (USD, mln)	129	2000	222	2005		
Substations, Total including all voltage levels (number)	42	2000	42	2005		
Transmission network length, High voltage (>66kV) (km)	4,300	2000	4,400	2005		

Equatorial Guinea

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Country GDP (in current USD mln)	132	1990	9,923	2007		
Country GDP per capita (constant 2000 USD)	611	1990	8,207	2007		
Country population (mln)	0.3	1990	0.5	2007		
Electricity generation, Net, Conventional thermal (GWh)	16	1992	25	2005		
Electricity generation, Net, Hydro (GWh)	2	1992	3	2005		
Electricity generation, Net, Total (GWh)	18	1992	28	2005		
Installed capacity, Conventional thermal (MW)	4	1992	10	2005		
Installed capacity, Hydro (MW)	1	1992	3	2005		
Installed capacity, Total (MW)	5	1992	13	2005		
Losses, Total system (%)	na	na	25	2004		

Eritrea

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	23	1995	32	2002		
Access to electricity, Households, Rural (%)	2.1	1995	3.0	2002		
Access to electricity, Households, Urban (%)	81	1995	78	2002		
Accounts receivable (days)	109	1998	67	2002		
Average electricity tariff, All customers (LCU/kWh)	0.83	1998	1.19	2002		
Average electricity tariff, All customers (USD/kWh)	0.11	1998	0.13	2007		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	0.80	1994	1.50	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.14	1994	0.10	2003		
Connections per employee (number)	132	1994	277	2003		
Country GDP (in current USD mln)	477	1992	1,201	2007		
Country GDP per capita (constant 2000 USD)	135	1992	156	2007		
Country population (mln)	3.2	1990	4.8	2007		
Current ratio (number)	1.6	1998	0.6	2002		
Customers, Non-residential (thousands)	15	1992	24	2003		
Customers, Residential or low voltage business (thousands)	57	1992	86	2003		
Customers, Total (thousands)	70	1992	109	2003		
Debt-equity ratio (number)	0.8	1998	0.9	2002		
Delay in obtaining an electrical connection for businesses (days)	na	na	65	2006		
Distribution network length, All voltages (km)	858	1998	1,412	2003		
Electricity consumption, Residential (GWh)	36	1992	92	2004		
Electricity generation, Net, Conventional thermal (GWh)	151	1994	273	2005		
Electricity generation, Net, Hydro (GWh)	0	1994	0	2005		
Electricity generation, Net, Other renewables (GWh)	1.0	1997	1.0	2005		
Electricity generation, Net, Total (GWh)	183	1992	286	2003		
Electricity purchased, Total (GWh)	4.1	1992	2.8	2003		
Electricity sold, Total (GWh)	117	1992	214	2003		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Employees, Total full time equivalent (number)	991	1994	771	2003		
Installed capacity, Conventional thermal (MW)	60	1994	114	2005		
Installed capacity, Hydro (MW)	0	1994	0	2007		
Installed capacity, Off-grid (MW)	na	na	20	2007		
Installed capacity, Total (MW)	na	na	134	2007		
Losses, Distribution (%)	12	1998	18	2003		
Losses, Total system (%)	18	1998	22	2002		
Operating capacity, Total (MW)	na	na	134	2007		
Operating expenses, Total (LCU, mln)	57	1994	273	2003		
Operating expenses, Total (USD, mln)	11	1994	20	2003		
Operating ratio (number)	0.9	1998	0.9	2002		
Operating-to-Installed capacity ratio (%)	na	na	100	2007		
Outages for firms (days per year)	na	na	94	2006		
Population using biomass as primary cooking fuel (%)	na	na	79	2004		
Population with electricity (mln)	0.7	2000	0.9	2004		
Population without electricity (mln)	3.4	2000	3.5	2004		
Return on assets (%)	(20)	1998	20	2002		
Return on equity (%)	15	1998	13	2002		
Revenue per employee (USD/employee)	19,765	1994	29,360	2003		
Revenue from electricity billed (LCU, mln)	106	1994	314	2003		
Revenue from electricity billed (USD, mln)	19	1994	23	2003		
Revenue, Total (LCU, mln)	107	1994	314	2003		
Revenue, Total (USD, mln)	20	1994	23	2003		

Ethiopia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	13	2000	14	2005		
Access to electricity, Households, Rural (%)	0.4	2000	1.9	2005		
Access to electricity, Households, Urban (%)	76	2000	86	2005		
Average annual revenue per residential or low voltage customer (USD)	na	na	41	2005		
Average connection charge, Residential customers (LCU)	103	2000	67	2005		
Average connection charge, Residential customers (USD)	na	na	7.0	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.06	2006		
Average electricity tariff, Resid. cust. & low volt. business (LCU/kWh)	0.20	1992	0.5	2004		
Average electricity tariff, Resid. cust. and low volt. business (USD/kWh)	0.07	1992	0.1	2004		
Average operating expenses per kWh (LCU/kWh)	0.17	2000	0.17	2005		
Average operating expenses per kWh (USD/kWh)	0.02	2000	0.02	2005		
Capacity factor, Annual (%)	na	na	41	2005		
Capital expenditure, Total (LCU, mln)	1,512	1997	1,800	2004		
Capital expenditure, Total (USD, mln)	225	1997	208	2004		
Collection ratio (%)	78	2000	97	2005		
Complaints about deficient service (number/year)	34,891	2000	31,200	2005		
Connections per employee (number)	na	na	84	2005		
Country GDP (in current USD mln)	12,083	1990	19,395	2007		
Country GDP per capita (constant 2000 USD)	130	1990	174	2007		
Country population (mln)	48	1990	79	2007		
Customers, High voltage industrial (thousands)	na	na	0.1	2005		
Customers, Medium voltage commercial (thousands)	79	2000	112	2005		
Customers, Non-residential (thousands)	66	1993	110	2004		
Customers, Residential or low voltage business (thousands)	508	2000	777	2005		
Debt-service coverage ratio (number)	5.2	2000	4.7	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	44	2006		
Distribution network length, Low voltage (<34.5kV) (km)	7,601	2000	11,869	2005		
Distribution network length, Medium voltage (34.5-66kV) (km)	9,126	2000	12,841	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Distribution transformers, Total including all ratings (number)	5,469	2000	8,894	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	4.1	2004		
Electricity consumption, Annual per capita of total cons. (kWh/person)	23	1990	34	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	969	2000	929	2005		
Electricity consumption, Residential (GWh)	405	1992	711	2004		
Electricity consumption, Total (GWh)	1,082	1990	2,585	2005		
Electricity generation, Net, Conventional thermal (GWh)	94	1992	40	2005		
Electricity generation, Net, Hydro (GWh)	1,127	1992	2,823	2005		
Electricity generation, Net, Off-grid (GWh)	33	2000	49	2005		
Electricity generation, Net, Other renewables (GWh)	60	1992	1.0	2005		
Electricity generation, Net, Total (GWh)	1,202	1990	2,872	2005		
Electricity sold, High voltage industrial (GWh)	na	na	388	2005		
Electricity sold, Medium voltage commercial (GWh)	319	2000	521	2005		
Electricity sold, Residential and low voltage business (GWh)	492	2000	722	2005		
Electricity sold, Total (GWh)	1,351	2000	2,069	2005		
Employees, Total full time equivalent (number)	8,047	2000	10,582	2005		
Gross fixed assets, Book value (LCU, mln)	5,792	2000	19,334	2005		
Gross fixed assets, Book value (USD, mln)	724	2000	2,148	2005		
Gross fixed assets, Date of last revaluation (year)	2000	2000	2000	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	46	2005		
Household average size (number)	na	na	4.9	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	62	1992	75	2005		
Installed capacity, Hydro (% of total)	na	na	89	2005		
Installed capacity, Hydro (MW)	372	1992	668	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Oil (% of total)	na	na	10	2005		
Installed capacity, Off-grid (MW)	20	2000	30	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Installed capacity, Other renewables (MW)	30	1992	11	2005		
Installed capacity, Total (MW)	464	1992	754	2005		
Labor costs, Total (LCU, mln)	104	2000	146	2005		
Labor costs, Total (USD, mln)	13	2000	16	2005		
Load factor, Annual (%)	59	2000	57	2005		
Losses, Distribution (%)	15	1992	22	2001		
Losses, Technical (%)	19	2000	17	2005		
Losses, Total system (%)	na	na	23	2004		
Operating capacity, Total (MW)	na	1995	721	2005		
Operating expenses covered by revenue (%)	na	na	34	2005		
Operating expenses, Total (LCU, mln)	173	2000	372	2005		
Operating expenses, Total (USD, mln)	22	2000	41	2005		
Operating-to-Installed capacity ratio (%)	na	na	96	2007		
Outages, Number in a typical month (number)	na	na	5.1	2006		
Peak load, Annual, On-grid (MW)	328	2000	521	2005		
Population density (people per sq. km)	46	1990	77	2006		
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Population with electricity (mln)	3	2000	11	2004		
Population without electricity (mln)	61	2000	61	2004		
Revenue per employee (USD/employee)	7,725	1997	11,057	2001		
Revenue, Annual, Average (US cents/kWh)	na	na	6.1	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	na	na	151	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	na	na	17	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	na	na	645	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	na	na	72	2005		
Revenue from electricity billed, Resid. and low volt. business (LCU, mln)	na	na	289	2005		
Revenue from electricity billed, Resid. and low volt. business (USD, mln)	na	na	32	2005		
Rural isolated networks, People served (thousands)	na	na	111	2007		
Substations, Total including all voltage levels (number)	102	2000	107	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Transmission network length, High voltage (>66kV) (km)	6,275	2000	6,534	2005		
Value lost due to power outages (% of sales)	na	na	0.9	2006		

Gabon

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, Rural (%)	30	2000	35	2005		
Access to electricity, Households, Urban (%)	90	2000	93	2005		
Country GDP (in current USD mln)	5,952	1990	10,654	2007		
Country GDP per capita (constant 2000 USD)	4,683	1990	4,435	2007		
Country population (mln)	0.9	1990	1.3	2007		
Customers, Total (thousands)	110	1997	na	na		
Distribution network length, All voltages (km)	2,994	1997	na	na		
Electricity consumption, Annual per cap. of total consumption (kWh/cap.)	951	1990	999	2005		
Electricity consumption, Residential (GWh)	232	1992	600	2004		
Electricity consumption, Total (GWh)	873	1990	1,290	2005		
Electricity generation, Net, Conventional thermal (GWh)	311	1992	705	2005		
Electricity generation, Net, Hydro (GWh)	708	1992	806	2005		
Electricity generation, Net, Other renewables (GWh)	8	1992	9	2005		
Electricity generation, Net, Total (GWh)	978	1990	1,569	2005		
Electricity sold, Total (GWh)	883	1997	na	na		
Household average size (number)	na	na	4.6	2005		
Installed capacity, Conventional thermal (MW)	144	1992	244	2005		
Installed capacity, Hydro (MW)	166	1992	170	2005		
Installed capacity, Total (MW)	310	1992	414	2005		
Losses, Total system (%)	11	1990	18	2005		
Population density (people per sq. km)	3.6	1990	5.1	2006		
Population with electricity (mln)	0.4	2000	0.7	2004		
Population without electricity (mln)	0.8	2000	0.7	2004		

The Gambia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	34	1993	na	na		
Access to electricity, Households, Rural (%)	18	2000	na	na		
Access to electricity, Households, Urban (%)	51	2000	na	na		
Country GDP (in current USD mln)	317	1990	643	2007		
Country GDP per capita (constant 2000 USD)	316	1990	340	2007		
Country population (mln)	1.0	1990	1.7	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	64	2006		
Electricity generation, Net, Conventional thermal (GWh)	67	1992	145	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	67	1992	145	2005		
Installed capacity, Conventional thermal (MW)	29	1992	29	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	29	1992	29	2005		
Outages, Number in a typical month (number)	na	na	24	2006		
Population density (people per sq. km)	96	1990	166	2006		
Value lost due to power outages (% of sales)	na	na	12	2006		

Ghana

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	31	1993	48	2005		
Access to electricity, Households, Rural (%)	6.0	1993	24	2003		
Access to electricity, Households, Urban (%)	75	1993	77	2003		
Accounts receivable (ECG) (days)	na	na	172	2005		
Accounts receivable (VRA) (days)	na	na	206	2005		
Average annual revenue per resid. or low voltage customer (ECG) (USD)	na	na	146	2005		
Average annual revenue per resid. or low voltage customer (VRA) (USD)	na	na	91	2005		
Average cost of generation (ECG) (USD/kWh)	na	na	0.06	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.08	2006		
Average electricity tariff, Resid. cust. & low volt. business (ECG) (LCU/kWh)	5.3	1992	695	2003		
Average operating expenses per kWh (ECG) (LCU/kWh)	na	na	690	2005		
Average operating expenses per kWh (VRA) (LCU/kWh)	na	na	1,400	2005		
Average operating expenses per kWh (ECG) (USD/kWh)	na	na	0.08	2005		
Average operating expenses per kWh (VRA) (USD/kWh)	na	na	0.16	2005		
Capacity factor, Annual (%)	na	na	45	2005		
Collection ratio (%)	na	na	86	2005		
Connections per employee (ECG) (number)	na	na	271	2005		
Country GDP (in current USD mln)	5,886	1990	15,246	2007		
Country GDP per capita (constant 2000 USD)	210	1990	307	2007		
Country population (mln)	16	1990	23	2007		
Customers, High voltage industrial (ECG) (thousands)	na	na	0.04	2005		
Customers, High voltage industrial (VRA) (thousands)	na	na	0.06	2005		
Customers, Medium voltage commercial (ECG) (thousands)	na	na	0.17	2005		
Customers, Medium voltage commercial (VRA) (thousands)	na	na	32	2005		
Customers, Non-residential (ECG) (thousands)	268	1992	853	2003		
Customers, Residential or low voltage business (ECG) (thousands)	na	na	1,008	2005		
Customers, Residential or low voltage business (VRA) (thousands)	na	na	170	2005		
Customers, Total (ECG) (thousands)	343	1992	1,094	2003		
Customers, Total (VRA) (thousands)	na	na	203	2005		
Debt-service coverage ratio(VRA) (number)	na	na	3.8	2004		

Indicator	Earliest available year, 1990-2000			Latest available year, 2003-2007			New data	
	Data	Year	Year	Data	Year	Data	Year	Year
	Delay in obtaining an electrical connection for businesses (days)	na	na	24	2007			
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	8.2	2006				
Electricity consumption, Annual per capita of total cons. (kWh/person)	291	1990	266	2005				
Electricity consumption, Average monthly sales to residential and low voltage business customers (ECG) (kWh/month)	na	na	1,833	2005				
Electricity consumption, Average monthly sales to residential and low voltage business customers (VRA) (kWh/month)	na	na	1,241	2005				
Electricity consumption, Residential (GWh)	1,229	1992	1,234	2004				
Electricity consumption, Total (GWh)	4,526	1990	5,989	2005				
Electricity exported (GWh)	455	1995	639	2005				
Electricity generation, Net, Conventional thermal (GWh)	39	1992	1,372	2005				
Electricity generation, Net, Hydro (GWh)	6,536	1992	5,276	2005				
Electricity generation, Net, Total (GWh)	5,721	1990	6,788	2005				
Electricity imported (GWh)	60	1995	815	2005				
Electricity purchased from IPPs (GWh)	na	na	328	2005				
Electricity sold, High voltage industrial (ECG) (GWh)	na	na	492	2005				
Electricity sold, High voltage industrial (VRA) (GWh)	na	na	1,139	2005				
Electricity sold, Medium voltage commercial (ECG) (GWh)	na	na	584	2005				
Electricity sold, Medium voltage commercial (VRA) (GWh)	na	na	542	2004				
Electricity sold, Residential and low voltage business (ECG) (GWh)	na	na	1,849	2005				
Electricity sold, Residential and low voltage business (VRA) (GWh)	na	na	211	2005				
Electricity sold, Total (ECG) (GWh)	na	na	3,762	2005				
Electricity sold, Total (VRA) (GWh)	(395)	1995	176	2005				
Electricity traded (GWh)	na	na	4,848	2005				
Employees, Total full time equivalent (ECG) (number)	na	na	3,424	2005				
Employees, Total full time equivalent (VRA) (number)	na	na	5,617,426	2004				
Gross fixed assets, Book value (ECG) (LCU, mln)	na	na	24,000,000	2005				
Gross fixed assets, Book value (VRA) (LCU, mln)	na	na	624	2004				
Gross fixed assets, Book value (ECG) (USD, mln)	na	na	2,650	2005				
Gross fixed assets, Book value (VRA) (USD, mln)	na	na	2,001	2003				
Gross fixed assets, Date of last revaluation (VRA) (year)	na	na	62	2005				
Historical cost recovery ratio (average effective residential tariff/average	na	na						

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
historical normative cost recovery tariff (%)						
Household average size (number)	na	na	4.3	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Coal (% of total)	115	1992	292	2005		
Installed capacity, Conventional thermal (MW)	na	na	7.0	2005		
Installed capacity, Gas (% of total)	na	na	53	2005		
Installed capacity, Hydro (% of total)	1,072	1992	1,198	2005		
Installed capacity, Hydro (MW)	na	na	34	2005		
Installed capacity, Oil (% of total)	1,187	1992	1,490	2005		
Installed capacity, Total (MW)	na	na	250,469	2005		
Labor costs, Total (ECG) (LCU, mln)	na	na	437,293	2005		
Labor costs, Total (VRA) (LCU, mln)	na	na	28	2005		
Labor costs, Total (ECG) (USD, mln)	na	na	48	2005		
Labor costs, Total (VRA) (USD, mln)	19	1992	25	2003		
Losses, Distribution (ECG) (%)	na	na	14	2005		
Losses, Non-technical (ECG) (%)	na	na	11	2005		
Losses, Technical (ECG) (%)	na	na	25	2005		
Losses, Total system (ECG) (%)	na	na	28	2005		
Losses, Total system (VRA) (%)	na	na	3.3	2005		
Losses, Transmission (VRA) (%)	946	1994	1,490	2005		
Operating capacity, Total (MW)	na	na	95	2005		
Operating expenses covered by revenue (ECG) (%)	na	na	164	2005		
Operating expenses covered by revenue (VRA) (%)	na	na	2,600,177	2005		
Operating expenses, Total (ECG) (LCU, mln)	na	na	5,347,706	2005		
Operating expenses, Total (VRA) (LCU, mln)	na	na	287	2005		
Operating expenses, Total (ECG) (USD, mln)	na	na	589	2005		
Operating expenses, Total (VRA) (USD, mln)	na	na	89	2005		
Operating meters rate, Residential and low voltage business (VRA) (%)	na	na	100	2005		
Operating-to-Installed capacity ratio (%)	na	na	Na	na		
Outages, Frequency rate (ECG) (number/year)	na	na	1,380	2005		
Outages, Frequency rate (VRA) (number/year)	na	na	10	2007		
Outages, Number in a typical month (number)	na	na	1,325	2005		
Peak load, Annual, On-grid (MW)	na	na				

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Population density (people per sq. km)	68	1990	101	2006		
Population using biomass as primary cooking fuel (%)	na	na	88	2004		
Population with electricity (mln)	8.7	2000	11	2004		
Population without electricity (mln)	11	2000	11	2004		
Prepayment meters rate (VRA) (%)	na	na	28	2005		
Revenue, Annual, Average (US cents/kWh)	na	na	8.0	2005		
Revenue from electricity billed, High voltage industrial (ECG) (LCU, mln)	na	na	284,493	2005		
Revenue from electricity billed, High voltage industrial (VRA) (LCU, mln)	na	na	3,012,070	2005		
Revenue from electricity billed, High voltage industrial (ECG) (USD, mln)	na	na	31	2005		
Revenue from electricity billed, High voltage industrial (VRA) (USD, mln)	na	na	332	2005		
Revenue from electricity billed, Med. voltage commercial (ECG) (LCU, mln)	na	na	437,563	2005		
Revenue from electricity billed, Med. voltage commercial (VRA) (LCU/year)	na	na	97,900	2005		
Revenue from electricity billed, Med. voltage commercial (ECG) (USD, mln)	na	na	48	2005		
Revenue from electricity billed, Med. voltage commercial (VRA) (USD, mln)	na	na	11	2005		
Revenue from electricity billed, Resid. & low volt. busin. (ECG) (LCU, mln)	na	na	1,331,362	2005		
Revenue from electricity billed, Resid. & low volt. busin. (VRA) (LCU, mln)	na	na	139,640	2005		
Revenue from electricity billed, Resid. & low volt. busin. (ECG) (USD, mln)	na	na	147	2005		
Revenue from electricity billed, Resid. and low volt. busin. (VRA) (USD, mln)	na	na	15	2005		
Rural isolated networks, People served (thousands)	na	na	230	2007		
Value lost due to power outages (% of sales)	na	na	6.0	2007		

Guinea

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	16	1999	20	2005		
Access to electricity, Households, Rural (%)	1.5	1999	2.8	2005		
Access to electricity, Households, Urban (%)	54	1999	64	2005		
Average cost of generation (USD/kWh)	na	na	0.05	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.06	2006		
Country GDP (in current USD mln)	2,667	1990	4,564	2007		
Country GDP per capita (constant 2000 USD)	346	1990	404	2007		
Country population (mln)	6.0	1990	9.4	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	16	2006		
Electricity generation, Net, Conventional thermal (GWh)	324	1992	345	2005		
Electricity generation, Net, Hydro (GWh)	178	1992	420	2005		
Electricity generation, Net, Total (GWh)	502	1992	765	2005		
Employees, Total full time equivalent (number)	na	na	1,400	2001		
Installed capacity, Conventional thermal (MW)	143	1992	145	2005		
Installed capacity, Hydro (MW)	43	1992	129	2005		
Installed capacity, Total (MW)	186	1992	274	2005		
Outages, Number in a typical month (number)	na	na	34	2006		
Population density (people per sq. km)	25	1990	37	2006		
Value lost due to power outages (% of sales)	na	na	14	2006		

Guinea-Bissau

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	41	2000	54	2002		
Average electricity tariff, All customers (USD/kWh)	na	na	0.45	2006		
Country GDP (in current USD mln)	244	1990	357	2007		
Country GDP per capita (constant 2000 USD)	183	1990	130	2007		
Country population (mln)	1.0	1990	1.7	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	21	2006		
Electricity generation, Net, Conventional thermal (GWh)	41	1992	60	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	41	1992	60	2005		
Household average size (number)	na	na	7.6	2003		
Installed capacity, Conventional thermal (MW)	11	1992	21	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	11	1992	21	2005		
Outages, Number in a typical month (number)	na	na	9.2	2006		
Population density (people per sq. km)	36	1990	59	2006		
Value lost due to power outages (% of sales)	na	na	5.3	2006		

Kenya

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Access to electricity, Households, National (%)	11	1993	16	2003	
Access to electricity, Households, Rural (%)	3	1993	5	2003		
Access to electricity, Households, Urban (%)	43	1993	50	2003		
Accounts receivable (KENGEN) (days)	8	2000	na	na		
Average annual revenue per resid. or low voltage customer (KPLC) (USD)	236	2000	230	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.08	2007		
Capacity factor, Annual (%)	56	2000	58	2005		
Capital expenditure, Total (KPLC) (LCU, mln)	589	1995	1,847	2004		
Capital expenditure, Total (KPLC) (USD, mln)	11	1995	23	2004		
Collection ratio (KPLC) (%)	na	na	99	2005		
Connections per employee (KPLC) (number)	na	na	227	2005		
Country GDP (in current USD mln)	8,591	1990	29,509	2007		
Country GDP per capita (constant 2000 USD)	449	1990	458	2007		
Country population (mln)	23	1990	38	2007		
Customers, High voltage industrial (KPLC) (thousands)	0.388	2000	0.447	2005		
Customers, Medium voltage commercial ((KPLC) thousands)	3	2000	3	2005		
Customers, Non-residential (KPLC) (thousands)	67	1992	191	2004		
Customers, Residential or low voltage business (KPLC) (thousands)	501	2000	730	2005		
Debt-service coverage ratio (KENGEN) (number)	3	2000	5	2004		
Debt-service coverage ratio (KPLC) (number)	na	na	13	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	41	2007		
Distribution network length, All voltages (km)	12,773	1992	na	na		
Distribution network length, Medium voltage (34.5-.66kV) (km)	15,162	2000	23,422	2005		
Distribution transformers, Total including all ratings (number)	2,181	2000	3,081	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	15	2006		
Electricity consumption, Annual per capita of total consumption (kWh/person)	116	1990	138	2005		
Electricity consumption, Average monthly sales to residential and low voltage business customers (KPLC) (kWh/month)	2,311	2000	2,026	2005		
Electricity consumption, Residential (GWh)	877	1992	1,120	2004		
Electricity consumption, Total (GWh)	2,729	1990	4,928	2005		
Electricity generation, Net, Conventional thermal (GWh)	138	1992	1,664	2005		
Electricity generation, Net, Hydro (GWh)	2,768	1992	2,996	2005		
Electricity generation, Net, Off-grid (GWh)	10	2000	11	2005		
Electricity generation, Net, Other renewables (GWh)	258	1992	842	2005		
Electricity generation, Net, Total (GWh)	3,164	1990	5,502	2005		
Electricity imported (GWh)	170	1995	28	2005		
Electricity purchased from IPPs (GWh)	465	2000	957	2005		
Electricity purchased, Total (KPLC) (GWh)	240	1992	222	2003		
Electricity sold, High voltage industrial (KPLC) (GWh)	1,398	2000	1,776	2005		
Electricity sold, Medium voltage commercial (KPLC) (GWh)	724	2000	885	2005		
Electricity sold, Residential and low voltage business (KPLC) (GWh)	1,158	2000	1,478	2005		
Electricity sold, Total (KENGEN) (GWh)	3,831	2000	4,280	2005		
Electricity sold, Total (KPLC) (GWh)	3,717	2000	4,379	2005		
Electricity traded (GWh)	170	1995	28	2005		
Employees, Total full time equivalent (KENGEN) (number)	na	na	1,480	2005		
Employees, Total full time equivalent (KPLC) (number)	5,907	2000	4,988	2005		
Gross fixed assets, Book value (KENGEN) (LCU, mln)	na	na	67,706	2005		
Gross fixed assets, Book value (KPLC) (LCU, mln)	na	na	22,285	2004		
Gross fixed assets, Book value (KENGEN) (USD, mln)	na	na	891	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Gross fixed assets, Book value (KPLC) (USD, mln)	na	na	282	2004		
Gross fixed assets, Date of last revaluation (KENGEN) (year)	na	na	2005	2005		
Gross fixed assets, Date of last revaluation (KPLC) (year)	na	na	2002	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	108	2005		
Household average size (number)	na	na	5	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	156	1992	409	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	58	2005		
Installed capacity, Hydro (MW)	604	1992	677	2005		
Installed capacity, Off-grid (MW)	5	2000	5	2005		
Installed capacity, Oil (% of total)	na	na	27	2005		
Installed capacity, Other renewables (MW)	45	1992	125	2005		
Installed capacity, Total (MW)	805	1992	1,211	2005		
Labor costs, Total (KENGEN) (LCU, mln)	2,338	2000	1,496	2005		
Labor costs, Total (KPLC) (LCU, mln)	4,340	2000	4,172	2005		
Labor costs, Total (KENGEN) (USD, mln)	31	2000	20	2005		
Labor costs, Total (KPLC) (USD, mln)	57	2000	55	2005		
Losses, Total system (%)	21	2000	18	2005		
Operating capacity, Total (MW)	na	1994	1,061	2005		
Operating expenses covered by revenue (KENGEN) (%)	na	na	29	2004		
Operating expenses covered by revenue (KPLC) (%)	na	na	181	2004		
Operating expenses, Total (KENGEN) (LCU, mln)	9,742	2000	6,501	2005		
Operating expenses, Total (KPLC) (LCU, mln)	27,720	2000	51,339	2004		
Operating expenses, Total (KENGEN) (USD, mln)	na	na	86	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Operating expenses, Total (KPLC) (USD, mln)	365	2000	650	2004		
Operating-to-Installed capacity ratio (%)	na	2000	88	2005		
Outages for firms (days per year)	na	na	84	2006		
Outages, Number in a typical month (number)	na	na	7	2007		
Peak load, Annual, On-grid (MW)	708	2000	884	2005		
Population density (people per sq. km)	41	1990	64	2006		
Population using biomass as primary cooking fuel (%)	na	na	81	2004		
Population with electricity (mln)	2	2000	5	2004		
Population without electricity (mln)	28	2000	29	2004		
Revenue, Annual, Average (KPLC) (US cents/kWh)	na	na	14	2005		
Revenue from electricity billed, High voltage industrial (KPLC) (LCU, mln)	8,576	2000	10,891	2005		
Revenue from electricity billed, High voltage industrial (KPLC) (USD, mln)	113	2000	143	2005		
Revenue from electricity billed, Med.voltage commercial (KPLC) (LCU, mln)	5,426	2000	6,509	2005		
Revenue from electricity billed, Med.voltage commercial (KPLC) (USD, mln)	71	2000	86	2005		
Revenue from electricity billed, Resid. & low volt. busin. (KPLC) (LCU, mln)	8,989	2000	12,742	2005		
Revenue from electricity billed, Resid. & low volt. busin. (KPLC) (USD, mln)	118	2000	168	2005		
Rural isolated networks, People served (thousands)	na	na	110	2007		
Substations, Total including all voltage levels (number)	4,759	2000	6,099	2005		
Transmission network length, High voltage (>66kV) (km)	3,450	2000	3,988	2005		
Value lost due to power outages (% of sales)	na	na	6	2007		

Lesotho

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	6.8	2004		
Access to electricity, Households, Rural (%)	na	na	0.8	2004		
Access to electricity, Households, Urban (%)	na	na	26	2004		
Accounts receivable (days)	na	na	56	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.05	2007		
Average operating expenses per kWh (LCU/kWh)	na	na	0.5	2005		
Average operating expenses per kWh (USD/kWh)	na	na	0.07	2005		
Capacity factor, Annual (%)	na	na	65	2005		
Connections per employee (number)	na	na	95	2005		
Country GDP (in current USD mln)	615	1990	1,600	2007		
Country GDP per capita (constant 2000 USD)	376	1990	550	2007		
Country population (mln)	1.6	1990	2.0	2007		
Customers, High voltage industrial (thousands)	na	na	0.15	2005		
Customers, Medium voltage commercial (thousands)	na	na	3.4	2005		
Customers, Residential or low voltage business (thousands)	na	na	38	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	51	2003		
Distribution network length, Medium voltage (34.5-.66kV) (km)	na	na	646	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	7.2	2006		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	na	na	3,520	2005		
Electricity generation, Net, Conventional thermal (GWh)	0	1992	0	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	350	2005		
Electricity generation, Net, Total (GWh)	195	1999	350	2005		
Electricity imported (GWh)	324	1995	13	2005		
Electricity purchased from IPPs (GWh)	na	na	36	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity sold, High voltage industrial (GWh)	na	na	124	2005		
Electricity sold, Medium voltage commercial (GWh)	na	na	124	2005		
Electricity sold, Residential and low voltage business (GWh)	na	na	135	2005		
Electricity sold, Total (GWh)	na	na	354	2005		
Electricity traded (GWh)	324	1995	13	2005		
Employees, Total full time equivalent (number)	na	na	439	2005		
Gross fixed assets, Book value (LCU, mln)	na	na	62	2005		
Gross fixed assets, Book value (USD, mln)	na	na	10	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)						
Installed capacity, Coal (% of total)	na	na	63	2005		
Installed capacity, Conventional thermal (MW)	na	na	0	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	98	2005		
Installed capacity, Hydro (MW)	0	1992	75	2005		
Installed capacity, Oil (% of total)	na	na	2.1	2005		
Installed capacity, Total (MW)	75	1998	75	2005		
Labor costs, Total (LCU, mln)	na	na	34	2003		
Labor costs, Total (USD, mln)	na	na	4.2	2003		
Losses, Total system (%)	na	na	20	2005		
Operating capacity, Total (MW)	72	2000	72	2005		
Operating expenses covered by revenue (%)	na	na	89	2005		
Operating expenses, Total (LCU, mln)	na	na	143	2005		
Operating expenses, Total (USD, mln)	na	na	24	2005		
Operating-to-Installed capacity ratio (%)	96	2000	96	2005		
Outages, Frequency rate (number/year)	na	na	84	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Peak load, Annual, On-grid (MW)	85	2000	94	2005		
Population density (people per sq. km)	53	1990	66	2006		
Population using biomass as primary cooking fuel (%)	na	na	83	2004		
Population with electricity (mln)	0.1	2000	0.2	2004		
Population without electricity (mln)	2.0	2000	1.9	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	7.1	2005		
Substations, Total including all voltage levels (number)	na	na	41	2005		
Transmission network length, High voltage (>66kV) (km)	na	na	467	2005		
Value lost due to power outages (% of sales)	na	na	8.5	2003		

Liberia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Country GDP (in current USD mln)	384	1990	725	2007		
Country GDP per capita (constant 2000 USD)	203	1990	140	2007		
Country population (mln)	2.14	1990	3.75	2007		
Electricity generation, Net, Conventional thermal (GWh)	282	1992	319	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	282	1992	319	2005		
Installed capacity, Conventional thermal (MW)	251	1992	188	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	251	1992	188	2005		
Population density (people per sq. km)	22.18	1990	37.16	2006		

Madagascar

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	9.2	1992	20	2003		
Access to electricity, Households, Rural (%)	1.9	1992	11	2003		
Access to electricity, Households, Urban (%)	47	1992	53	2003		
Average electricity tariff, All customers (USD/kWh)	na	na	0.14	2006		
Capacity factor, Annual (%)	na	na	79	2005		
Collection ratio (%)	na	na	86	2005		
Country GDP (in current USD mln)	3,081	1990	7,326	2007		
Country GDP per capita (constant 2000 USD)	271	1990	246	2007		
Country population (mln)	12	1990	20	2007		
Customers, High voltage industrial (thousands)	0.003	2000	0.003	2005		
Customers, Medium voltage commercial (thousands)	0.9	2000	0.9	2005		
Customers, Residential or low voltage business (thousands)	295	2000	401	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	58	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	26	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	1,141	2000	1,101	2005		
Electricity generation, Net, Conventional thermal (GWh)	238	1992	396	2005		
Electricity generation, Net, Hydro (GWh)	342	1992	650	2005		
Electricity generation, Net, Off-grid (GWh)	na	na	180	2004		
Electricity generation, Net, Total (GWh)	580	1992	1,046	2005		
Electricity sold, High voltage industrial (GWh)	21	2000	17	2005		
Electricity sold, Medium voltage commercial (GWh)	239	2000	278	2005		
Electricity sold, Residential and low voltage business (GWh)	336	2000	442	2005		
Electricity sold, Total (GWh)	617	2000	754	2005		
Gross fixed assets, Book value (LCU, mln)	na	na	1,345,802	2005		
Gross fixed assets, Book value (USD, mln)	na	na	672	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	156	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Household average size (number)	na	na	4.7	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	114	1992	122	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	57	2005		
Installed capacity, Hydro (MW)	106	1992	105	2005		
Installed capacity, Oil (% of total)	na	na	43	2005		
Installed capacity, Off-grid (MW)	na	na	80	2005		
Installed capacity, Total (MW)	220	1992	227	2005		
Labor costs, Total (LCU, mln)	na	na	139,905	2005		
Labor costs, Total (USD, mln)	na	na	70	2005		
Losses, Total system (%)	21	2000	24	2005		
Operating capacity, Total (MW)	na	na	140	2005		
Operating-to-Installed capacity ratio (%)	100	2000	62	2005		
Outages for firms (days per year)	na	na	78	2006		
Peak load, Annual, On-grid (MW)	112	2000	140	2005		
Population density (people per sq. km)	21	1990	33	2006		
Population using biomass as primary cooking fuel (%)	na	na	98	2004		
Population with electricity (mln)	1.2	2000	2.7	2004		
Population without electricity (mln)	14	2000	15	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	46	2005		
Rural isolated networks, People served (thousands)	na	na	340	2007		
Value lost due to power outages (% of sales)	na	na	6.6	2005		

Malawi

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	3.2	1992	6.9	2004		
Access to electricity, Households, Rural (%)	1.1	1992	2.2	2004		
Access to electricity, Households, Urban (%)	20	1992	30	2004		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	na	na	0.03	2007		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.8	1999	2.7	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.0	1999	0.03	2003		
Average operating expenses per kWh (LCU/kWh)	na	na	8.0	2004		
Average operating expenses per kWh (USD/kWh)	na	na	0.06	2004		
Capacity factor, Annual (%)	43	2000	60	2005		
Capital expenditure, Total (LCU, mln)	159	1993	na	na		
Capital expenditure, Total (USD, mln)	36	1993	na	na		
Collection ratio (%)	na	na	96	2005		
Country GDP (in current USD mln)	1,881	1990	3,552	2007		
Country GDP per capita (constant 2000 USD)	132	1990	151	2007		
Country population (mln)	9.5	1990	14	2007		
Customers, High voltage industrial (thousands)	0.9	2000	0.7	2005		
Customers, Medium voltage commercial (thousands)	18	2000	30	2005		
Customers, Non-residential (thousands)	12	1993	na	na		
Customers, Residential or low voltage business (thousands)	62	2000	125	2005		
Customers, Total (thousands)	46	1992	135	2003		
Debt-service coverage ratio (number)	na	na	2.0	2004		
Delay in obtaining an electrical connection for businesses (days)	na	na	98	2006		
Distribution network length, All voltages (km)	6,458	1994	9,250	2002		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	3.5	2006	
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	4,448	2000	3,024	2005		
Electricity generation, Net, Conventional thermal (GWh)	15	1992	28	2005		
Electricity generation, Net, Hydro (GWh)	768	1992	1,369	2005		
Electricity generation, Net, Total (GWh)	783	1992	1,397	2005		
Electricity sold, High voltage industrial (GWh)	483	2000	491	2005		
Electricity sold, Medium voltage commercial (GWh)	139	2000	180	2005		
Electricity sold, Residential and low voltage business (GWh)	276	2000	377	2005		
Electricity sold, Total (GWh)	902	2000	1,055	2005		
Employees, Total full time equivalent (number)	2,251	1992	2,249	2003		
Gross fixed assets, Book value (LCU, mln)	na	na	22,311	2004		
Gross fixed assets, Book value (USD, mln)	na	na	205	2004		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	34	2005		
Household average size (number)	na	na	4.5	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	39	1992	27	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	91	2005		
Installed capacity, Hydro (MW)	146	1992	283	2005		
Installed capacity, Oil (% of total)	na	na	3.2	2005		
Installed capacity, Total (MW)	185	1992	310	2005		
Load factor, Annual (%)	na	na	56	2005		
Losses, Distribution (%)	21	1992	na	na		
Losses, Total system (%)	na	na	33	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Operating capacity, Total (MW)	148	1997	261	2005	
Operating expenses covered by revenue (%)	na	na	172	2004		
Operating expenses, Total (LCU, mln)	na	na	6,389	2004		
Operating expenses, Total (USD, mln)	na	na	59	2004		
Operating-to-Installed capacity ratio (%)	na	na	84	2005		
Outages, Number in a typical month (number)	na	na	77	2006		
Peak load, Annual, On-grid (MW)	na	na	242	2005		
Population density (people per sq. km)	100	1990	144	2006		
Population using biomass as primary cooking fuel (%)	na	na	95	2004		
Population without electricity (mln)	0.5	2000	0.9	2004		
Population with electricity (mln)	9.9	2000	12	2004		
Prepayment meters rate (%)	2.0	2000	14	2005		
Revenue per employee (USD/employee)	9,123	1995	16,654	2003		
Revenue, Annual, Average (US cents/kWh)	na	na	3.2	2005		
Revenue, Total (LCU, mln)	348	1995	3,649	2003		
Revenue, Total (USD, mln)	23	1995	38	2003		
Value lost due to power outages (% of sales)	na	na	23	2006		

Mali

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	6	1995	17	2002		
Access to electricity, Households, Rural (%)	0.4	1995	4.9	2002		
Access to electricity, Households, Urban (%)	2.2	1995	40	2002		
Average electricity tariff, All customers (USD/kWh)	na	na	0.16	2004		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	112	2000	110	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.16	2000	0.19	2003		
Capital expenditure, Total (LCU, mln)	na	na	9,028	2003		
Capital expenditure, Total (USD, mln)	na	na	16	2003		
Connections per employee (number)	337	2000	433	2003		
Country GDP (in current USD mln)	2,421	1990	6,863	2007		
Country GDP per capita (constant 2000 USD)	213	1990	289	2007		
Country population (mln)	7.7	1990	12	2007		
Customers, Non-residential (thousands)	0.5	1995	0.9	2003		
Customers, Residential or low voltage business (thousands)	66	1995	130	2003		
Customers, Total (thousands)	66	1995	154	2004		
Delay in obtaining an electrical connection for businesses (days)	na	na	48	2007		
Electricity generation, Net, Conventional thermal (GWh)	63	1992	204	2005		
Electricity generation, Net, Hydro (GWh)	208	1992	240	2005		
Electricity generation, Net, Total (GWh)	271	1992	444	2005		
Electricity sold, Total (GWh)	243	1995	464	2003		
Employees, Total full time equivalent (number)	1,034	2000	1,073	2003		
Installed capacity, Conventional thermal (MW)	42	1992	125	2005		
Installed capacity, Hydro (MW)	45	1992	155	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Installed capacity, Total (MW)	87	1992	280	2005		
Labor costs, Total (LCU, mln)	2,716	1998	6,461	2003		
Labor costs, Total (USD, mln)	4.6	1998	11	2003		
Losses, Distribution (%)	22	1995	27	2003		
Losses, Total system (%)	na	na	25	2004		
Operating expenses, Total (LCU, mln)	24,431	1999	41,202	2003		
Operating expenses, Total (USD, mln)	40	1999	71	2003		
Outages, Number in a typical month (number)	na	na	4.4	2007		
Population density (people per sq. km)	6.3	1990	10	2006		
Population using biomass as primary cooking fuel (%)	na	na	98	2004		
Revenue per employee (USD/employee)	52,930	2000	82,211	2003		
Revenue, Total (LCU, mln)	38,978	2000	51,266	2003		
Revenue, Total (USD, mln)	55	2000	88	2003		
Value lost due to power outages (% of sales)	na	na	1.8	2007		

Mauritania

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	18	2005		
Access to electricity, Households, Rural (%)	na	na	1.6	2005		
Access to electricity, Households, Urban (%)	na	na	42	2005		
Connections per employee (number)	157	1999	na	na		
Country GDP (in current USD mln)	1,020	1990	2,644	2007		
Country GDP per capita (constant 2000 USD)	419	1990	480	2007		
Country population (mln)	2.0	1990	3.1	2007		
Customers, Total (thousands)	20	1992	84	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	7.5	2006		
Distribution network length, All voltages (km)	na	na	1,200	2005		
Electricity generation, Net, Conventional thermal (GWh)	113	1992	212	2005		
Electricity generation, Net, Hydro (GWh)	26	1992	36	2005		
Electricity generation, Net, Total (GWh)	139	1992	248	2005		
Electricity sold, Total (GWh)	154	1999	na	Na		
Employees, Total full time equivalent (number)	492	1992	805	2005		
Household average size (number)	na	na	6.5	2005		
Installed capacity, Conventional thermal (MW)	44	1992	110	2005		
Installed capacity, Hydro (MW)	61	1992	65	2005		
Installed capacity, Total (MW)	105	1992	175	2005		
Losses, Distribution (%)	26	1999	na	na		
Losses, Total system (%)	na	na	26	2004		
Outages, Number in a typical month (number)	na	na	3.7	2006		
Population density (people per sq. km)	1.9	1990	3.0	2006		
Revenue per employee (USD/employee)	3,316	1992	208	2001		
Revenue, Total (LCU, mln)	142	1992	52	2001		
Revenue, Total (USD, mln)	1.6	1992	0.2	2001		
Value lost due to power outages (% of sales)	na	na	1.6	2006		

Mauritius

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	100	2000	94	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.1	2004		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	0.8	1992	1.1	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.05	1992	0.04	2003		
Collection ratio (%)	100	1992	100	2003		
Connections per employee (number)	355	1992	947	2003		
Country GDP (in current USD mln)	2,383	1990	6,363	2007		
Country GDP per capita (constant 2000 USD)	2,535	1990	4,700	2007		
Country population (mln)	1.2	1990	1.2	2007		
Customers, Non-residential (thousands)	25	1992	36	2003		
Customers, Residential or low voltage business (thousands)	212	1992	302	2003		
Customers, Total (thousands)	237	1992	339	2003		
Delay in obtaining an electrical connection for businesses (days)	na	na	23	2005		
Distribution network length, All voltages (km)	na	na	7,007	2003		
Electricity generation, Net, Conventional thermal (GWh)	763	1992	1,996	2005		
Electricity generation, Net, Hydro (GWh)	112	1992	125	2005		
Electricity generation, Net, Total (GWh)	875	1992	2,122	2005		
Electricity purchased, Total (GWh)	140	1992	755	2003		
Electricity sold, Residential and low voltage business (GWh)	249	1992	553	2003		
Electricity sold, Total (GWh)	688	1992	1,607	2003		
Employees, Total full time equivalent (number)	1,940	1992	1,697	2003		
Installed capacity, Conventional thermal (MW)	261	1992	596	2005		
Installed capacity, Hydro (MW)	59	1992	59	2005		
Installed capacity, Total (MW)	320	1992	655	2005		

Losses, Total system (%)	na	na	8	2004
Outages, Frequency rate (number/year)	2,031	2000	2,773	2005
Population density (people per sq. km)	521	1990	617	2006
Population with electricity (mln)	1	2000	1	2004
Population without electricity (mln)	0	2000	0	2004
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	532	1992	1,835	2003
Revenue from electricity billed, Residential and low voltage business (USD, mln)	34	1992	66	2003
Revenue per employee (USD/employee)	48,167	1992	109,766	2003
Revenue, Total (LCU, mln)	1,454	1992	5,197	2003
Revenue, Total (USD, mln)	93	1992	186	2003
Value lost due to power outages (% of sales)	na	na	3	2005

Mozambique

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	6.6	1997	8.1	2003		
Access to electricity, Households, Rural (%)	2.1	1997	1.1	2003		
Access to electricity, Households, Urban (%)	26	1997	25	2003		
Average annual revenue per residential or low voltage customer (USD)	na	na	220	2005		
Average connection charge, Residential customers (USD)	na	na	56	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.08	2005		
Average operating expenses per kWh (USD/kWh)	na	na	0.06	2005		
Capacity factor, Annual (%)	na	na	72	2005		
Collection ratio (%)	77	1995	92	2002		
Connections per employee (number)	na	na	99	2005		
Country GDP (in current USD mln)	2,463	1990	7,752	2007		
Country GDP per capita (constant 2000 USD)	193	1990	347	2007		
Country population (mln)	14	1990	21	2007		
Customers, High voltage industrial (thousands)	na	na	na	na		
Customers, Medium voltage commercial (thousands)	1.2	2000	1.5	2005		
Customers, Non-residential (thousands)	21	1992	30	2002		
Customers, Residential or low voltage business (thousands)	173	2000	316	2005		
Customers, Total (thousands)	132	1992	219	2002		
Debt-service coverage ratio (number)	na	na	4.5	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	13	2007		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	5,871	2000	6,185	2005		
Distribution feeders, Total (number)	69	2000	69	2005		
Distribution network length, All voltages (km)	5,937	1994	6,429	2002		
Distribution network length, Low voltage (<34.5kV) (km)	3,263	2000	3,265	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	3,167	2000	3,167	2005		
Distribution transformers, Average capacity (kVA)	91	2000	142	2005		
Distribution transformers, Total including all ratings (number)	56	2000	54	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	6.8	2006		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity consumption, Annual per capita of total consumption (kWh/person)	40	1990	450	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	2,263	2000	1,523	2005		
Electricity consumption, Residential (GWh)	252	1992	448	2004		
Electricity consumption, Total (GWh)	548	1990	9,243	2005		
Electricity exported (GWh)	483	1997	12,001	2005		
Electricity generation, Net, Conventional thermal (GWh)	86	1992	38	2005		
Electricity generation, Net, Hydro (GWh)	322	1992	13,131	2005		
Electricity generation, Net, Off-grid (GWh)	45	2000	13	2005		
Electricity generation, Net, Total (GWh)	454	1990	13,285	2005		
Electricity imported (GWh)	600	1995	9,588	2005		
Electricity purchased from IPPs (GWh)	245	2000	19	2005		
Electricity purchased, Total (GWh)	436	1992	13	2002		
Electricity sold, High voltage industrial (GWh)	na	na	na	na		
Electricity sold, Medium voltage commercial (GWh)	444	2000	535	2005		
Electricity sold, Residential and low voltage business (GWh)	392	2000	481	2005		
Electricity sold, Total (GWh)	1,014	2000	1,307	2005		
Electricity traded (GWh)	600	1995	(2,413)	2005		
Employees, Total full time equivalent (number)	3,271	2000	3,194	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	71	2005		
Household average size (number)	na	na	4.8	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	280	1992	204	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	94	2005		
Installed capacity, Hydro (MW)	2,078	1992	2,136	2005		
Installed capacity, Oil (% of total)	na	na	5.6	2005		
Installed capacity, Off-grid (MW)	11	2000	7.7	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Installed capacity, Total (MW)	2,358	1992	2,340	2005		
Losses, Distribution (%)	12	2000	18	2005		
Losses, Non-technical (%)	6.0	2000	12	2005		
Losses, Technical (%)	6.0	2000	6.0	2005		
Losses, Total system (%)	26	2000	25	2005		
Losses, Transmission (%)	7.0	2000	6.3	2005		
Operating expenses covered by revenue (%)	na	na	83	2005		
Operating meters rate, Residential and low voltage business (%)	na	na	27	2004		
Outages, Number in a typical month (number)	na	na	3.2	2007		
Peak load, Annual, On-grid (MW)	225	2000	285	2005		
Population density (people per sq. km)	17	1990	27	2006		
Population with electricity (mln)	1.3	2000	1.3	2004		
Population without electricity (mln)	16	2000	19	2004		
Prepayment meters rate (%)	na	na	73	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	7.6	2005		
Substations, Total including all voltage levels (number)	66	2000	71	2005		
Transmission network length, High voltage (>66kV) (km)	3,255	2000	3,568	2005		
Value lost due to power outages (% of sales)	na	na	2.5	2007		

Namibia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	20	1992	31.7	2000		
Access to electricity, Households, Rural (%)	4.2	1992	13.2	2000		
Accounts receivable (NamPower) (days)	53	2000	60	2005		
Accounts receivable (Nored) (days)	na	na	94	2005		
Average annual revenue per residential or low voltage customer (USD)	na	na	196	2005		
Average cost of generation (NamPower) (USD/kWh)	na	na	0.03	2003		
Average electricity tariff, All customers (USD/kWh)	na	na	0.04	2007		
Average operating expenses per kWh (NamPower) (LCU/kWh)	na	na	0.2	2005		
Average operating expenses per kWh (Nored) (LCU/kWh)	na	na	0.81	2005		
Average operating expenses per kWh (NamPower) (USD/kWh)	na	na	0.03	2005		
Average operating expenses per kWh (Nored) (USD/kWh)	na	na	0.12	2005		
Capacity factor, Annual (%)	38	2000	46	2005		
Capital expenditure, Total (NamPower) (LCU, mln)	4.0	2000	6.1	2004		
Capital expenditure, Total (Nored) (LCU, mln)	na	na	0.01	2003		
Capital expenditure, Total (NamPower) (USD, mln)	0.6	2000	0.9	2004		
Capital expenditure, Total (Nored) (USD, mln)	na	na	0	2003		
Connections per employee (Nored) (number)	na	na	337	2005		
Country GDP (in current USD mln)	2,350	1990	6,740	2007		
Country GDP per capita (constant 2000 USD)	1,596	1990	2,265	2007		
Country population (mln)	1.4	1990	2.1	2007		
Customers, Medium voltage commercial (Nored) (thousands)	na	na	1.9	2005		
Customers, Non-residential (NamPower) (thousands)	2.5	1998	3.3	2003		
Customers, Non-residential (Oshaka) (thousands)	na	na	0.4	2004		
Customers, Residential or low voltage business (Nored) (thousands)	na	na	32	2005		
Debt-service coverage ratio (NamPower) (number)	na	na	8.7	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	9.2	2006		
Distribution feeders, Total (number)	176	2000	197	2005		
Distribution network length, Low voltage (<34.5kV) (km)	na	na	na	na		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Distribution network length, Medium voltage (34.5-.66kV) (km)	12,656	2000	22,072	2005		
Distribution transformers, Average capacity (kVA)	7,710	2000	9,071	2005		
Distribution transformers, Total including all ratings (number)	114	2000	133	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	12	2006		
Electricity consumption, Annual per capita of total consumption (kWh/person)	1,047	1991	1,428	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (Nored) (kWh/month)	na	na	1,931	2005		
Electricity consumption, Total (GWh)	1,539	1991	2,884	2005		
Electricity exported (GWh)	na	na	78	2005		
Electricity generation, Net, Conventional thermal (GWh)	35	1995	47	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	1,641	2005		
Electricity generation, Net, Total (GWh)	0	1990	1,709	2005		
Electricity imported (GWh)	950	1995	1,567	2005		
Electricity purchased, Total ((NamPower) GWh)	877	1998	1,045	2003		
Electricity sold, Medium voltage commercial (Nored) (GWh)	na	na	70	2005		
Electricity sold, Residential and low voltage business (Nored) (GWh)	na	na	62	2005		
Electricity sold, Total (Oshaka) (GWh)	na	na	43	2004		
Electricity sold, Total (NamPower) (GWh)	1,978	2000	3,363	2005		
Electricity sold, Total (Nored) (GWh)	na	na	131	2005		
Electricity traded (GWh)	950	1995	1,489	2005		
Employees, Total full time equivalent (Nampower) (number)	831	2000	891	2005		
Employees, Total full time equivalent (Nored) (number)	na	na	85	2004		
Employees, Total full time equivalent (Oshaka) (number)	10	2000	31	2004		
Employees, Total full time equivalent (Reho) (number)	na	na	20	2004		
Gross fixed assets, Book value (NamPower) (LCU, mln)	4,133	2000	6,639	2005		
Gross fixed assets, Book value (Nored) (LCU, mln)	na	na	175	2005		
Gross fixed assets, Book value (NamPower) (USD, mln)	590	2000	1,107	2005		
Gross fixed assets, Book value (Nored) (USD, mln)	na	na	29	2005		
Gross fixed assets, Date of last revaluation (Nampower) (year)	1996	2000	2001	2005		
Gross fixed assets, Date of last revaluation (Nored) (year)	na	na	2002	2003		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	62	2005		
Installed capacity, Coal (% of total)	na	na	31	2005		
Installed capacity, Conventional thermal (MW)	0	1992	15	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	62	2005		
Installed capacity, Hydro (MW)	249	1992	249	2005		
Installed capacity, Oil (% of total)	na	na	6.6	2005		
Installed capacity, Total (MW)	249	1992	393	2005		
Labor costs, Total (NamPower) (LCU, mln)	109	2000	121	2005		
Labor costs, Total (Nored) (LCU, mln)	na	na	11	2005		
Labor costs, Total (NamPower) (USD, mln)	16	2000	20	2005		
Labor costs, Total (Nored) (USD, mln)	na	na	1.8	2005		
Losses, Distribution (Nored) (%)	na	na	20	2005		
Losses, Distribution (Oshaka) (%)	na	na	13	2004		
Losses, Distribution (Reho) (%)	na	na	10	2001		
Losses, Total system (%)	14	1991	18	2005		
Losses, Total system (NamPower) (%)	na	na	9.0	2004		
Losses, Total system (Oshaka) (%)	na	na	13	2004		
Operating capacity, Total (NamPower) (MW)	na	na	360	2007		
Operating expenses covered by revenue (Nored) (%)	na	na	91	2005		
Operating expenses, Total (NamPower) (LCU, mln)	240	2000	680	2005		
Operating expenses, Total (Nored) (LCU, mln)	na	na	95	2005		
Operating expenses, Total (NamPower) (USD, mln)	34	2000	113	2005		
Operating expenses, Total (Nored) (USD, mln)	na	na	16	2005		
Operating-to-Installed capacity ratio (%)	100	2000	92	2005		
Outages, Number in a typical month (number)	na	na	1.7	2006		
Peak load, Annual, On-grid (MW)	320	2000	403	2005		
Population density (people per sq. km)	1.7	1990	2.5	2006		
Population using biomass as primary cooking fuel (%)	na	na	63	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Population with electricity (mln)	0.6	2000	0.7	2004		
Population without electricity (mln)	1.2	2000	1.4	2004		
Prepayment meters rate (%)	na	na	98	2005		
Revenue, Annual, Average (US cents/kWh)	na	na	12	2005		
Revenue from electricity billed, Medium voltage commercial (Nored) (LCU, mln)	na	na	66	2005		
Revenue from electricity billed, Medium voltage commercial (Nored) (USD, mln)	na	na	11	2005		
Revenue from electricity billed, Resid. and low voltage business (Nored) (LCU, mln)	na	na	38	2005		
Revenue from electricity billed, Resid. & low voltage business (Nored) (USD, mln)	na	na	6	2005		
Substations, Total including all voltage levels (number)	101	2000	115	2005		
Transmission network length, High voltage (>66kV) (km)	7,377	2000	8,490	2005		
Value lost due to power outages (% of sales)	na	na	1	2006		

Niger

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	4.4	1992	7.1	2005		
Access to electricity, Households, Rural (%)	0.2	1992	0.5	2005		
Access to electricity, Households, Urban (%)	27	1992	39	2005		
Accounts receivable (days)	12	2000	6.4	2005		
Average annual revenue per residential or low voltage customer (USD)	151	2000	275	2005		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	88	1995	86	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.2	1995	0.2	2003		
Average operating expenses per kWh (LCU/kWh)	58	2000	140	2005		
Average operating expenses per kWh (USD/kWh)	0.1	2000	0.3	2005		
Capacity factor, Annual (%)	24	2000	25	2005		
Collection ratio (%)	96	2000	96	2005		
Connections per employee (number)	na	na	118	2005		
Country GDP (in current USD mln)	2,481	1990	4,170	2007		
Country GDP per capita (constant 2000 USD)	193	1990	169	2007		
Country population (mln)	7.8	1990	14	2007		
Customers, High voltage industrial (thousands)	0	2000	0.002	2005		
Customers, Medium voltage commercial (thousands)	0.7	2000	0.7	2005		
Customers, Residential or low voltage business (thousands)	80	2000	125	2005		
Customers, Total (thousands)	44	1992	107	2003		
Debt-service coverage ratio (number)	5.0	2000	5.7	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	21	2006		
Distribution feeders, Length, Low voltage (upto 415V) (km)	470	2000	660	2005		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	355	2000	465	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Distribution feeders, Total (number)	703	2000	706	2005		
Distribution network length, All voltages (km)	1,155	1992	2,629	2003		
Distribution network length, Low voltage (<34.5kV) (km)	1,119	2000	1,333	2005		
Distribution network length, Medium voltage (34.5-.66kV) (km)	1,085	2000	1,844	2005		
Distribution transformers, Average capacity (kVA)	230	2000	230	2005		
Distribution transformers, Total including all ratings (number)	672	2000	672	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	14	2003		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	1,551	2000	1,612	2005		
Electricity generation, Net, Conventional thermal (GWh)	161	1992	234	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Off-grid (GWh)	29	2000	31	2005		
Electricity generation, Net, Total (GWh)	161	1992	234	2005		
Electricity imported (GWh)	190	1995	220	2005		
Electricity purchased from IPPs (GWh)	5.6	2000	3.8	2005		
Electricity purchased, Total (GWh)	160	1992	275	2003		
Electricity sold, High voltage industrial (GWh)	0	2000	0	2005		
Electricity sold, Medium voltage commercial (GWh)	0.2	2000	0.2	2005		
Electricity sold, Residential and low voltage business (GWh)	125	2000	202	2005		
Electricity sold, Total (GWh)	236	2000	333	2005		
Electricity traded (GWh)	190	1995	220	2005		
Employees, Total full time equivalent (number)	1,104	2000	1,063	2005		
Gross fixed assets, Book value (LCU, mln)	79,218	2000	2,192	2005		
Gross fixed assets, Book value (USD, mln)	111	2000	4.2	2005		
Household average size (number)	na	na	6.4	2005		
Installed capacity, Coal (% of total)	na	na	31	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Installed capacity, Conventional thermal (MW)	63	1992	105	2005	
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	0	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Off-grid (MW)	60	2000	55	2005		
Installed capacity, Oil (% of total)	na	na	69	2005		
Installed capacity, Total (MW)	63	1992	105	2005		
Labor costs, Total (LCU, mln)	3,375	2000	4,504	2005		
Labor costs, Total (USD, mln)	4.7	2000	8.6	2005		
Losses, Distribution (%)	7.0	2000	7.0	2005		
Losses, Technical (%)	16	2000	16	2005		
Losses, Total system (%)	na	na	25	2004		
Losses, Transmission (%)	10	2000	9.4	2005		
Operating capacity, Total (MW)	na	na	92	2005		
Operating expenses covered by revenue (%)	na	na	166	2005		
Operating expenses, Total (LCU, mln)	21,639	2000	45,325	2005		
Operating expenses, Total (USD, mln)	30	2000	86	2005		
Operating meters rate, Residential and low voltage business (%)	81	2000	85	2005		
Operating-to-Installed capacity ratio (%)	91	2000	88	2005		
Outages, Number in a typical month (number)	na	na	21	2006		
Peak load, Annual, On-grid (MW)	38	2000	50	2005		
Population density (people per sq. km)	6.2	1990	11	2006		
Population using biomass as primary cooking fuel (%)	na	na	97	2004		
Revenue per employee (USD/employee)	40,247	1995	47,876	2003		
Revenue, Annual, Average (US cents/kWh)	na	na	16	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	0	2000	0	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Revenue from electricity billed, High voltage industrial (USD, mln)	0	2000	0	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	13,846	2000	12,770	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	19	2000	24	2005		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	8,660	2000	18,134	2005		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	12	2000	34	2005		
Rural isolated networks, People served (thousands)	na	na	29	2007		
Substations, Total including all voltage levels (number)	703	2000	706	2005		
Transmission network length, High voltage (>66kV) (km)	796	2000	1,062	2005		
Value lost due to power outages (% of sales)	na	na	2.5	2006		

Nigeria

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	45	1999	52	2003		
Access to electricity, Households, Rural (%)	28	1999	34	2003		
Access to electricity, Households, Urban (%)	84	1999	85	2003		
Average annual revenue per residential or low voltage customer (USD)	157	2000	62	2005		
Average electricity tariff, All customers (LCU/kWh)	3.9	2000	6.4	2005		
Average electricity tariff, All customers (USD/kWh)	0.04	2000	0.05	2005		
Average operating expenses per kWh (LCU/kWh)	3.93	2000	2.62	2005		
Average operating expenses per kWh (USD/kWh)	0.03	2000	0.02	2005		
Capacity factor, Annual (%)	89	2000	74	2005		
Capital expenditure, Total (LCU, mln)	na	na	20,987	2005		
Capital expenditure, Total (USD, mln)	na	na	160	2005		
Collection ratio (%)	63	2000	69	2004		
Connections per employee (number)	na	na	127	2005		
Country GDP (in current USD mln)	28,472	1990	165,690	2007		
Country GDP per capita (constant 2000 USD)	370	1990	472	2007		
Country population (mln)	94	1990	148	2007		
Current ratio (number)	1.4	2000	1.3	2005		
Customers, High voltage industrial (thousands)	13	2000	17	2005		
Customers, Medium voltage commercial (thousands)	432	2000	651	2005		
Customers, Residential or low voltage business (thousands)	1,289	2000	3,760	2005		
Customers, Total (thousands)	2,737	2000	4,500	2005		
Debt-equity ratio (number)	0.7	2000	0.2	2005		
Debt-service coverage ratio (number)	0	2000	3.4	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	7.7	2007		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Distribution feeders, Length, Low voltage (upto 415V) (km)	70,799	2000	126,032	2005		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	77,027	2000	92,163	2005		
Distribution feeders, Total (number)	na	na	680	2005		
Distribution network length, Low voltage (<34.5kV) (km)	70,799	2000	126,033	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	66,192	2000	80,990	2005		
Distribution transformers, Average capacity (kVA)	5,526	2000	5,526	2005		
Distribution transformers, Total including all ratings (number)	na	na	1,790	2004		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	3.4	2005		
Electricity consumption, Annual per capita of total consumption (kWh/person)	88	1990	127	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	5,693	2000	2,903	2005		
Electricity consumption, Residential (GWh)	4,340	1992	7,684	2004		
Electricity consumption, Total (GWh)	8,291	1990	17,895	2005		
Electricity exported (GWh)	198	2000	273	2005		
Electricity generation, Net, Conventional thermal (GWh)	8,249	1992	14,655	2005		
Electricity generation, Net, Hydro (GWh)	5,998	1992	7,871	2005		
Electricity generation, Net, Total (GWh)	13,463	1990	23,539	2005		
Electricity purchased from IPPs (GWh)	na	na	3,443	2005		
Electricity sold, High voltage industrial (GWh)	2,490	2000	4,708	2005		
Electricity sold, Medium voltage commercial (GWh)	3,057	2000	5,779	2005		
Electricity sold, Residential and low voltage business (GWh)	5,773	2000	10,915	2005		
Electricity sold, Total (GWh)	11,320	2000	21,402	2005		
Electricity traded (GWh)	(19)	1998	(20)	2004		
Employees, Total full time equivalent (number)	33,986	2000	31,668	2004		
Gross fixed assets, Book value (LCU, mln)	na	na	118,411	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Gross fixed assets, Book value (USD, mln)	na	na	904	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	45	2005		
Household average size (number)	na	na	4.7	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	3,540	1992	3,960	2005		
Installed capacity, Gas (% of total)	na	na	60	2005		
Installed capacity, Hydro (% of total)	na	na	23	2005		
Installed capacity, Hydro (MW)	2,419	1992	1,938	2005		
Installed capacity, Off-grid (MW)	na	na	8.8	2005		
Installed capacity, Oil (% of total)	na	na	15	2005		
Installed capacity, Total (MW)	5,959	1992	5,898	2005		
Labor costs, Total (LCU, mln)	na	na	29,568	2005		
Labor costs, Total (USD, mln)	na	na	226	2005		
Losses, Total system (%)	41	2000	29	2005		
Losses, Transmission (%)	24	2000	8.5	2005		
Operating capacity, Total (MW)	na	na	3,300	2007		
Operating expenses covered by revenue (%)	na	na	78	2005		
Operating expenses, Total (LCU, mln)	na	na	61,696	2005		
Operating expenses, Total (USD, mln)	na	na	471	2005		
Operating-to-Installed capacity ratio (%)	33	2000	56	2005		
Outages, Frequency rate (number/year)	792	2000	956	2005		
Outages, Number in a typical month (number)	na	na	27	2007		
Peak load, Annual, On-grid (MW)	2,499	2000	3,774	2005		
Population density (people per sq. km)	104	1990	159	2006		
Population using biomass as primary cooking fuel (%)	na	na	85	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Population with electricity (mln)	51	2000	61	2004		
Population without electricity (mln)	76	2000	71	2004		
Revenue per employee (USD/employee)	10,242	2000	24,341	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	2.8	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	10,086	2000	24,790	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	99	2000	189	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	6,687	1998	34,763	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	12,226	2000	23,114	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	120	2000	176	2005		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	16,281	2000	30,780	2005		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	160	2000	235	2005		
Rural isolated networks, People served (thousands)	na	na	5.0	2007		
Substations, Total including all voltage levels (number)	135,230	2000	586,165	2005		
Transmission network length, High voltage (>66kV) (km)	9,925	2000	11,173	2005		
Value lost due to power outages (% of sales)	na	na	8.9	2007		

Rwanda

Indicator	Earliest available year, 1990-2000			Latest available year, 2003-2007			New data	
	Data	Year	Year	Data	Year	Data	Year	
	Access to electricity, Households, National (%)	2.3	1992		4.8	2005		
Access to electricity, Households, Rural (%)	0.5	1992		1.3	2005			
Access to electricity, Households, Urban (%)	31	1992		25	2005			
Accounts receivable (days)	na	na		10	2005			
Average annual revenue per residential or low voltage customer (USD)	na	na		61	2004			
Average connection charge, Residential customers (LCU)	na	na		60,000	2005			
Average connection charge, Residential customers (USD)	na	na		107	2005			
Average electricity tariff, All customers (USD/kWh)	na	na		0.20	2007			
Average operating expenses per kWh (LCU/kWh)	na	na		191	2005			
Average operating expenses per kWh (USD/kWh)	na	na		0.34	2005			
Capacity factor, Annual (%)	na	na		43	2005			
Collection ratio (%)	na	na		83	2005			
Complaints about deficient service (number/year)	na	na		29,000	2005			
Connections per employee (number)	na	na		189	2005			
Country GDP (in current USD mln)	2,584	1990		3,320	2007			
Country GDP per capita (constant 2000 USD)	229	1990		271	2007			
Country population (mln)	7.3	1990		10	2007			
Customers, High voltage industrial (thousands)	0	2000		0	2005			
Customers, Medium voltage commercial (thousands)	0.3	2000		0.2	2005			
Customers, Residential or low voltage business (thousands)	46	2000		70	2005			
Delay in obtaining an electrical connection for businesses (days)	na	na		18	2006			
Distribution feeders, Length, Low voltage (upto 415V) (km)	1,900	2000		1,900	2005			
Distribution feeders, Length, Medium voltage (415V ..11kV) (km)	989	2000		989	2005			
Distribution feeders, Total (number)	35	2000		41	2005			
Distribution network length, Low voltage (<34.5kV) (km)	na	na		2,030	2005			
Distribution network length, Medium voltage (34.5..66kV) (km)	na	na		1,207	2005			
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na		15	2005			
Electricity consumption, Average monthly sales to Residential and low	na	na		na	na			

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
voltage business customers (kWh/month)						
Electricity exported (GWh)	5.0	1995	10	2005		
Electricity generation, Net, Conventional thermal (GWh)	4.0	1992	5.0	2005		
Electricity generation, Net, Hydro (GWh)	170	1992	90	2005		
Electricity generation, Net, Total (GWh)	174	1992	95	2005		
Electricity imported (GWh)	14	1995	120	2005		
Electricity sold, High voltage industrial (GWh)	na	na	na	na		
Electricity sold, Medium voltage commercial (GWh)	na	na	na	na		
Electricity sold, Residential and low voltage business (GWh)	na	na	na	na		
Electricity sold, Total (GWh)	134	2000	157	2005		
Electricity traded (GWh)	9.0	1995	110	2005		
Employees, Total full time equivalent (number)	318	2000	372	2005		
Gross fixed assets, Book value (LCU, mln)	na	na	28,154	2005		
Gross fixed assets, Book value (USD, mln)	na	na	50	2005		
Gross fixed assets, Date of last revaluation (year)	na	na	2004	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	38	2005		
Household average size (number)	na	na	5.0	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	4.0	1992	4.0	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	96	2005		
Installed capacity, Hydro (MW)	30	1992	27	2005		
Installed capacity, Oil (% of total)	na	na	0	2005		
Installed capacity, Total (MW)	34	1992	31	2005		
Labor costs, Total (LCU, mln)	33	2000	2,539	2005		
Labor costs, Total (USD, mln)	0.1	2000	4.6	2005		
Losses, Non-technical (%)	na	na	12	2005		
Losses, Technical (%)	na	na	11	2005		
Losses, Total system (%)	34	2000	23	2005		

Indicator	Earliest available year, 1990-2000			Latest available year, 2003-2007			New data	
	Data	Year		Data	Year		Data	Year
	Operating capacity, Total (MW)	na	na		31	2005		
Operating expenses covered by revenue (%)	na	na		0	2005			
Operating expenses, Total (LCU, mln)	na	na		30,131	2005			
Operating expenses, Total (USD, mln)	na	na		54	2005			
Operating-to-Installed capacity ratio (%)	100	2000		100	2005			
Outages, Frequency rate (number/year)	na	na		4,298	2005			
Outages, Number in a typical month (number)	na	na		14	2006			
Population density (people per sq. km)	296	1990		384	2006			
Population using biomass as primary cooking fuel (%)	100	1998		100	2004			
Prepayment meters rate (%)	na	na		65	2005			
Revenue, Annual, Average US cents/kWh	na	na		22	2005			
Revenue from electricity billed, High voltage industrial (LCU, mln)	na	na		na	na			
Revenue from electricity billed, High voltage industrial (USD, mln)	na	na		na	na			
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	na	na		4,063	2004			
Revenue from electricity billed, Medium voltage commercial (USD, mln)	na	na		7.0	2004			
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	na	na		2,386	2004			
Revenue from electricity billed, Residential and low voltage business (USD, mln)	na	na		4.1	2004			
Rural isolated networks, People served (thousands)	na	na		26	2007			
Substations, Total including all voltage levels (number)	21	2000		22	2005			
Transmission network length, High voltage (>66kV) (km)	370	2000		370	2005			
Value lost due to power outages (% of sales)	na	na		8.7	2006			

Sao Tome and Principe

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	48.4	2000	na	na		
Access to electricity, Households, Rural (%)	35	2000	na	na		
Access to electricity, Households, Urban (%)	60	2000	na	na		
Country GDP (in current USD mln)	na	na	1.45	2007		
Country population (mln)	0.1	1990	0.2	2007		
Electricity generation, Net, Conventional thermal (GWh)	7.0	1992	8.0	2005		
Electricity generation, Net, Hydro (GWh)	8.0	1992	10	2005		
Electricity generation, Net, Total (GWh)	15	1992	18	2005		
Household average size (number)	na	na	4.6	2005		
Installed capacity, Conventional thermal (MW)	4.0	1992	3.0	2005		
Installed capacity, Hydro (MW)	2.0	1992	6.0	2005		
Installed capacity, Total (MW)	6.0	1992	9.0	2005		
Population density (people per sq. km)	121	1990	162	2006		

Senegal

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	26	1992	47	2005		
Access to electricity, Households, Rural (%)	2.2	1992	16	2005		
Access to electricity, Households, Urban (%)	59	1992	80	2005		
Accounts receivable (days)	71	2000	83	2005		
Average annual revenue per residential or low voltage customer (USD)	168	2000	268	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.2	2006		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	70	1994	82	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.13	1994	0.14	2003		
Average operating expenses per kWh (LCU/kWh)	97	2000	110	2005		
Average operating expenses per kWh (USD/kWh)	0.14	2000	0.21	2005		
Capacity factor, Annual (%)	47	2000	66	2005		
Capital expenditure, Total (LCU, mln)	26,732	1999	15,406	2001		
Capital expenditure, Total (USD, mln)	43	1999	21	2001		
Complaints about deficient service (number/year)	24,725	2000	52,405	2005		
Connections per employee (number)	na	na	257	2005		
Country GDP (in current USD mln)	5,717	1990	11,151	2007		
Country GDP per capita (constant 2000 USD)	439	1990	509	2007		
Country population (mln)	8	1990	12	2007		
Customers, High voltage industrial (thousands)	0.004	2000	0.003	2005		
Customers, Medium voltage commercial (thousands)	1.0	2000	1.1	2005		
Customers, Non-residential (thousands)	66	1999	90	2002		
Customers, Residential or low voltage business (thousands)	391	2000	598	2005		
Debt-service coverage ratio (number)	0	2000	1.1	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Delay in obtaining an electrical connection for businesses (days)	na	na	9.4	2007		
Distribution feeders, Length, Low voltage (upto 415V) (km)	3,998	2000	6,760	2005		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	4,893	2000	7,844	2005		
Distribution feeders, Total (number)	116	2000	127	2005		
Distribution network length, Low voltage (<34.5kV) (km)	3,998	2000	6,760	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	4,549	2000	6,827	2005		
Distribution transformers, Total including all ratings (number)	2,524	2000	3,285	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	15	2006		
Electricity consumption, Annual per capita of total consumption (kWh/person)	99	1990	151	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	1,471	2000	1,673	2005		
Electricity consumption, Residential (GWh)	153	1992	997	2004		
Electricity consumption, Total (GWh)	780	1990	1,777	2005		
Electricity generation, Net, Conventional thermal (GWh)	960	1992	1,955	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	264	2005		
Electricity generation, Net, Off-grid (GWh)	58	2000	88	2005		
Electricity generation, Net, Other renewables (GWh)	0	1992	4.0	2005		
Electricity generation, Net, Total (GWh)	901	1990	2,544	2005		
Electricity purchased from IPPs (GWh)	154	2000	721	2005		
Electricity sold, High voltage industrial (GWh)	185	2000	172	2005		
Electricity sold, Medium voltage commercial (GWh)	389	2000	536	2005		
Electricity sold, Residential and low voltage business (GWh)	575	2000	1,001	2005		
Electricity sold, Total (GWh)	1,149	2000	1,710	2005		
Employees, Total full time equivalent (number)	1,726	2000	2,328	2005		
Gross fixed assets, Book value (LCU, mln)	268,338	2000	373,029	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Gross fixed assets, Book value (USD, mln)	377	2000	708	2005		
Gross fixed assets, Date of last revaluation (year)	1983	2000	1983	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	64	2005		
Household average size (number)	na	na	5.0	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	231	1992	300	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	0	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Off-grid (MW)	19	2000	33	2005		
Installed capacity, Oil (% of total)	na	na	96	2005		
Installed capacity, Total (MW)	231	1992	300	2005		
Labor costs, Total (LCU, mln)	12,766	2000	18,262	2005		
Labor costs, Total (USD, mln)	18	2000	35	2005		
Losses, Distribution (%)	16	2000	19	2005		
Losses, Total system (%)	19	2000	21	2005		
Losses, Transmission (%)	4.4	2000	3.2	2005		
Operating capacity, Total (MW)	344	1995	365	2005		
Operating expenses covered by revenue (%)	na	na	140	2005		
Operating expenses, Total (LCU, mln)	111,826	2000	188,219	2005		
Operating expenses, Total (USD, mln)	157	2000	357	2005		
Outages for firms (days per year)	na	na	26	2006		
Outages, Number in a typical month (number)	na	na	12	2007		
Peak load, Annual, On-grid (MW)	246	2000	374	2005		
Population density (people per sq. km)	41	1990	63	2006		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Population using biomass as primary cooking fuel (%)	na	na	41	2004		
Population with electricity (mln)	2.9	2000	3.8	2004		
Population without electricity (mln)	6.6	2000	7.8	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	15	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	10,261	2000	9,817	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	14	2000	19	2005		
Revenue from electricity billed, Medium voltage commercial (LCU, mln)	28,089	2000	40,363	2005		
Revenue from electricity billed, Medium voltage commercial (USD, mln)	39	2000	77	2005		
Revenue from electricity billed, Residential and low voltage business (LCU, mln)	46,803	2000	84,472	2005		
Revenue from electricity billed, Residential and low voltage business (USD, mln)	66	2000	160	2005		
Rural isolated networks, People served (thousands)	na	na	100	2007		
Substations, Total including all voltage levels (number)	20	2000	22	2005		
Transmission network length, High voltage (>66kV) (km)	345	2000	1,017	2005		
Value lost due to power outages (% of sales)	na	na	5.0	2007		

Seychelles

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Country GDP (in current USD mln)	369	1990	728	2007		
Country GDP per capita (constant 2000 USD)	5,645	1990	7,408	2007		
Country population (mln)	0.1	1990	0.1	2007		
Electricity generation, Net, Conventional thermal (GWh)	103	1992	208	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	103	1992	208	2005		
Installed capacity, Conventional thermal (MW)	28	1992	95	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	28	1992	95	2005		
Population density (people per sq. km)	152	1990	184	2006		

Sierra Leone

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	na	na	17	2003		
Access to electricity, Households, Rural (%)	na	na	3.2	2003		
Access to electricity, Households, Urban (%)	na	na	35	2003		
Average electricity tariff, All customers (USD/kWh)	na	na	0	2007		
Country GDP (in current USD mln)	650	1990	1,672	2007		
Country GDP per capita (constant 2000 USD)	250	1990	235	2007		
Country population (mln)	4.1	1990	5.9	2007		
Customers, Total (thousands)	na	na	32	2007		
Electricity generation, Net, Conventional thermal (GWh)	216	1992	245	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	216	1992	245	2005		
Electricity sold, Total (GWh)	38	2000	20	2006		
Household average size (number)	na	na	6.2	2005		
Installed capacity, Conventional thermal (MW)	124	1992	114	2005		
Installed capacity, Hydro (MW)	2.0	1992	4.0	2005		
Installed capacity, Total (MW)	126	1992	118	2005		
Losses, Total system (%)	38	2000	37	2006		
Population density (people per sq. km)	57	1990	80	2006		

Somalia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Country GDP (in current USD mln)	917	1990	na	na		
Country population (mln)	6.72	1990	8.7	2007		
Electricity generation, Net, Conventional thermal (GWh)	249	1992	270	2005		
Electricity generation, Net, Hydro (GWh)	0	1992	0	2005		
Electricity generation, Net, Total (GWh)	249	1992	270	2005		
Installed capacity, Conventional thermal (MW)	70	1992	80	2005		
Installed capacity, Hydro (MW)	0	1992	0	2005		
Installed capacity, Total (MW)	70	1992	80	2005		
Losses, Total system (%)	na	na	18	2004		
Population density (people per sq. km)	10.71	1990	13.46	2006		

South Africa (utility data are for Eskom only)

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	63	1998	na	na		
Access to electricity, Households, Rural (%)	37	1998	na	na		
Accounts receivable (Eskom) (days)	64	2000	47	2003		
Average annual revenue per residential or low voltage customer (Eskom) (USD)	87	2000	151	2005		
Average cost of generation (Eskom) (USD/kWh)	na	na	0.02	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.03	2007		
Average electricity tariff, Residential customers and low voltage business (Eskom) (LCU/kWh)	na	na	0.40	2005		
Average electricity tariff, Residential customers and low voltage business (Eskom) (USD/kWh)	na	na	0.06	2005		
Average operating expenses per kWh (Eskom) (LCU/kWh)	0.07	2000	0.15	2005		
Average operating expenses per kWh (Eskom) (USD/kWh)	0.01	2000	0.02	2005		
Capacity factor, Annual (%)	na	na	72	2005		
Country GDP (in current USD mln)	112,014	1990	277,581	2007		
Country GDP per capita (constant 2000 USD)	3,152	1990	3,718	2007		
Country population (mln)	35	1990	48	2007		
Customers, High voltage industrial (Eskom) (thousands)	5	2000	5	2005		
Customers, Medium voltage commercial (Eskom) (thousands)	32	2000	43	2005		
Customers, Non-residential (Eskom) (thousands)	107	2000	129	2006		
Customers, Residential or low voltage business (Eskom) (thousands)	2,948	2000	3,475	2005		
Customers, Total (Eskom) (thousands)	3,054	2000	3,604	2005		
Debt-service coverage ratio (Eskom) (number)	5.7	2000	3.7	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	7.3	2003		
Distribution feeders, Length, Low voltage (upto 415V) (km)	na	na	7,875	2005		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	na	na	137	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Distribution network length, All voltages (km)	na	na	42,988	2005		
Distribution network length, Low voltage (<34.5kV) (km)	na	na	277,047	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	na	na	21,187	2005		
Distribution transformers, Average capacity (kVA)	na	na	291	2005		
Distribution transformers, Total including all ratings (number)	na	na	305,402	2005		
Electricity consumption, Annual per capita of total consumption (kWh/person)	4,431	1990	4,847	2005		
Electricity consumption, Average monthly sales to Residential and low voltage business customers (Eskom) (kWh/month)	2,140	2000	2,336	2005		
Electricity consumption, Residential (GWh)	19,394	1992	36,231	2004		
Electricity consumption, Total (GWh)	155,988	1990	227,296	2005		
Electricity exported (GWh)	5,554	1996	13,122	2006		
Electricity generation, Net, Conventional thermal (GWh)	147,056	1992	214,893	2005		
Electricity generation, Net, Hydro (GWh)	1,319	1996	1,141	2006		
Electricity generation, Net, Nuclear (GWh)	11,775	1996	11,293	2006		
Electricity generation, Net, Other renewables (GWh)	0	1992	300	2005		
Electricity generation, Net, Total (GWh)	175,754	1996	228,480	2006		
Electricity imported (GWh)	149	1995	11,079	2005		
Electricity purchased from IPPs (Eskom) (GWh)	5,294	2000	9,758	2005		
Electricity purchased, Total (Eskom) (GWh)	29	1996	10,310	2006		
Electricity sold, High voltage industrial (Eskom) (GWh)	90,609	2000	92,883	2005		
Electricity sold, Medium voltage commercial (Eskom) (GWh)	na	na	7,143	2005		
Electricity sold, Residential and low voltage business (Eskom) (GWh)	6,308	2000	8,117	2005		
Electricity sold, Total (Eskom) (GWh)	178,192	2000	205,567	2005		
Electricity traded (GWh)	(2,851)	1995	(2,343)	2005		
Employees, Total full time equivalent (Eskom) (number)	39,857	1996	29,697	2006		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Gross fixed assets, Book value (Eskom) (LCU, mln)	81,770	2000	59,523	2005		
Gross fixed assets, Book value (Eskom) (USD, mln)	11,681	2000	9,921	2005		
Household average size (number)	na	na	3.8	2005		
Installed capacity, Coal (% of total)	na	na	87	2005		
Installed capacity, Conventional thermal (MW)	32,448	1992	38,020	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	6.0	2005		
Installed capacity, Hydro (MW)	550	1992	661	2005		
Installed capacity, Nuclear (MW)	1,842	1992	1,800	2005		
Installed capacity, Oil (% of total)	na	na	2.0	2005		
Installed capacity, Total (MW)	34,840	1992	40,481	2005		
Labor costs, Total (Eskom) (LCU, mln)	5,385	2000	9,317	2005		
Labor costs, Total (Eskom) (USD, mln)	769	2000	1,553	2005		
Load factor, Annual (%)	64	1996	70	2006		
Losses, Total system (%)	8	2000	10	2005		
Operating capacity, Total (MW)	36,563	1996	39,810	2006		
Operating expenses covered by revenue (%)	na	na	73	2005		
Operating expenses, Total (Eskom) (LCU, mln)	14,838	2000	30,070	2005		
Operating expenses, Total (Eskom) (USD, mln)	2,120	2000	5,012	2005		
Operating meters rate, Residential and low voltage business (%)	100	2000	100	2005		
Operating-to-Installed capacity ratio (%)	97	2000	98	2007		
Outages for firms (days per year)	na	na	6.0	2006		
Peak load, Annual, On-grid (MW)	27,967	1996	33,461	2006		
Population density (people per sq. km)	29	1990	39	2006		
Population with electricity (mln)	28	2000	33	2004		
Population without electricity (mln)	15	2000	14	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Prepayment meters rate (%)	na	na	85	2006	
Revenue per employee (Eskom) (USD/employee)	109,035	1996	217,176	2005		
Revenue, Annual, Average (Eskom) (US cents/kWh)	na	na	16	2005		
Revenue from electricity billed, High voltage industrial (Eskom) (LCU, mln)	11,243	2000	13,598	2005		
Revenue from electricity billed, High voltage industrial (Eskom) (USD, mln)	1,606	2000	2,266	2005		
Revenue from electricity billed, Medium voltage commercial (Eskom) (LCU, mln)	185	2000	1,563	2005		
Revenue from electricity billed, Medium voltage commercial (Eskom) (USD, mln)	26	2000	261	2005		
Revenue from electricity billed, Residential and low voltage business (Eskom) (LCU, mln)	1,794	2000	3,142	2005		
Revenue from electricity billed, Residential and low voltage business (Eskom) (USD, mln)	256	2000	524	2005		
Transmission network length, High voltage (>66kV) (km)	na	na	48,970	2005		
Value lost due to power outages (% of sales)	na	na	0.4	2003		

Sudan

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	30	2000	30	2004		
Average electricity tariff, All customers (USD/kWh)	na	na	0.09	2007		
Country GDP (in current USD mln)	12,409	1990	46,228	2007		
Country GDP per capita (constant 2000 USD)	272	1990	527	2007		
Country population (mln)	26	1990	39	2007		
Electricity consumption, Annual per capita of total consumption (kWh/person)	49	1990	94	2005		
Electricity consumption, Residential (GWh)	701	1992	1,566	2004		
Electricity consumption, Total (GWh)	1,282	1990	3,478	2005		
Electricity generation, Net, Conventional thermal (GWh)	512	1992	2,717	2005		
Electricity generation, Net, Hydro (GWh)	1,078	1992	1,227	2005		
Electricity generation, Net, Total (GWh)	1,515	1990	4,124	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	275	1992	451	2005		
Installed capacity, Gas (% of total)	na	na	9	2005		
Installed capacity, Hydro (% of total)	na	na	19	2005		
Installed capacity, Hydro (MW)	225	1992	350	2005		
Installed capacity, Oil (% of total)	na	na	66	2005		
Installed capacity, Total (MW)	500	1992	801	2005		
Losses, Total system (%)	na	na	25	2004		
Operating capacity, Total (MW)	na	na	801	2005		
Operating-to-Installed capacity ratio (%)	100	2000	100	2005		
Population density (people per sq. km)	11	1990	16	2006		
Population with electricity (mln)	9	2000	11	2004		
Population without electricity (mln)	22	2000	25	2004		

Swaziland

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	27	2000	na	na		
Access to electricity, Households, Rural (%)	12	2000	na	na		
Access to electricity, Households, Urban (%)	48	1997	na	na		
Average electricity tariff, All customers (USD/kWh)	na	na	0.1	2003		
Capacity factor, Annual (%)	na	na	23	2005		
Country GDP (in current USD mln)	1,115	1990	2,894	2007		
Country GDP per capita (constant 2000 USD)	1,342	1990	1,547	2007		
Country population (mln)	0.8	1990	1.1	2007		
Delay in obtaining an electrical connection for businesses (days)	na	na	17	2006		
Electricity generation, Net, Conventional thermal (GWh)	202	1992	265	2005		
Electricity generation, Net, Hydro (GWh)	202	1992	195	2005		
Electricity generation, Net, Total (GWh)	404	1992	460	2005		
Electricity imported (GWh)	618	1995	872	2005		
Electricity traded (GWh)	618	1995	872	2005		
Installed capacity, Conventional thermal (MW)	79	1992	87	2005		
Installed capacity, Hydro (MW)	43	1992	60	2005		
Installed capacity, Total (MW)	122	1992	147	2005		
Losses, Total system (%)	na	na	68	2004		
Outages, Number in a typical month (number)	na	na	2.5	2006		
Peak load, Annual, On-grid (MW)	na	na	172	2005		
Population density (people per sq. km)	45	1990	66	2006		
Value lost due to power outages (% of sales)	na	na	2.5	2006		

Tanzania

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	6.8	1992	11	2004		
Access to electricity, Households, Rural (%)	1.3	1992	1.6	2004		
Access to electricity, Households, Urban (%)	24	1992	39	2004		
Average annual revenue per residential or low voltage customer (USD)	na	na	158	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0	2005		
Average electricity tariff, Resid. cust. & low volt. business (LCU/kWh)	18	1992	na	na		
Average electricity tariff, Resid. cust. & low volt. business (USD/kWh)	0.1	1992	na	na		
Average operating expenses per kWh (LCU/kWh)	89	2000	125	2004		
Average operating expenses per kWh (USD/kWh)	0.1	2000	0.1	2004		
Capacity factor, Annual (%)	na	na	50	2005		
Collection ratio (%)	na	na	94	2005		
Connections per employee (number)	na	na	124	2005		
Country GDP (in current USD mln)	4,259	1990	16,181	2007		
Country GDP per capita (constant 2000 USD)	267	1990	354	2007		
Country population (mln)	25	1990	40	2007		
Customers, High voltage industrial (thousands)	na	na	0.5	2005		
Customers, Medium voltage commercial (thousands)	na	na	1.3	2005		
Customers, Non-residential (thousands)	1.8	1992	2.8	2001		
Customers, Residential or low voltage business (thousands)	na	na	549	2004		
Customers, Total (thousands)	222	1992	551	2004		
Debt-service coverage ratio (number)	na	na	4.6	2004		
Delay in obtaining an electrical connection for businesses (days)	na	na	44	2006		
Distribution feeders, Length, Low voltage (up to 415V) (km)	na	na	21,786	2005		
Distribution feeders, Length, Medium voltage (415V..11kV) (km)	na	na	4,933	2005		
Distribution network length, Low voltage (<34.5kV) (km)	na	na	824	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	na	na	1,952	2005		
Distribution transformers, Average capacity (kVA)	na	na	1,463	2005		
Distribution transformers, Total including all ratings (number)	na	na	7,798	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	6.7	2006		
Electricity consumption, Annual per cap. of total cons. (kWh/person)	51	1990	61	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity consumption, Average monthly sales to Residential and low voltage business customers (kWh/month)	na	na	1,940	2005		
Electricity consumption, Residential (GWh)	553	1992	1,163	2004		
Electricity consumption, Total (GWh)	1,441	1992	2,013	2004		
Electricity generation, Net, Conventional thermal (GWh)	156	1992	120	2005		
Electricity generation, Net, Hydro (GWh)	1,634	1992	1,760	2005		
Electricity generation, Net, Off-grid (GWh)	na	na	88	2005		
Electricity generation, Net, Total (GWh)	1,790	1992	1,880	2005		
Electricity imported (GWh)	0	1995	136	2005		
Electricity purchased from IPPs (GWh)	na	na	2,045	2005		
Electricity sold, High voltage industrial (GWh)	523	2000	1,091	2005		
Electricity sold, Medium voltage commercial (GWh)	309	2000	392	2005		
Electricity sold, Residential and low voltage business (GWh)	1,025	2000	1,145	2005		
Electricity sold, Total (GWh)	1,857	2000	2,628	2005		
Electricity traded (GWh)	0	1995	136	2005		
Employees, Total full time equivalent (number)	na	na	4,783	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	42	2005		
Household average size (number)	na	na	4.8	2005		
Installed capacity, Coal (% of total)	na	na	1.0	2005		
Installed capacity, Conventional thermal (MW)	177	1992	324	2005		
Installed capacity, Gas (% of total)	na	na	18	2005		
Installed capacity, Hydro (% of total)	na	na	53	2005		
Installed capacity, Off-grid (MW)	329	1992	557	2005		
Installed capacity, Oil (% of total)	na	na	33	2005		
Installed capacity, Total (MW)	506	1992	881	2005		
Labor costs, Total (LCU, mln)	12,446	2000	20,038	2005		
Labor costs, Total (USD, mln)	16	2000	18	2005		
Losses, Distribution (%)	25	1992	20	2003		
Losses, Total system (%)	20	1990	27	2005		
Operating capacity, Total (MW)	260	1994	848	2005		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Operating expenses covered by revenue (%)	na	na	114	2004		
Operating expenses, Total (LCU, mln)	71,605	2000	214,037	2004		
Operating expenses, Total (USD, mln)	90	2000	197	2004		
Operating meters rate, Residential and low voltage business (%)	na	na	95	2005		
Operating-to-Installed capacity ratio (%)	na	na	96	2005		
Outages for firms (days per year)	na	na	61	2006		
Outages, Number in a typical month (number)	na	na	12	2006		
Peak load, Annual, On-grid (MW)	na	na	531	2005		
Population density (people per sq. km)	29	1990	45	2006		
Population with electricity (mln)	3.5	2000	4.2	2004		
Population without electricity (mln)	30	2000	34	2004		
Prepayment meters rate (%)	na	na	4.2	2005		
Revenue per employee (USD/employee)	18,123	1993	na	na		
Revenue, Annual, Average (US cents/kWh)	na	na	7.5	2005		
Revenue from electricity billed, High voltage industrial (LCU, mln)	37,745	2000	79,517	2005		
Revenue from electricity billed, High voltage industrial (USD, mln)	47	2000	70	2005		
Revenue from electricity billed, Med. voltage commercial (LCU, mln)	31,724	2000	36,654	2005		
Revenue from electricity billed, Med. voltage commercial (USD, mln)	40	2000	32	2005		
Revenue from electricity billed, Resid. & low volt. business (LCU, mln)	61,283	2000	105,487	2005		
Revenue from electricity billed, Resid. & low volt. business (USD, mln)	77	2000	93	2005		
Rural isolated networks, People served (thousands)	na	na	631	2007		
Transmission network length, High voltage (>66kV) (km)	na	na	3,456	2005		
Value lost due to power outages (% of sales)	na	na	10	2006		

Togo

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	15	1998	na	na		
Access to electricity, Households, Rural (%)	2.4	1998	na	na		
Access to electricity, Households, Urban (%)	41	1998	na	na		
Country GDP (in current USD mln)	1,628	1990	2,493	2007		
Country GDP per capita (constant 2000 USD)	270	1990	239	2007		
Country population (mln)	4.0	1990	6.6	2007		
Electricity consumption, Annual per capita of total consumption (kWh/person)	87	1990	94	2005		
Electricity consumption, Residential (GWh)	144	1992	274	2004		
Electricity consumption, Total (GWh)	343	1990	587	2005		
Electricity generation, Net, Conventional thermal (GWh)	84	1992	103	2005		
Electricity generation, Net, Hydro (GWh)	128	1992	73	2005		
Electricity generation, Net, Total (GWh)	212	1992	176	2005		
Electricity imported (GWh)	310	1995	486	2005		
Electricity traded (GWh)	310	1995	486	2005		
Installed capacity, Conventional thermal (MW)	30	1992	18	2005		
Installed capacity, Hydro (MW)	4.0	1992	3.0	2005		
Installed capacity, Total (MW)	34	1992	21	2005		
Losses, Total system (%)	na	na	na	2004		
Population density (people per sq. km)	73	1990	118	2006		
Population with electricity (mln)	0.4	2000	1.0	2004		
Population without electricity (mln)	4.1	2000	5.1	2004		

Uganda (utility data are for UEDCL)

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	6.8	1995	8.9	2004		
Access to electricity, Households, Rural (%)	1.5	1995	2.5	2004		
Access to electricity, Households, Urban (%)	40	1995	49	2004		
Accounts receivable (UEDCL) (days)	na	na	106	2005		
Average connection charge, Residential customers (UEDCL) (LCU)	na	na	279,000	2005		
Average connection charge, Residential customers (UEDCL) (USD)	na	na	156	2005		
Average electricity tariff, All customers (USD/kWh)	na	na	0.1	2005		
Average electricity tariff, Residential customers and low voltage business (UEDCL) (LCU/kWh)	52	1992	170	2003		
Average electricity tariff, Residential customers and low voltage business (UEDCL) (USD/kWh)	0.05	1992	0.09	2003		
Average operating expenses per kWh (UEDCL) (LCU/kWh)	na	na	183	2004		
Average operating expenses per kWh (UEDCL) (USD/kWh)	na	na	0.1	2004		
Capacity factor, Annual (%)	68	2000	96	2005		
Collection ratio (UEDCL) (%)	na	na	77	2005		
Connections per employee (UEDCL) (number)	na	na	169	2005		
Country GDP (in current USD mln)	4,304	1990	11,771	2007		
Country GDP per capita (constant 2000 USD)	180	1990	324	2007		
Country population (mln)	18	1990	31	2007		
Customers, High voltage industrial (UEDCL) (thousands)	na	na	0.7	2004		
Customers, Medium voltage commercial (UEDCL) (thousands)	na	na	23	2004		
Customers, Residential or low voltage business (UEDCL) (thousands)	na	na	239	2004		
Customers, Total (UEDCL) (thousands)	111	1992	263	2003		
Delay in obtaining an electrical connection for businesses (days)	na	na	33	2006		
Distribution network length, All voltages (km)	2,664	1992	16,645	2003		
Distribution network length, Low voltage (<34.5kV) (km)	na	na	8,514	2005		
Distribution network length, Medium voltage (34.5-66kV) (km)	na	na	8,820	2005		
Distribution transformers, Average capacity (kVA)	na	na	833	2004		
Distribution transformers, Total including all ratings (number)	na	na	4,021	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	21	2006		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Electricity consumption, Average monthly sales to Residential and low voltage business customers (UEDCL) (kWh/month)	na	na	1,558	2004		
Electricity exported (GWh)	115	1995	170	2005		
Electricity generation, Net, Conventional thermal (GWh)	9.0	1992	3.0	2005		
Electricity generation, Net, Hydro (GWh)	973	1992	1,980	2005		
Electricity generation, Net, Total (GWh)	982	1992	1,983	2005		
Electricity imported (GWh)	0	1995	0	2005		
Electricity purchased, Total (UEDCL) (GWh)	4.4	1992	19	2002		
Electricity sold, High voltage industrial (UEDCL) (GWh)	na	na	554	2005		
Electricity sold, Medium voltage commercial (UEDCL) (GWh)	na	na	137	2005		
Electricity sold, Residential and low voltage business (UEDCL) (GWh)	na	na	344	2005		
Electricity sold, Total (UEDCL) (GWh)	na	na	1,035	2004		
Electricity traded (GWh)	(115)	1995	(170)	2005		
Employees, Total full time equivalent (UEDCL) (number)	na	na	1,513	2004		
Gross fixed assets, Book value (UEDCL) (LCU, mln)	na	na	256,900	2005		
Gross fixed assets, Book value (UEDCL) (USD, mln)	na	na	144	2005		
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na	174	2005		
Household average size (number)	na	na	5.1	2005		
Installed capacity, Coal (% of total)	na	na	0	2005		
Installed capacity, Conventional thermal (MW)	7.0	1992	3.0	2005		
Installed capacity, Gas (% of total)	na	na	0	2005		
Installed capacity, Hydro (% of total)	na	na	85	2005		
Installed capacity, Hydro (MW)	155	1992	318	2005		
Installed capacity, Off-grid (MW)	na	na	3.0	2005		
Installed capacity, Oil (% of total)	na	na	12	2005		
Installed capacity, Total (MW)	162	1992	321	2005		
Labor costs, Total (UEDCL) (LCU, mln)	na	na	27,445	2004		
Labor costs, Total (UEDCL) (USD, mln)	na	na	15	2004		
Losses, Total system (%)	40	1990	20	2004		
Operating capacity, Total (MW)	na	na	226	2005		
Operating expenses covered by revenue (UEDCL) (%)	na	na	120	2004		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Operating expenses, Total (UEDCL) (LCU, mln)	na	na	4,944	2005		
Operating expenses, Total (UEDCL) (USD, mln)	na	na	97	2004		
Operating-to-Installed capacity ratio (%)	na	2000	70	2005		
Outages for firms (days per year)	na	na	71	2006		
Outages, Number in a typical month (number)	na	na	11	2006		
Peak load, Annual, On-grid (MW)	253	2000	366	2005		
Population density (people per sq. km)	91	1990	152	2006		
Population using biomass as primary cooking fuel (%)	na	na	96	2004		
Population with electricity (mln)	0.9	2000	2.4	2004		
Population without electricity (mln)	23	2000	25	2004		
Revenue, Annual, Average (UEDCL) (US cents/kWh)	na	na	8.7	2005		
Revenue from electricity billed, Residential and low voltage business (UEDCL) (LCU, mln)	na	na	66,339	2003		
Revenue from electricity billed, Residential and low voltage business (UEDCL) (USD, mln)	na	na	34	2003		
Revenue, Total (UEDCL) (LCU, mln)	22,710	1992	156,038	2003		
Revenue, Total (UEDCL) (USD, mln)	20	1992	80	2003		
Rural isolated networks, People served (thousands)	na	na	300	2007		
Substations, Total including all voltage levels (number)	60	2000	60	2005		
Transmission network length, High voltage (>66kV) (km)	na	na	1,140	2005		
Value lost due to power outages (% of sales)	na	na	10	2006		

Zambia

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
	Access to electricity, Households, National (%)	19	1992	19	2002	
Access to electricity, Households, Rural (%)	1.5	1996	2.9	2002		
Access to electricity, Households, Urban (%)	44	1996	49	2002		
Average electricity tariff, All customers (USD/kWh)	na	na	0.02	2007		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	93	2000	95	2003		
Average electricity tariff, Residential customers and low voltage business (USD/kWh)	0.03	2000	0.02	2003		
Capacity factor, Annual (%)	na	na	85	2005		
Country GDP (in current USD mln)	3,288	1990	11,363	2007		
Country GDP per capita (constant 2000 USD)	373	1990	386	2007		
Country population (mln)	8.1	1990	12	2007		
Customers, Residential or low voltage business (thousands)	na	na	284	2003		
Customers, Total (thousands)	127	1992	304	2003		
Debt-service coverage ratio (number)	na	na	(11)	2005		
Delay in obtaining an electrical connection for businesses (days)	na	na	93	2007		
Distribution network length, All voltages (km)	na	na	10,280	2003		
Distribution network length, Low voltage (<34.5kV) (km)	na	na	8,514	2005		
Distribution network length, Medium voltage (34.5..66kV) (km)	na	na	8,820	2005		
Effective residential tariff at 100 kWh/mo consumption level (US cents)	na	na	2.9	2005		
Electricity consumption, Annual per capita of total consumption (kWh/person)	754	1990	721	2005		
Electricity consumption, Residential (GWh)	615	1992	1,458	2004		
Electricity consumption, Total (GWh)	6,123	1990	8,278	2005		
Electricity exported (GWh)	1,500	1995	243	2005		
Electricity generation, Net, Conventional thermal (GWh)	57	1992	56	2005		

Indicator	Earliest available year, 1990-2000			Latest available year, 2003-2007			New data	
	Data	Year		Data	Year	Data	Year	
Electricity generation, Net, Hydro (GWh)	7,663	1992		8,794	2005		2005	
Electricity generation, Net, Total (GWh)	8,013	1990		8,850	2005		2005	
Electricity imported (GWh)	20	1995		465	2005		2005	
Electricity purchased, Total (GWh)	326	1992		1,007	2003		2003	
Electricity sold, Total (GWh)	6,399	1992		8,383	2003		2003	
Electricity traded (GWh)	(1,480)	1995		222	2005		2005	
Employees, Total full time equivalent (number)	5,300	1992		3,691	2003		2003	
Gross fixed assets, Book value (LCU, mln)	na	na		3,499,240	2005		2005	
Gross fixed assets, Book value (USD, mln)	na	na		784	2005		2005	
Historical cost recovery ratio (average effective residential tariff/average historical normative cost recovery tariff) (%)	na	na		38	2005		2005	
Household average size (number)	na	na		5.4	2005		2005	
Installed capacity, Coal (% of total)	na	na		0	2005		2005	
Installed capacity, Conventional thermal (MW)	116	1992		80	2005		2005	
Installed capacity, Gas (% of total)	na	na		0	2005		2005	
Installed capacity, Hydro (% of total)	na	na		93	2005		2005	
Installed capacity, Hydro (MW)	1,670	1992		1,698	2005		2005	
Installed capacity, Oil (% of total)	na	na		5.3	2005		2005	
Installed capacity, Total (MW)	1,786	1992		1,778	2005		2005	
Labor costs, Total (LCU, mln)	na	na		782,641	2005		2005	
Labor costs, Total (USD, mln)	na	na		175	2005		2005	
Losses, Distribution (%)	30	2000		18	2005		2005	
Losses, Transmission (%)	5.4	2000		2.9	2005		2005	
Operating capacity, Total (MW)	1,184	2000		1,184	2005		2005	
Operating expenses covered by revenue (%)	na	na		72	2005		2005	
Operating expenses, Total (LCU, mln)	na	na		564,742	2005		2005	

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Operating expenses, Total (USD, mln)	na	na	127	2005		
Operating-to-Installed capacity ratio (%)	na	na	67	2007		
Outages for firms (days per year)	na	na	30	2006		
Outages, Number in a typical month (number)	na	na	4.2	2007		
Peak load, Annual, On-grid (MW)	na	na	1,330	2005		
Population density (people per sq. km)	11	1990	16	2006		
Population using biomass as primary cooking fuel (%)	na	na	85	2004		
Population with electricity (mln)	1.2	2000	2.2	2004		
Population without electricity (mln)	8.9	2000	10	2004		
Revenue, Annual, Average (US cents/kWh)	na	na	5.0	2005		
Rural isolated networks, People served (thousands)	na	na	130	2007		
Transmission network length, High voltage (>66kV) (km)	na	na	1,140	2005		
Value lost due to power outages (% of sales)	na	na	3.6	2007		

Zimbabwe

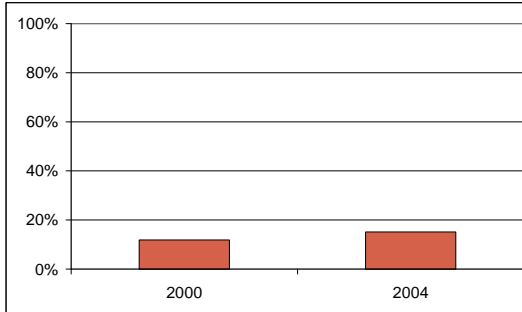
Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Access to electricity, Households, National (%)	28	1992	34	2002		
Access to electricity, Households, Rural (%)	3.4	1994	15	2002		
Access to electricity, Households, Urban (%)	80	1994	72	2002		
Average electricity tariff, Residential customers and low voltage business (LCU/kWh)	0.10	1992	na	na		
Capacity factor, Annual (%)	na	na	54	2005		
Connections per employee (number)	1,282	1995	1,786	2001		
Country GDP (in current USD mln)	8,784	1990	3,418	2005		
Country GDP per capita (constant 2000 USD)	642	1990	428	2005		
Country population (mln)	10	1990	13	2007		
Customers, Total (thousands)	333	1992	517	2001		
Electricity consumption, Annual per capita of total consumption (kWh/person)	861	1990	953	2005		
Electricity consumption, Residential (GWh)	1,572	1992	2,884	2004		
Electricity consumption, Total (GWh)	9,028	1990	12,504	2005		
Electricity exported (GWh)	1.0	1995	0	2005		
Electricity generation, Net, Conventional thermal (GWh)	4,771	1992	4,174	2005		
Electricity generation, Net, Hydro (GWh)	2,880	1992	5,776	2005		
Electricity generation, Net, Total (GWh)	9,362	1990	10,269	2005		
Electricity imported (GWh)	1,000	1995	3,013	2005		
Electricity purchased, Total (GWh)	2,027	1992	4,066	2001		
Electricity sold, Residential and low voltage business (GWh)	1,572	1992	2,349	2001		
Electricity sold, Total (GWh)	10,264	1992	11,972	2001		
Electricity traded (GWh)	999	1995	3,013	2005		
Employees, Total full time equivalent (number)	7,903	1995	5,654	2002		

Indicator	Earliest available year, 1990-2000		Latest available year, 2003-2007		New data	
	Data	Year	Data	Year	Data	Year
Installed capacity, Conventional thermal (MW)	1,405	1992	1,345	2005		
Installed capacity, Hydro (MW)	633	1992	754	2005		
Installed capacity, Total (MW)	2,038	1992	2,099	2005		
Losses, Distribution (%)	7	1992	11	2002		
Losses, Total system (%)	9	1990	43	2004		
Operating capacity, Total (MW)	na	na	300	2007		
Operating-to-Installed capacity ratio (%)	na	na	14	2007		
Peak load, Annual, On-grid (MW)	na	na	2,066	2005		
Population density (people per sq. km)	27	1990	34	2006		
Population using biomass as primary cooking fuel (%)	na	na	73	2004		
Population with electricity (mln)	5.0	2000	4.5	2004		
Population without electricity (mln)	7.6	2000	8.7	2004		
Revenue per employee (USD/employee)	28,129	1995	98,585	2002		
Revenue, Total (LCU, mln)	0.8	1992	33	2002		
Revenue, Total (USD, mln)	85	1992	557	2002		

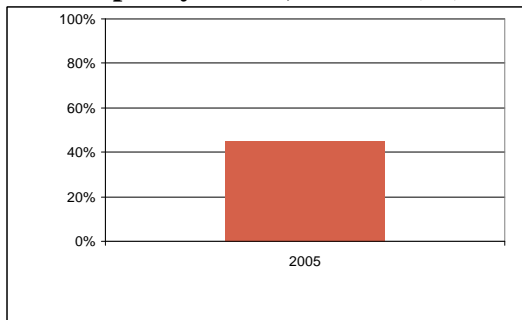
Annex V. ASK Database: Country Graphs

Angola

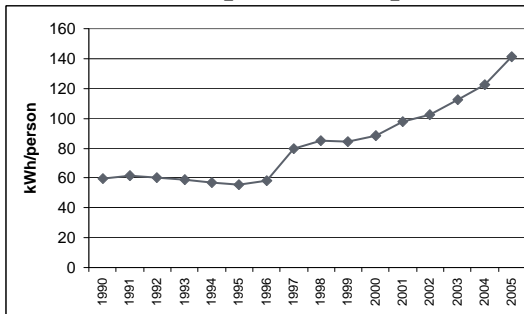
Access to electricity, Households, National (%)



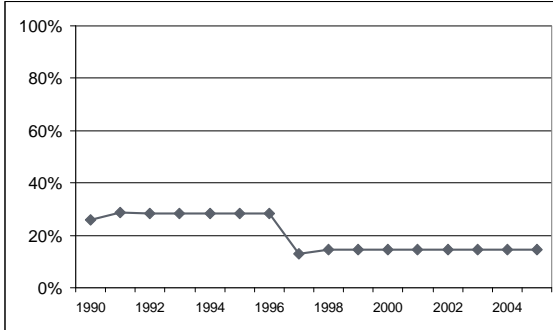
Capacity factor, Annual (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

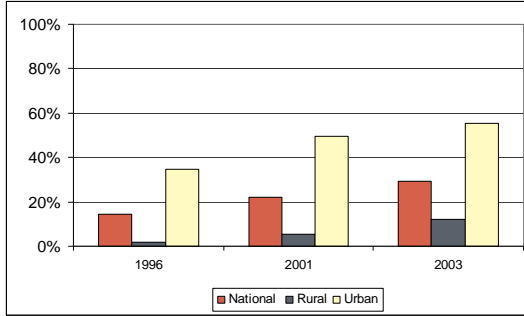


Losses, Total system (%)

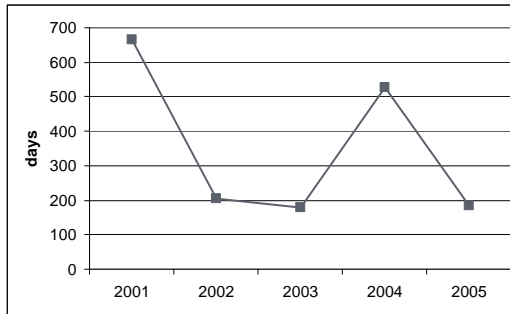


Benin

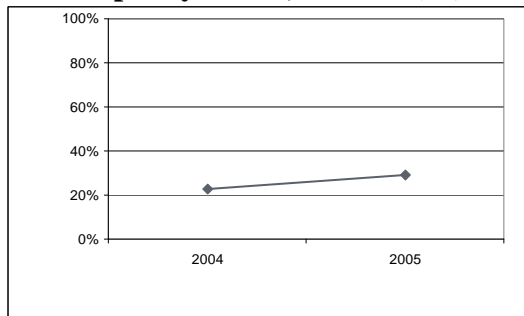
Access to electricity, Households (%)



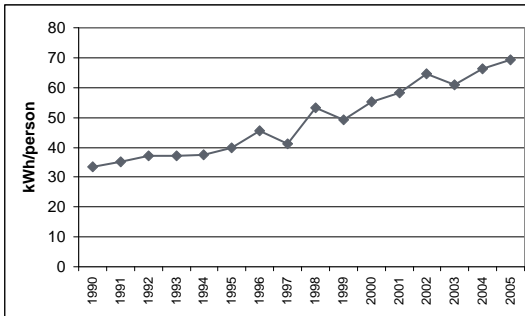
Accounts receivable (days)



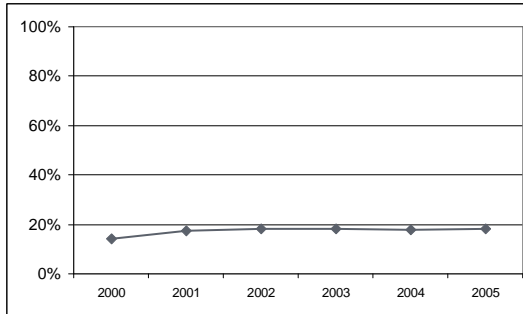
Capacity factor, Annual (%)



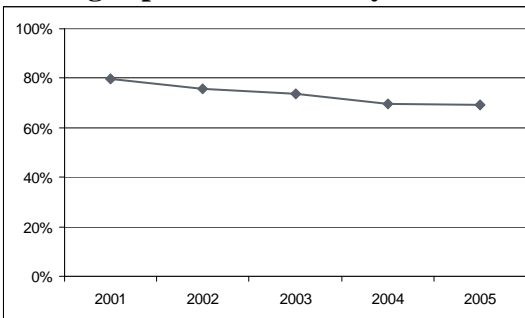
Electricity consumption, Annual per capita of total consumption (kWh/person)



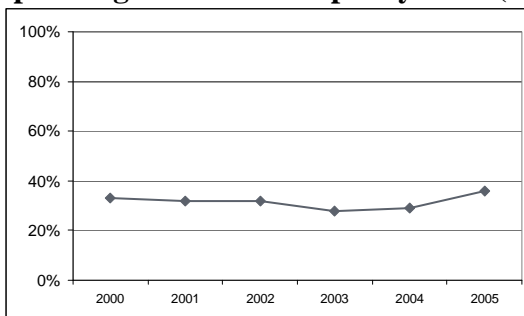
Losses, Total system (%)



Operating expenses covered by revenues (%)

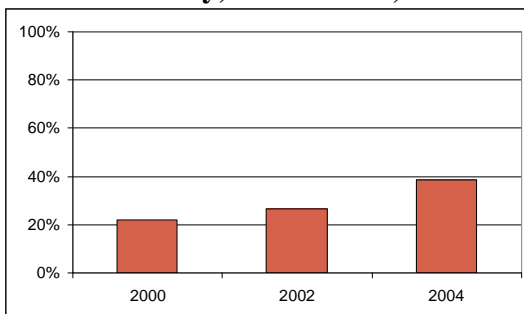


Operating-to-installed capacity ratio (%)

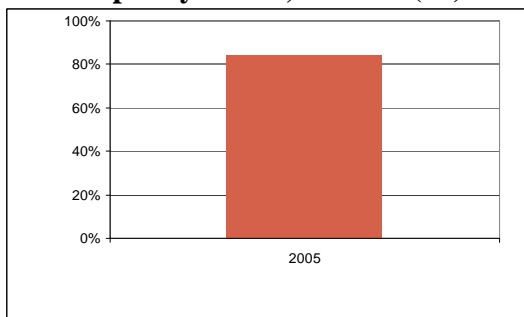


Botswana

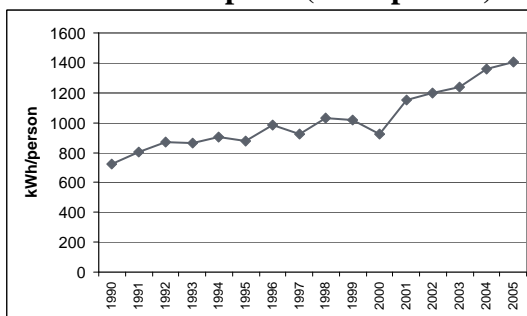
Access to electricity, Households, National (%)



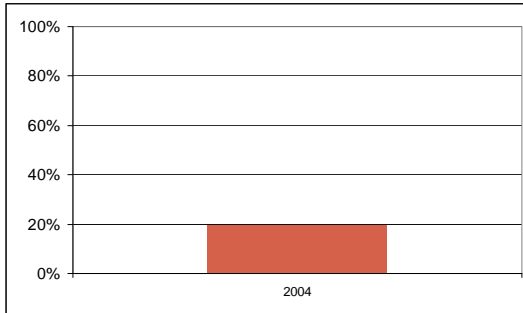
Capacity factor, Annual (%)



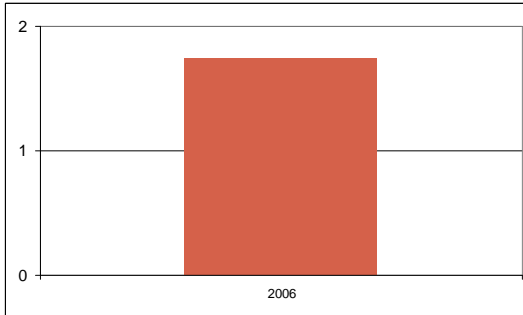
Electricity consumption, Annual per capita of total consumption (kWh/person)



Losses, Total system (%)

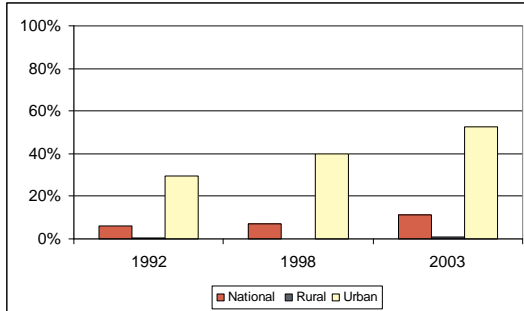


Outages, number in a typical month (number)

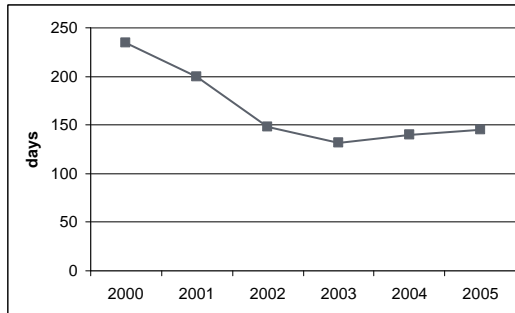


Burkina Faso

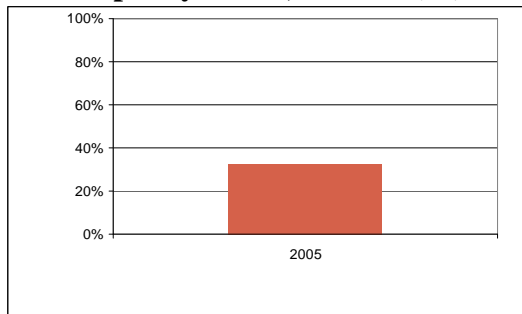
Access to electricity, Households (%)



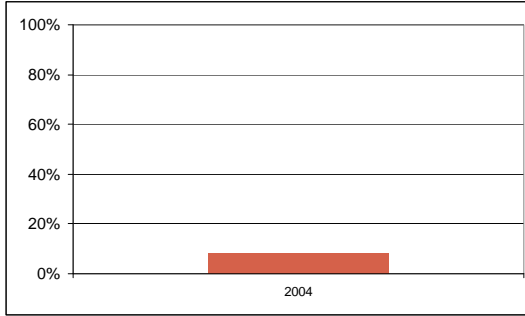
Accounts receivable (days)



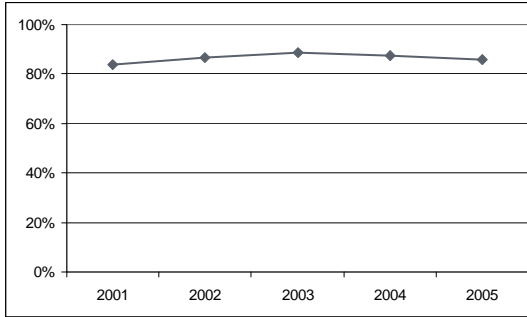
Capacity factor, Annual (%)



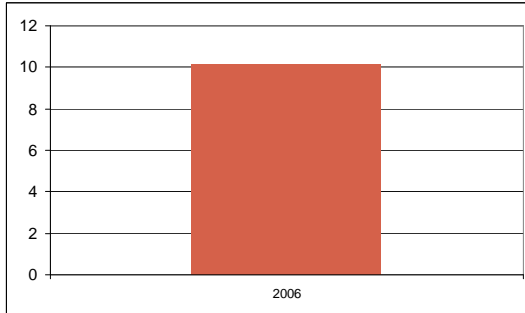
Losses, Total system (%)



Operating expenses covered by revenues (%)

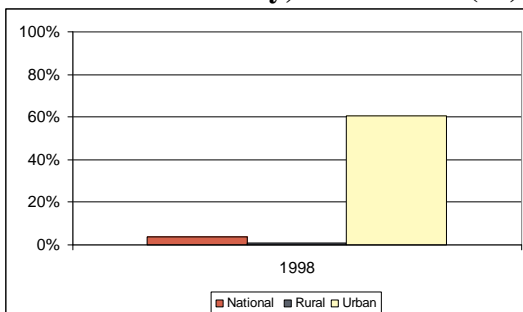


Outages, number in a typical month (number)

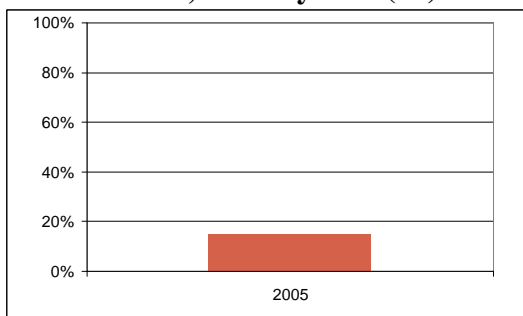


Burundi

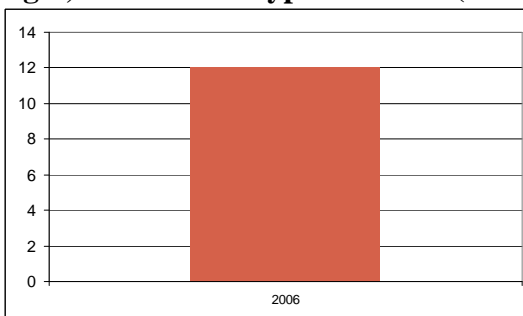
Access to electricity, Households (%)



Losses, Total system (%)

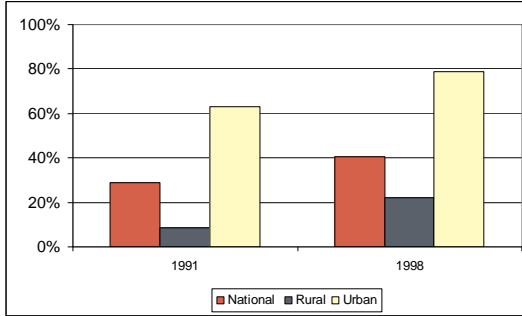


Outages, number in a typical month (number)

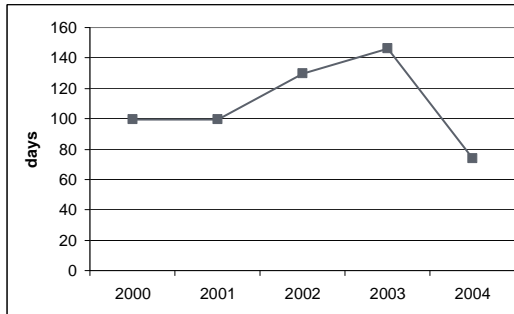


Cameroon

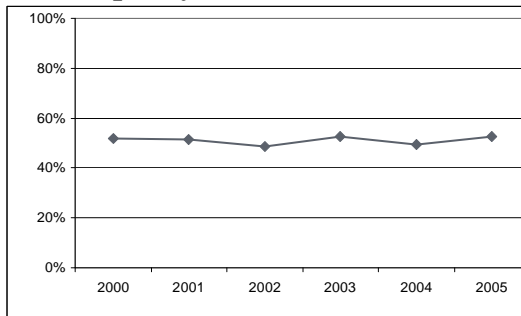
Access to electricity, Households (%)



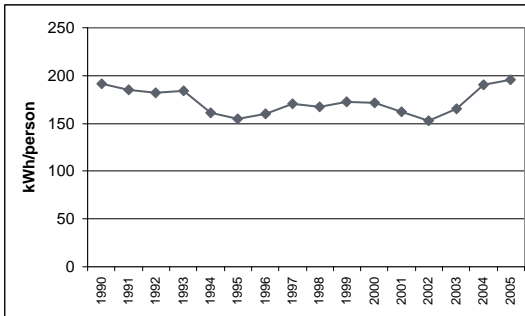
Accounts receivable (days)



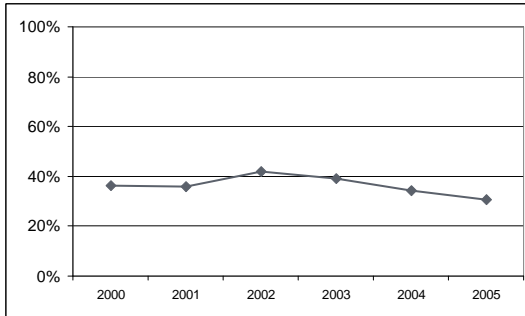
Capacity factor, Annual (%)



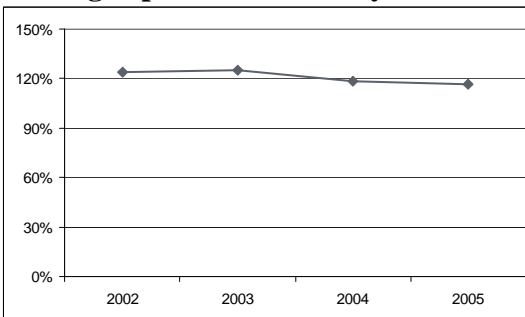
Electricity consumption, Annual per capita of total consumption (kWh/person)



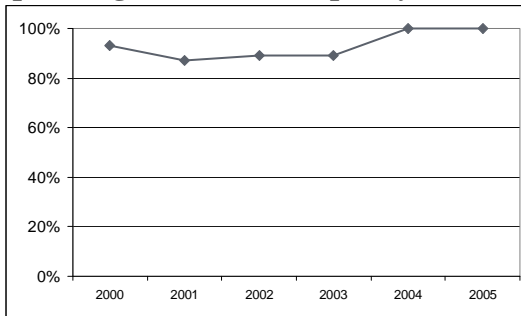
Losses, Total system (%)



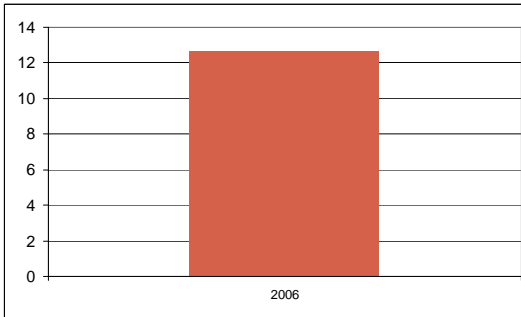
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

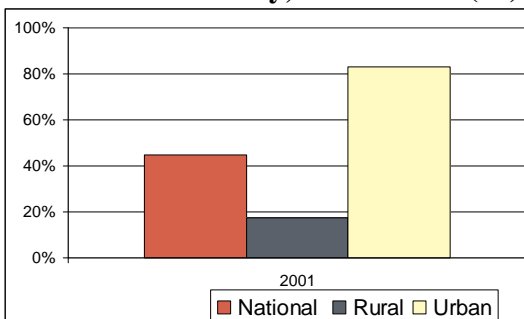


Outages, number in a typical month (number)

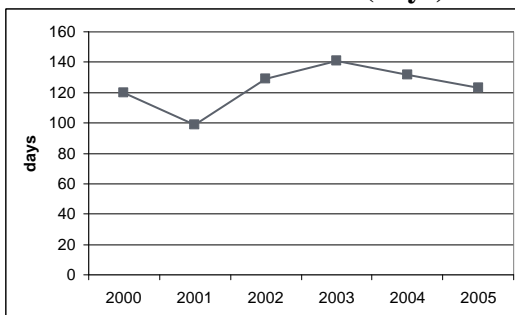


Cape Verde

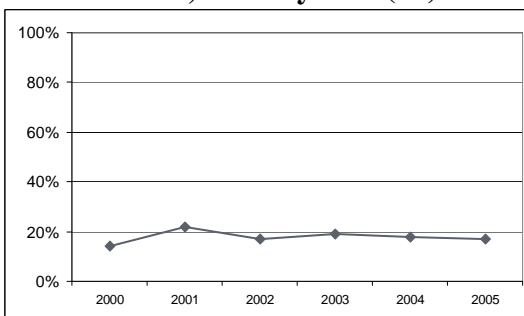
Access to electricity, Households (%)



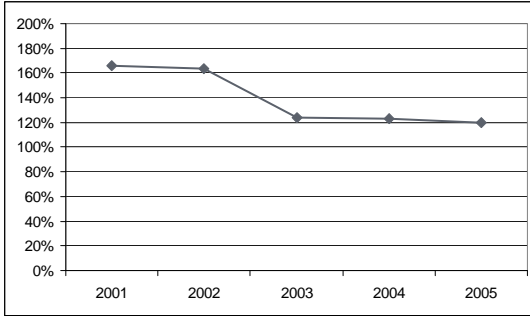
Accounts receivable (days)



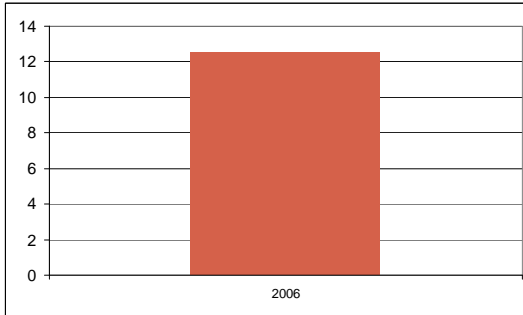
Losses, Total system (%)



Operating expenses covered by revenues (%)

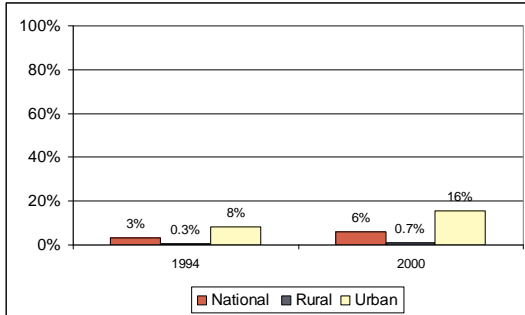


Outages, number in a typical month (number)

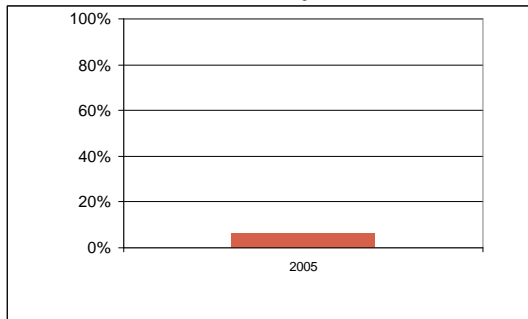


Central African Republic

Access to electricity, Households (%)

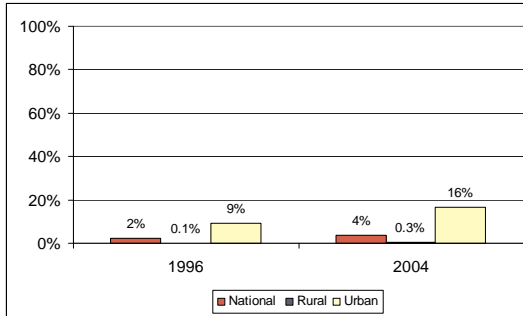


Losses, Total system (%)

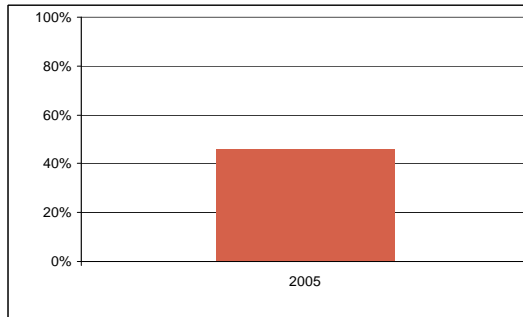


Chad

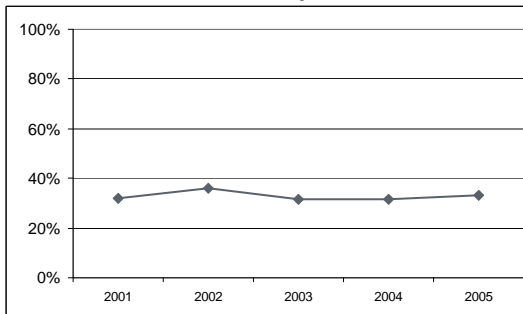
Access to electricity, Households (%)



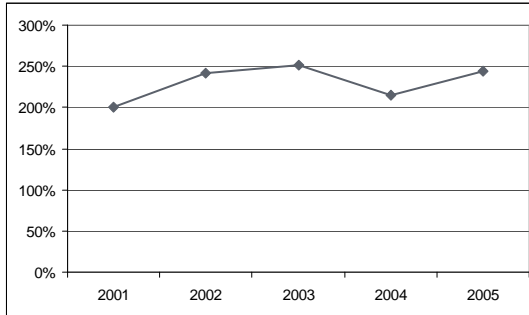
Capacity factor, Annual (%)



Losses, Total system (%)

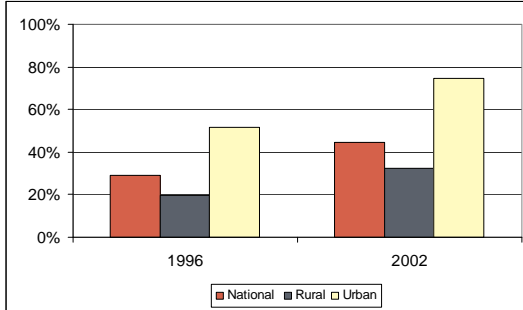


Operating expenses covered by revenues (%)

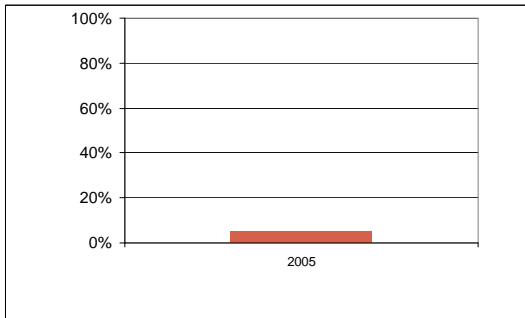


Comoros

Access to electricity, Households (%)

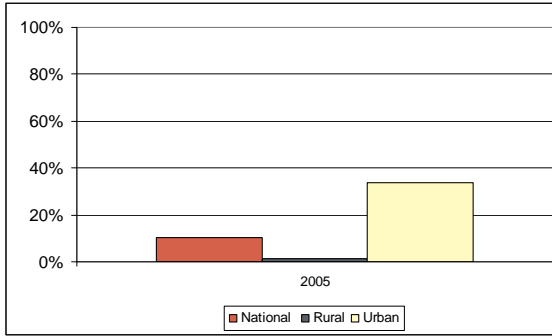


Losses, Total system (%)

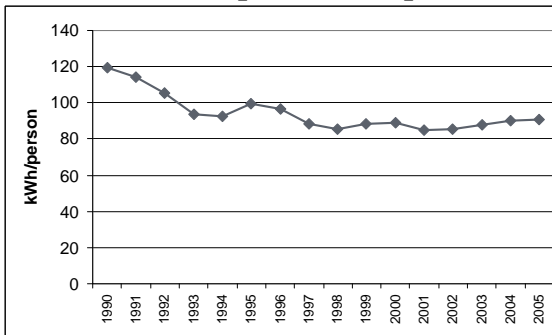


Congo, Dem. Rep.

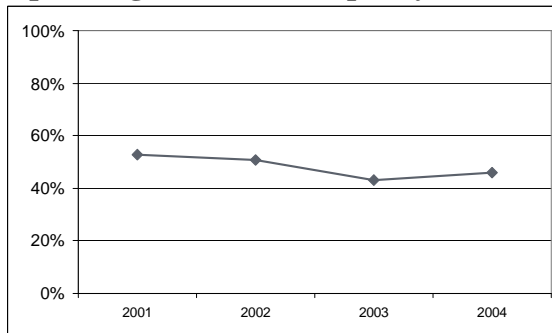
Access to electricity, Households (%)



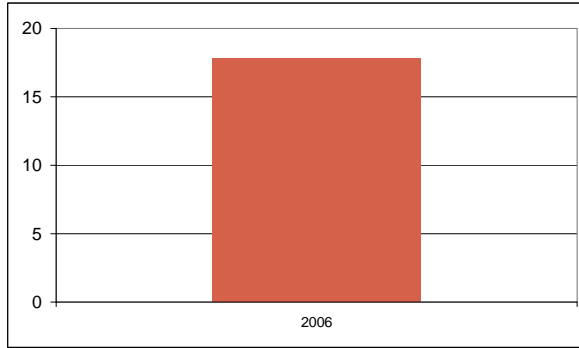
Electricity consumption, Annual per capita of total consumption (kWh/person)



Operating-to-installed capacity ratio (%)

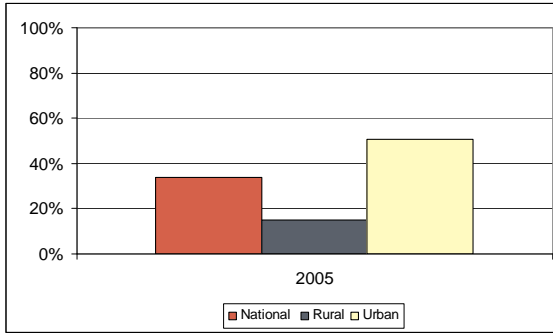


Outages, number in a typical month (number)

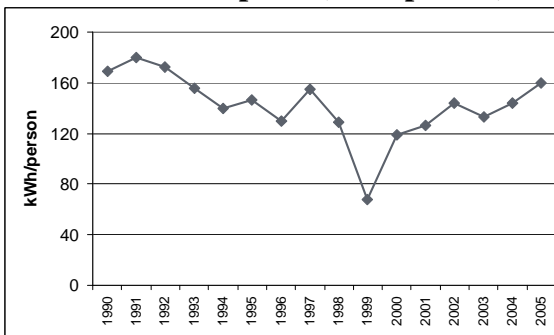


Congo, Rep.

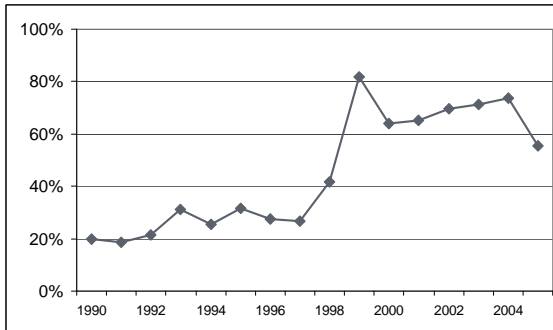
Access to electricity, Households (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

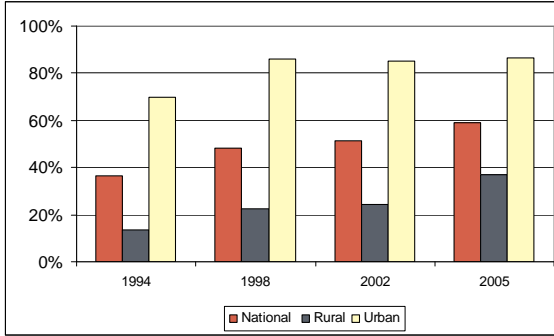


Losses, Total system (%)

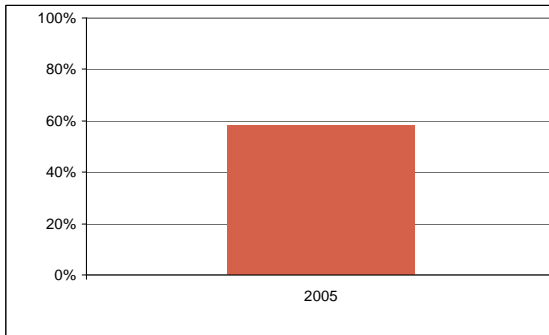


Cote d'Ivoire

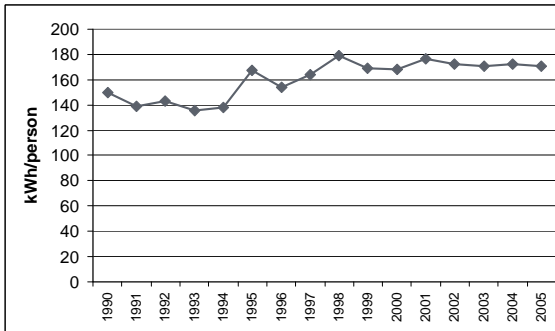
Access to electricity, Households (%)



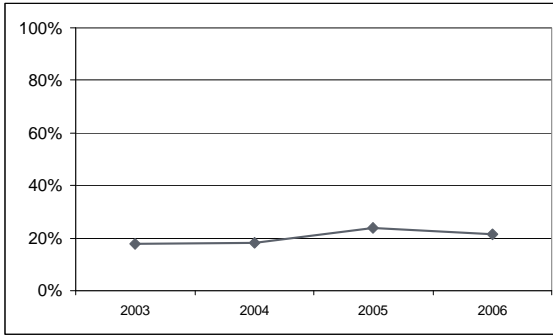
Capacity factor, Annual (%)



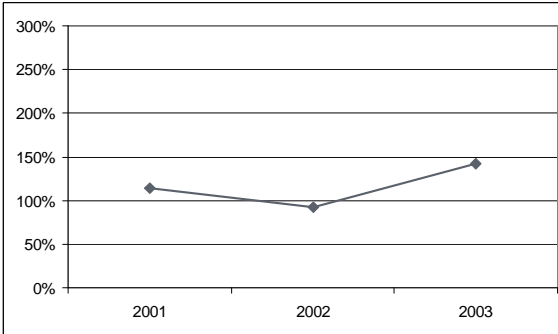
Electricity consumption, Annual per capita of total consumption (kWh/person)



Losses, Total system (%)

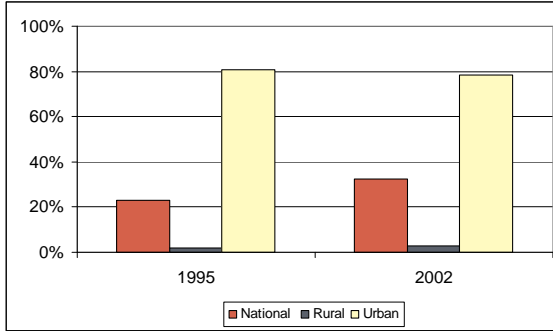


Operating expenses covered by revenues (%)

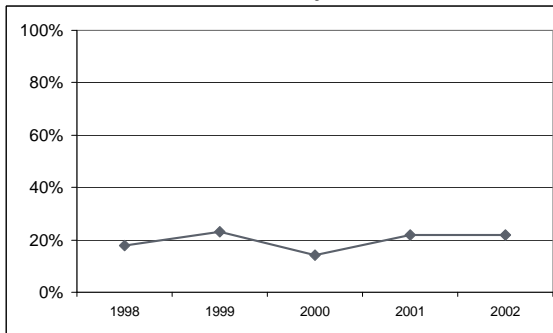


Eritrea

Access to electricity, Households (%)

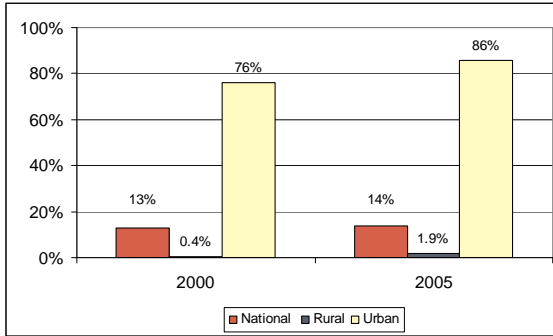


Losses, Total system (%)

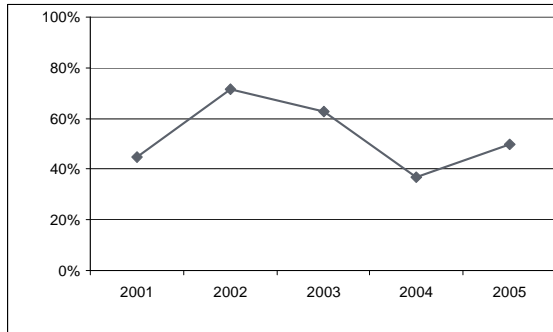


Ethiopia

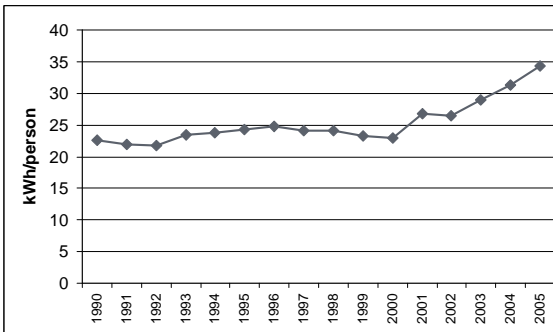
Access to electricity, Households (%)



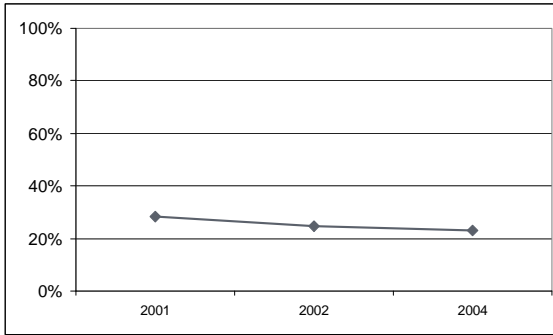
Capacity factor, Annual (%)



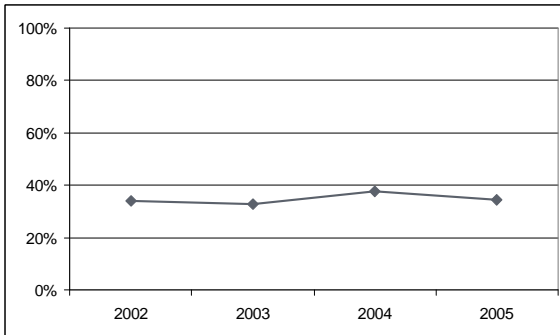
Electricity consumption, Annual per capita of total consumption (kWh/person)



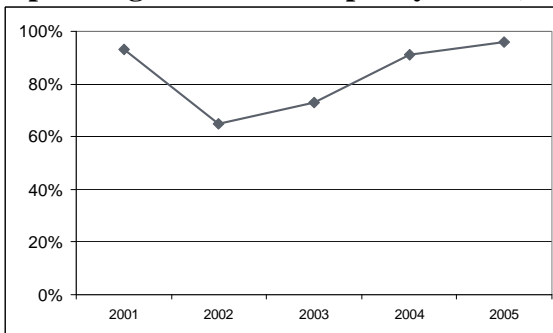
Losses, Total system (%)



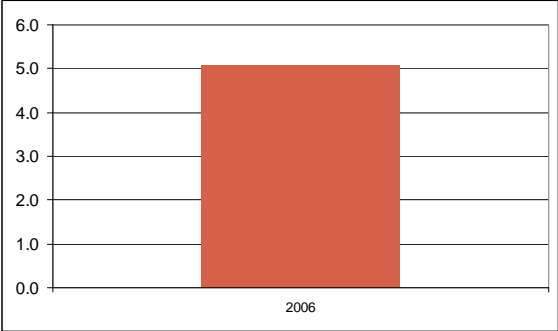
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

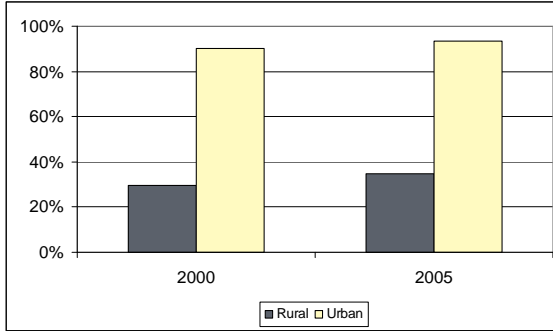


Outages, number in a typical month (number)

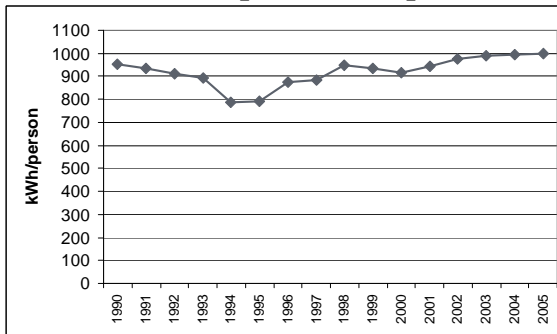


Gabon

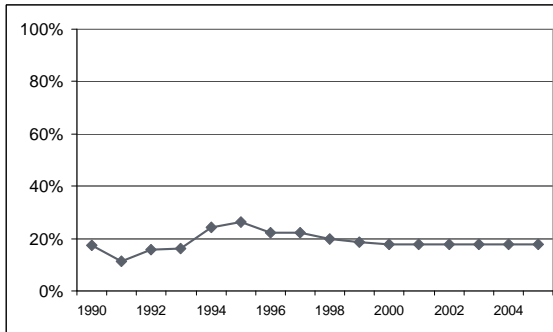
Access to electricity, Households (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

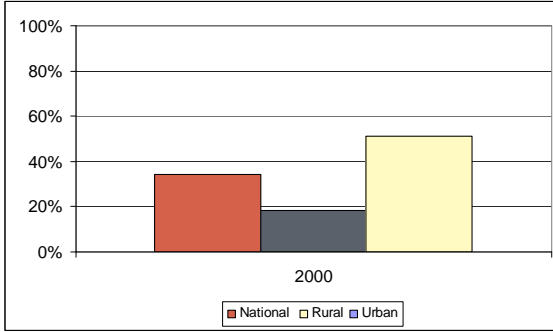


Losses, Total system (%)

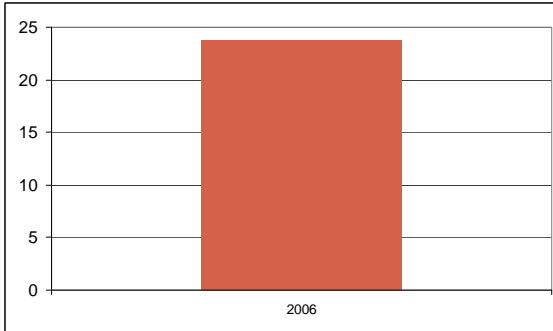


Gambia, The

Access to electricity, Households (%)

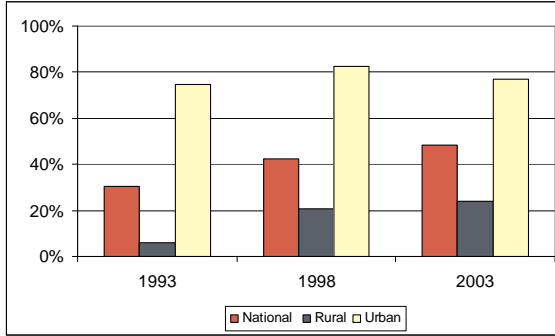


Outages, number in a typical month (number)

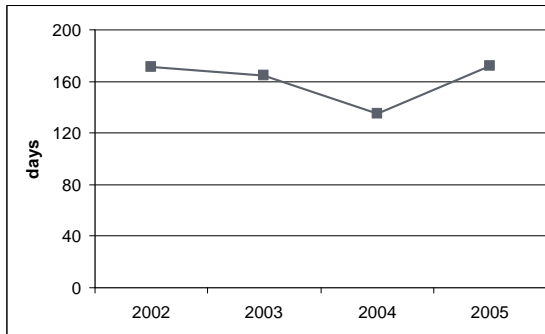


Ghana

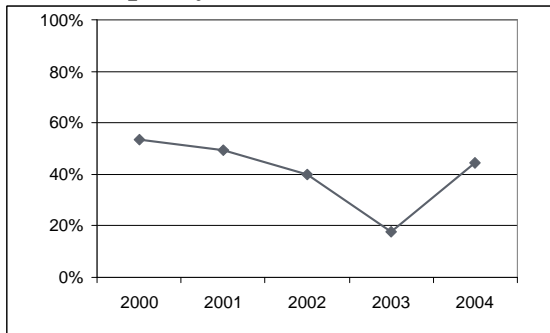
Access to electricity, Households (%)



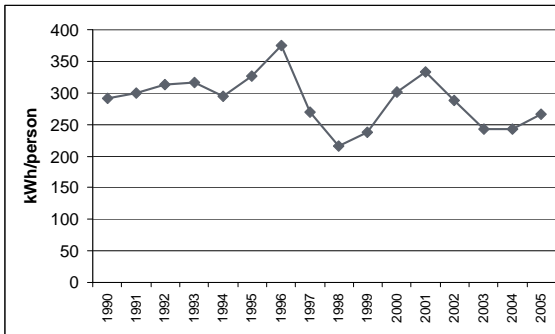
Accounts receivable (days)



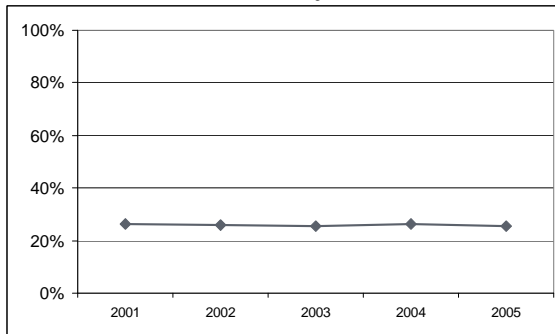
Capacity factor, Annual (%)



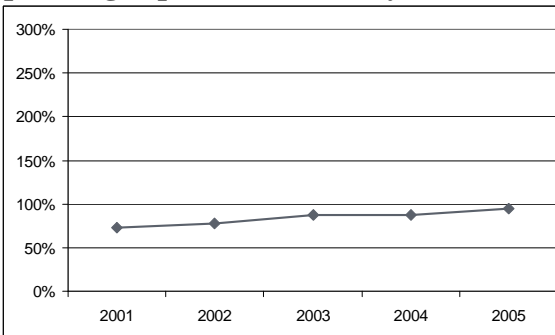
Electricity consumption, Annual per capita of total consumption (kWh/person)



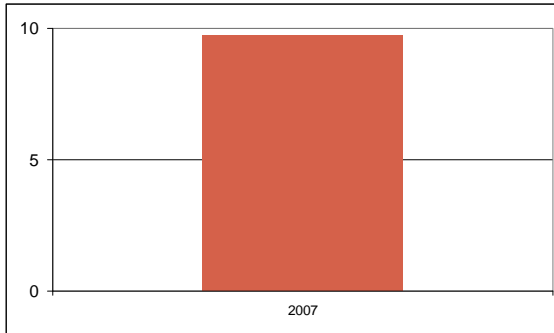
Losses, Total system (%)



Operating expenses covered by revenues (%)

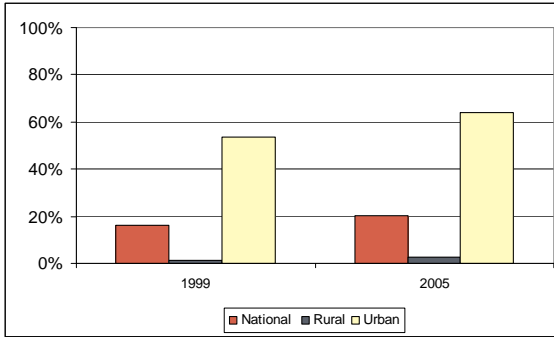


Outages, number in a typical month (number)

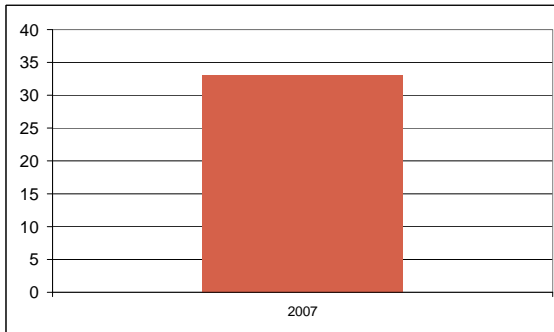


Guinea

Access to electricity, Households (%)

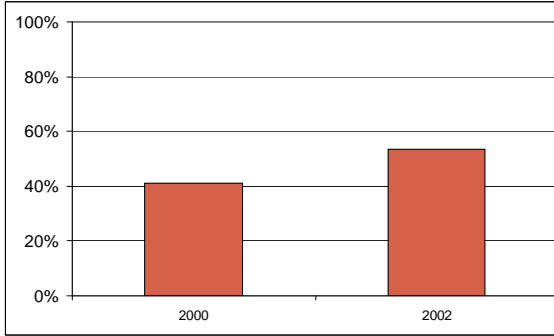


Outages, number in a typical month (number)

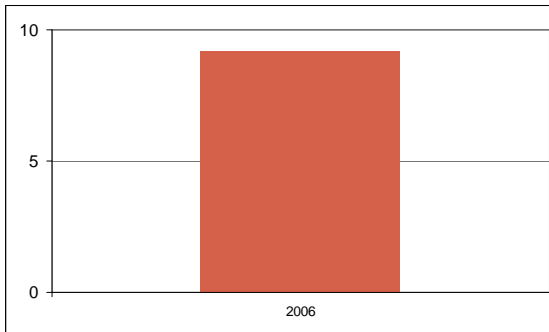


Guinea-Bissau

Access to electricity, Households, National (%)

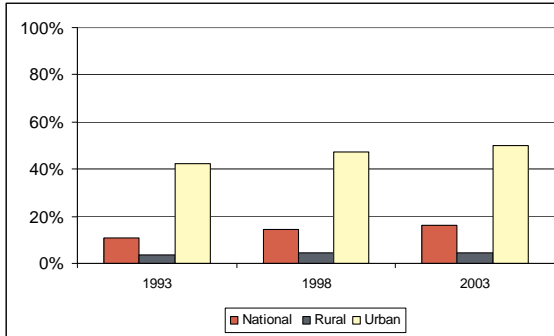


Outages, number in a typical month (number)

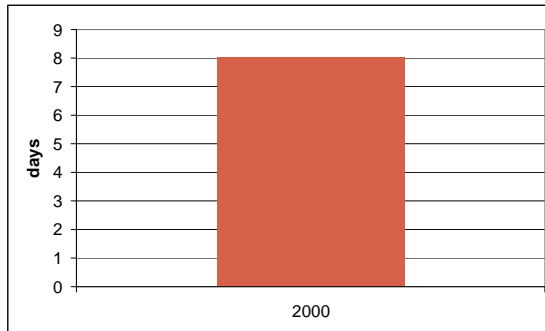


Kenya

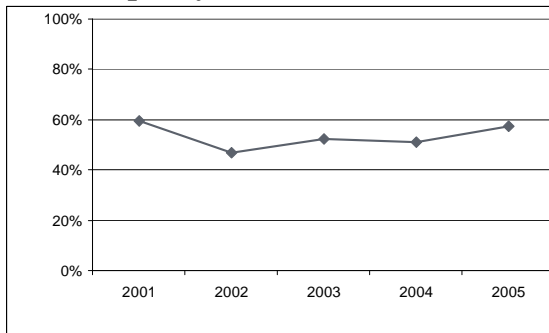
Access to electricity, Households (%)



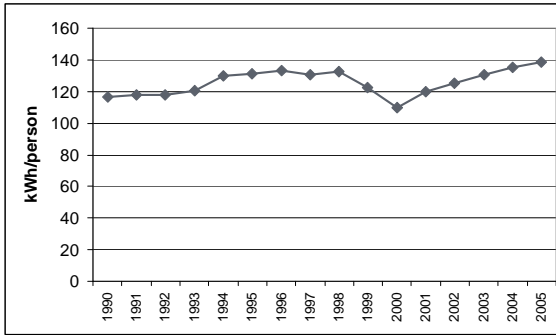
Accounts receivable (days)



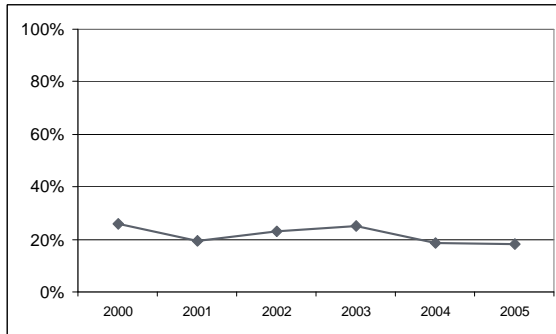
Capacity factor, Annual (%)



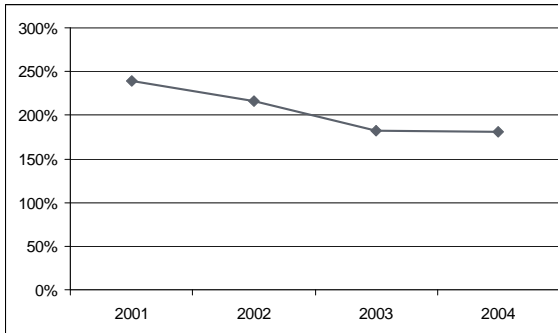
Electricity consumption, Annual per capita of total consumption (kWh/person)



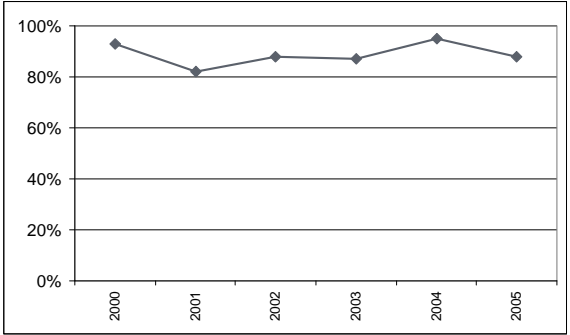
Losses, Total system (%)



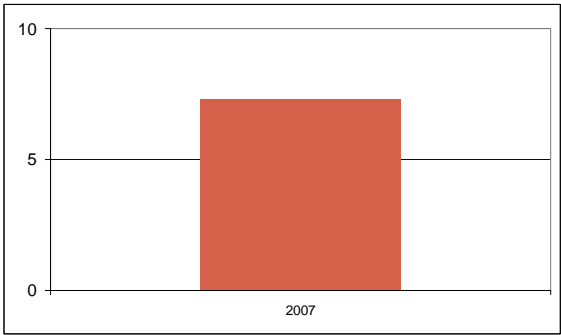
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

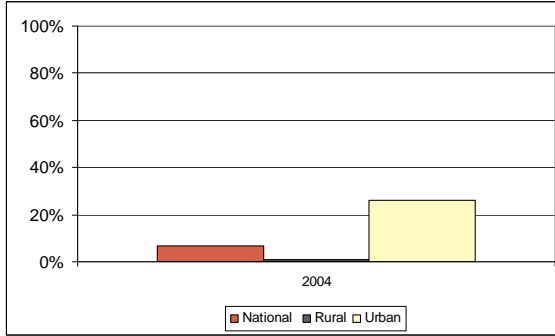


Outages, number in a typical month (number)

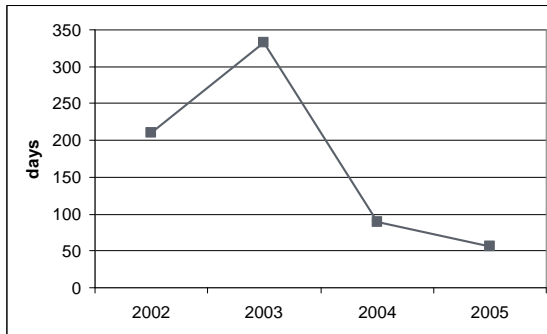


Lesotho

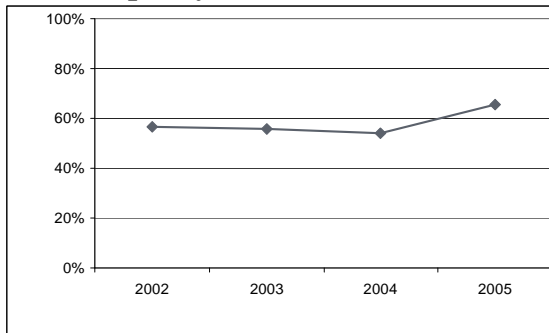
Access to electricity, Households (%)



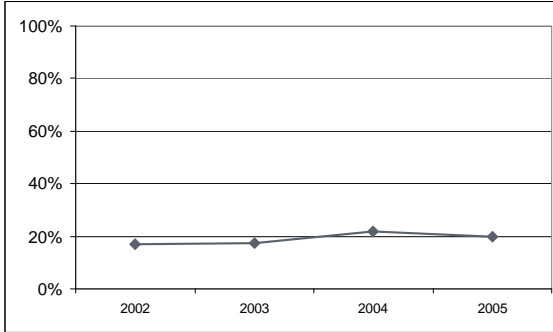
Accounts receivable (days)



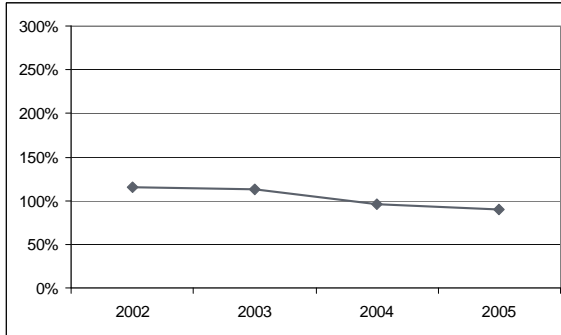
Capacity factor, Annual (%)



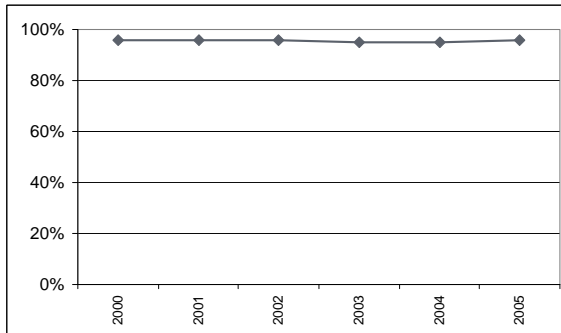
Losses, Total system (%)



Operating expenses covered by revenues (%)

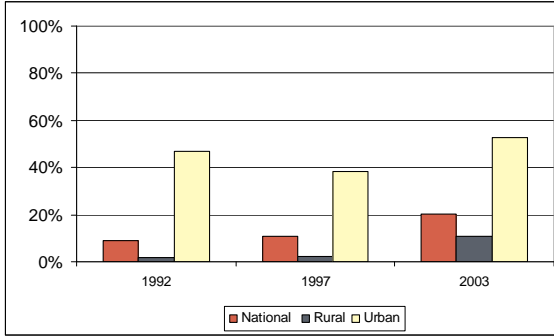


Operating-to-installed capacity ratio (%)

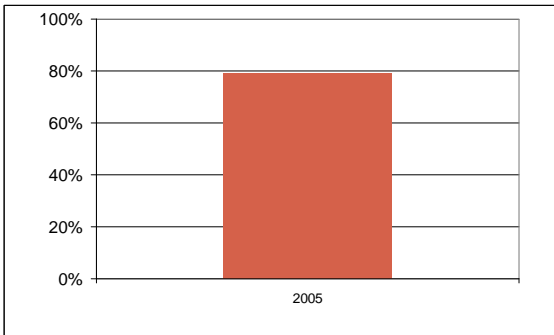


Madagascar

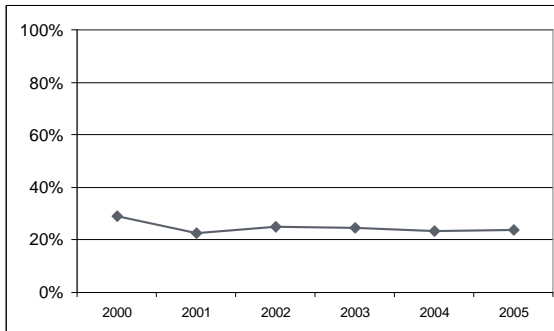
Access to electricity, Households (%)



Capacity factor, Annual (%)

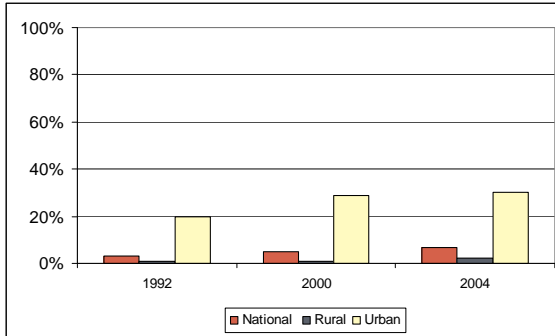


Losses, Total system (%)

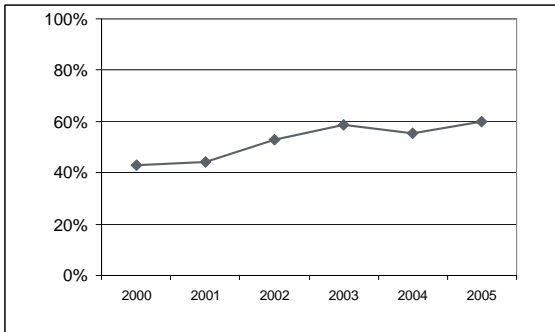


Malawi

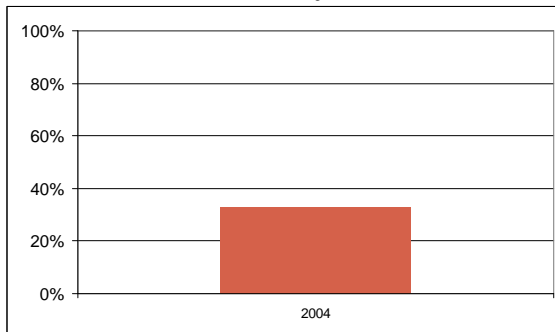
Access to electricity, Households (%)



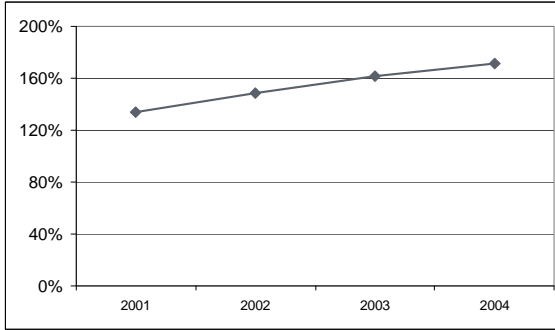
Capacity factor, Annual (%)



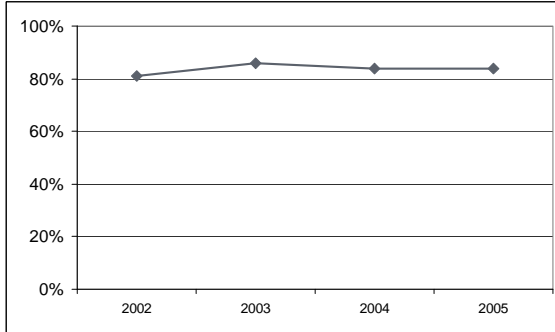
Losses, Total system (%)



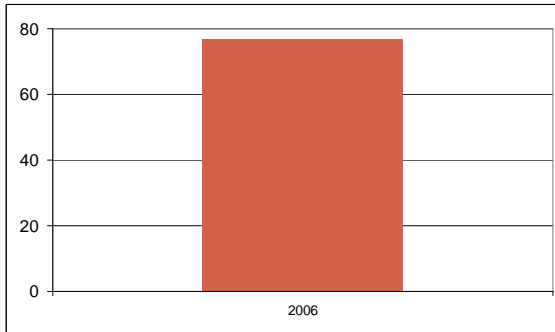
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

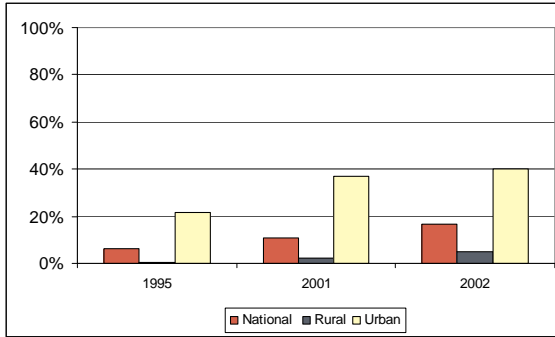


Outages, number in a typical month (number)

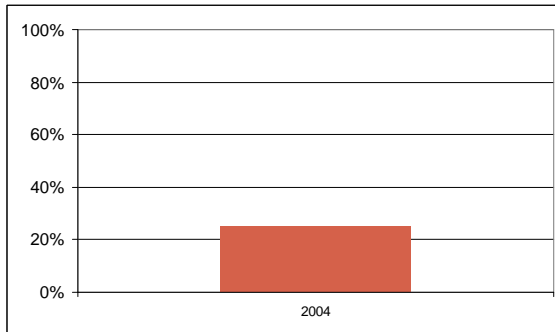


Mali

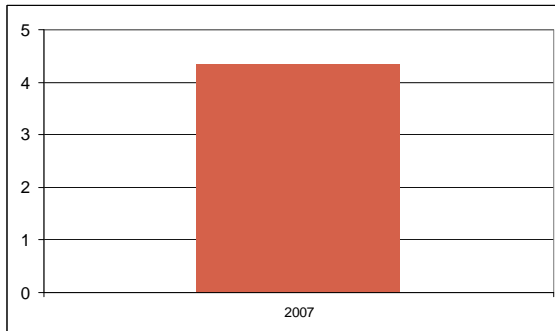
Access to electricity, Households (%)



Losses, Total system (%)

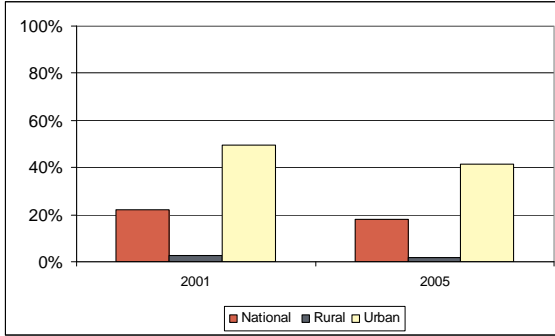


Outages, number in a typical month (number)

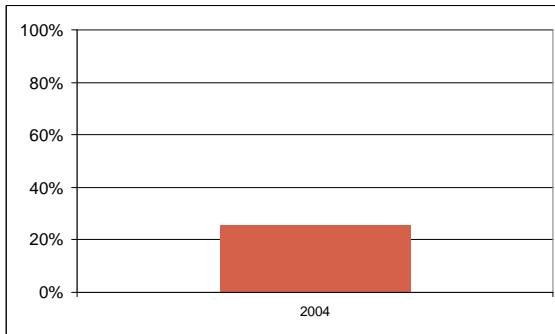


Mauritania

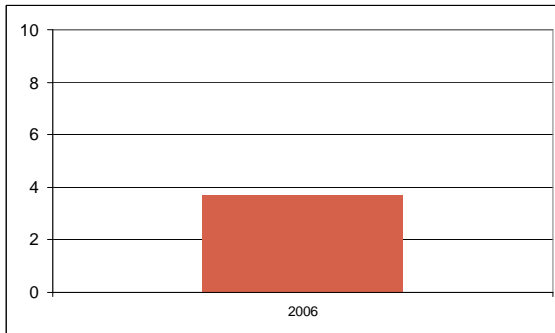
Access to electricity, Households (%)



Losses, Total system (%)

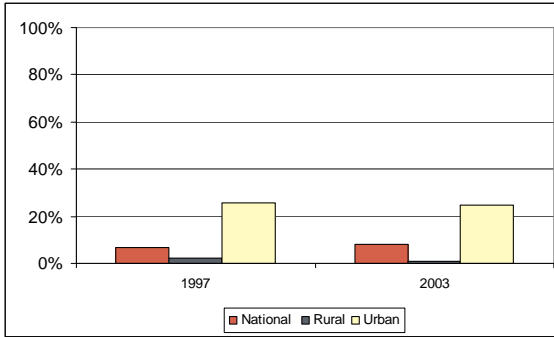


Outages, number in a typical month (number)

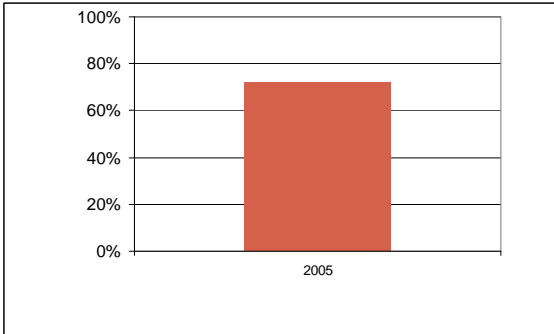


Mozambique

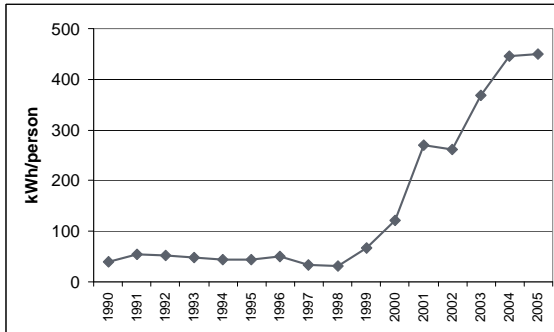
Access to electricity, Households (%)



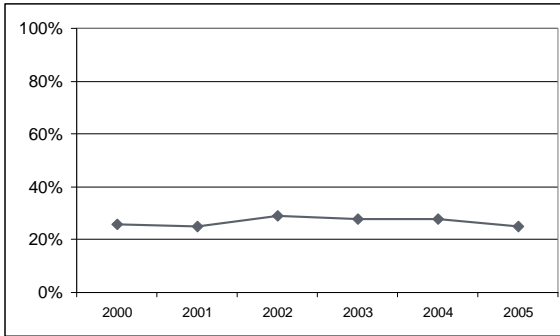
Capacity factor, Annual (%)



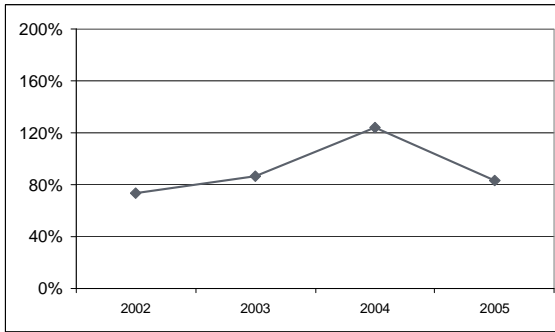
Electricity consumption, Annual per capita of total consumption (kWh/person)



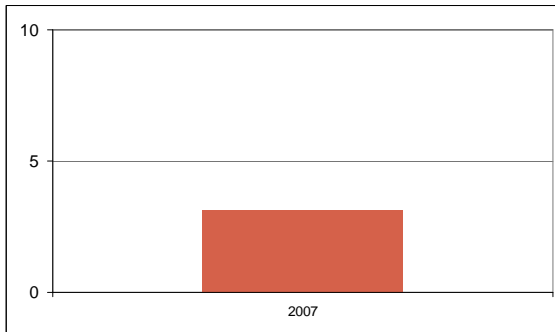
Losses, Total system (%)



Operating expenses covered by revenues (%)

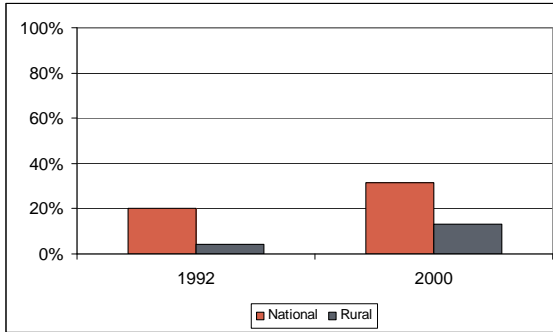


Outages, number in a typical month (number)

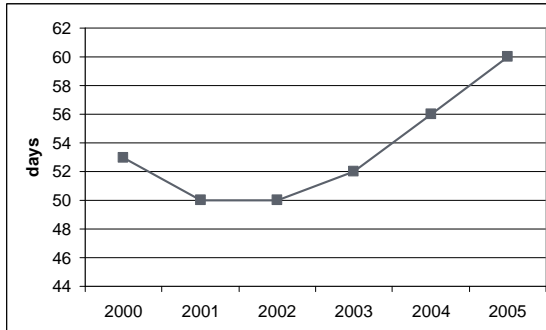


Namibia

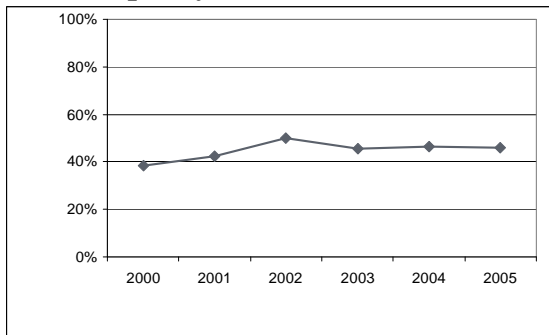
Access to electricity, Households (%)



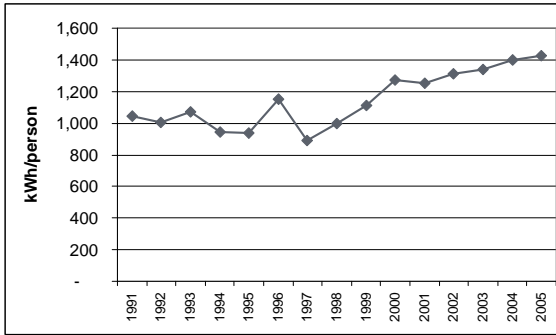
Accounts receivable (days)



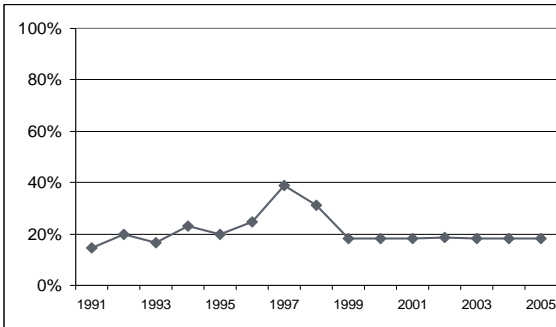
Capacity factor, Annual (%)



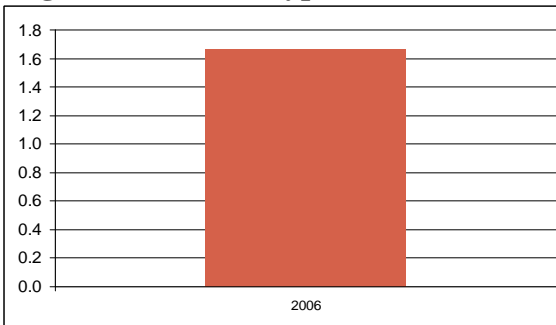
Electricity consumption, Annual per capita of total consumption (kWh/person)



Losses, Total system (%)

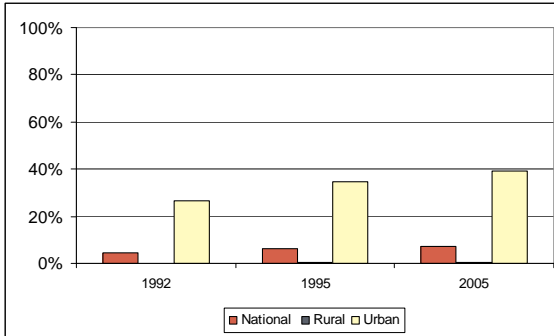


Outages, number in a typical month (number)

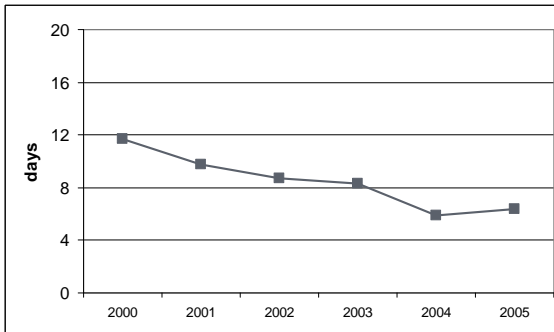


Niger

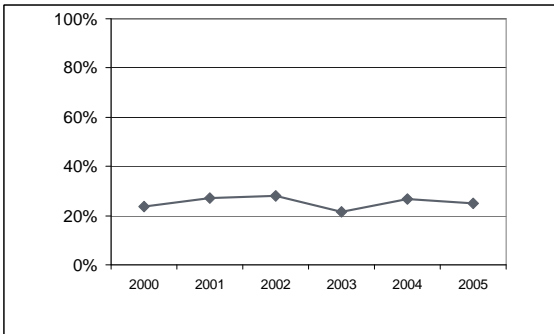
Access to electricity, Households (%)



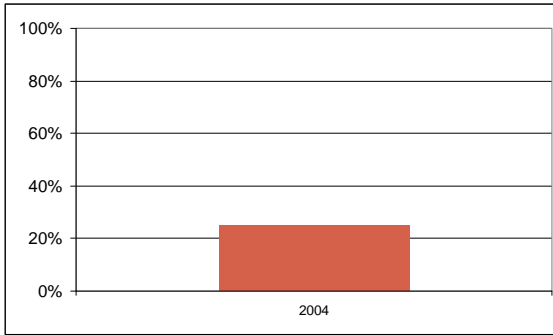
Accounts receivable (days)



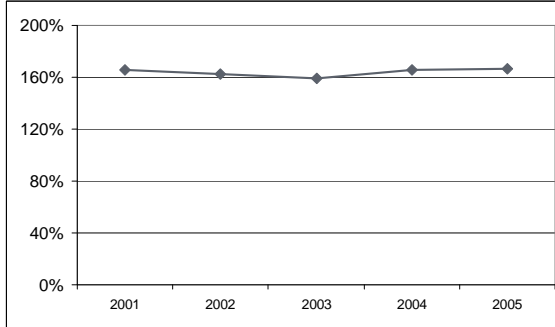
Capacity factor, Annual (%)



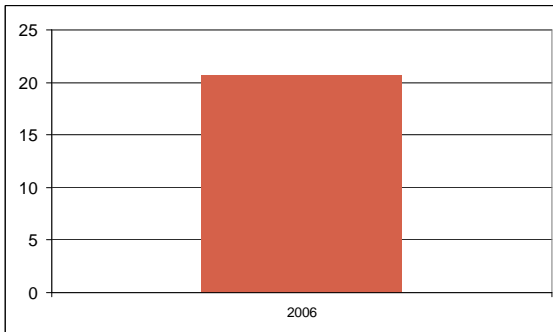
Losses, Total system (%)



Operating expenses covered by revenues (%)

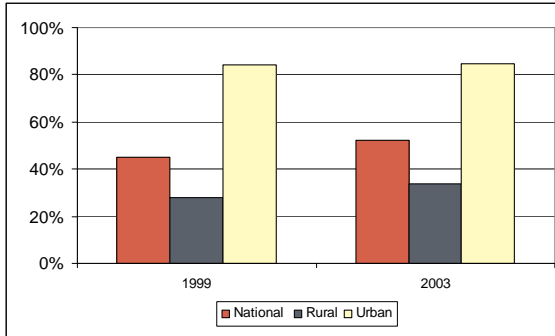


Outages, number in a typical month (number)

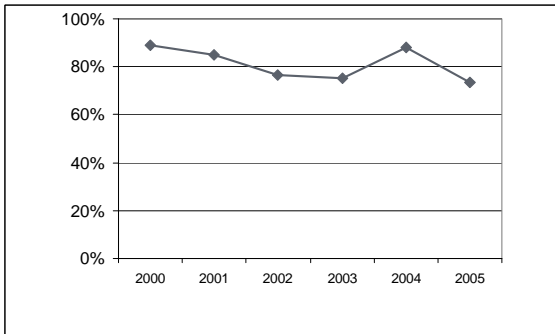


Nigeria

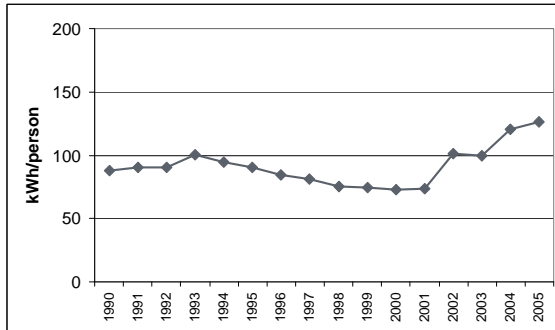
Access to electricity, Households (%)



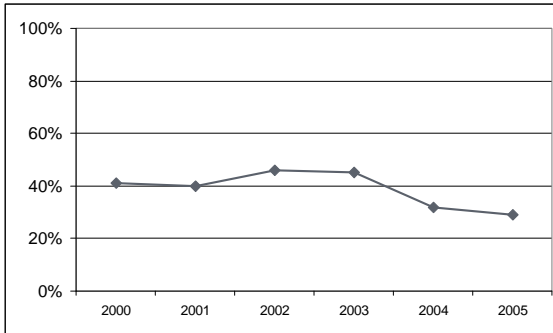
Capacity factor, Annual (%)



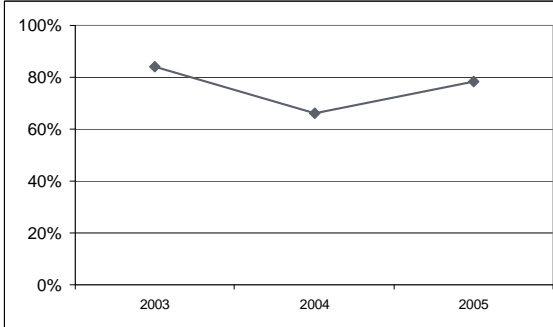
Electricity consumption, Annual per capita of total consumption (kWh/person)



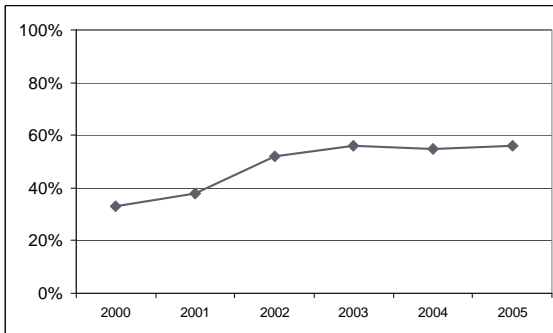
Losses, Total system (%)



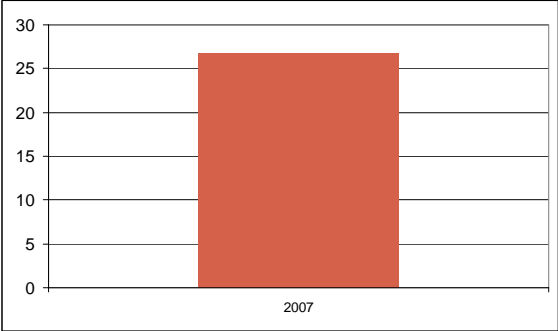
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

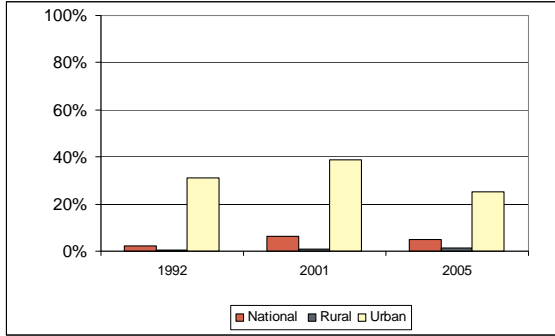


Outages, number in a typical month (number)

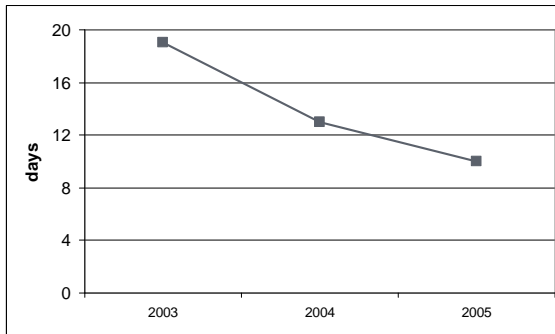


Rwanda

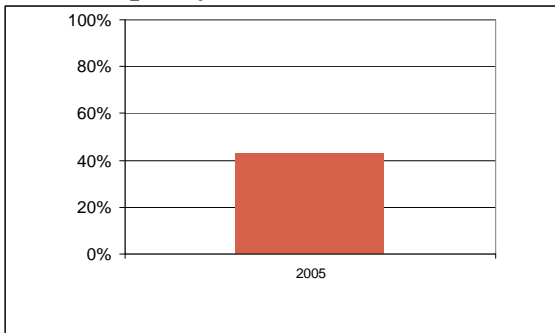
Access to electricity, Households (%)



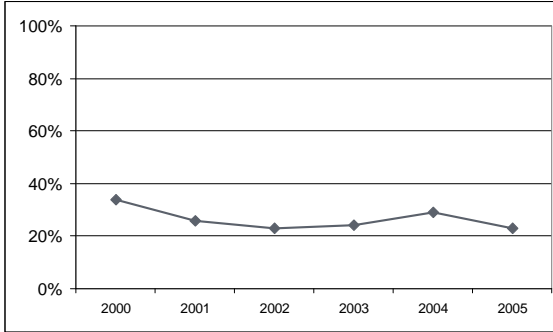
Accounts receivable (days)



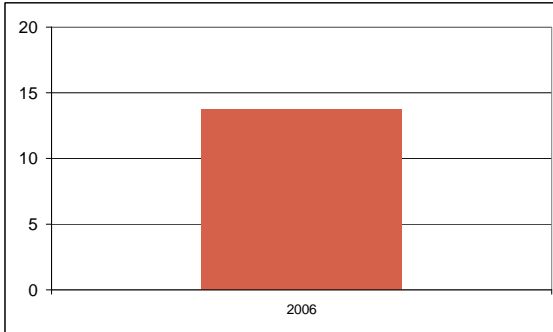
Capacity factor, Annual (%)



Losses, Total system (%)

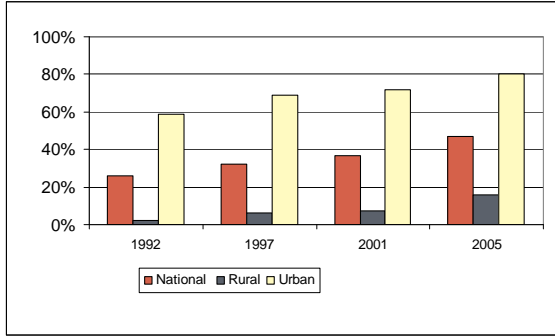


Outages, number in a typical month (number)

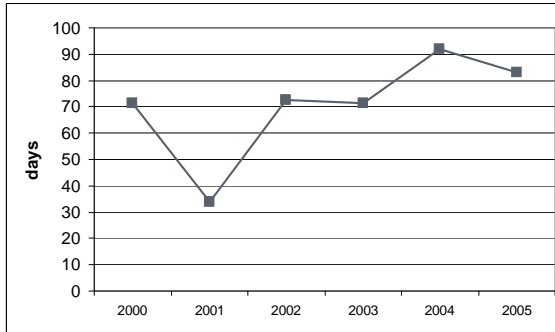


Senegal

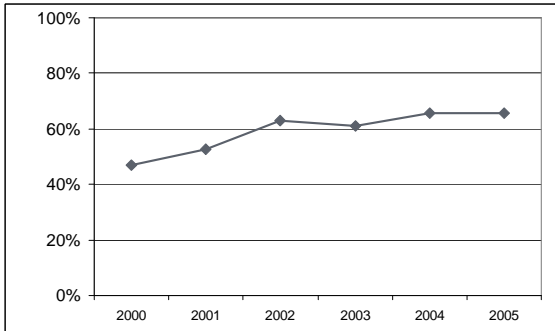
Access to electricity, Households (%)



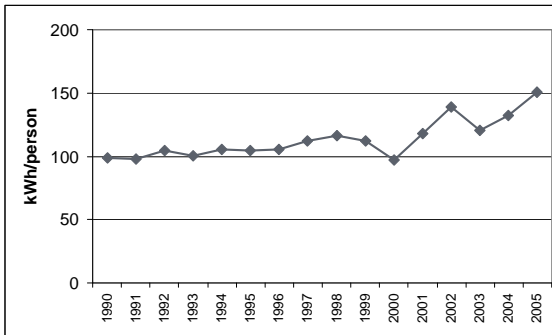
Accounts receivable (days)



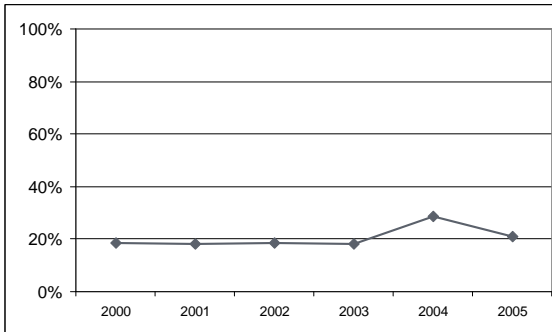
Capacity factor, Annual (%)



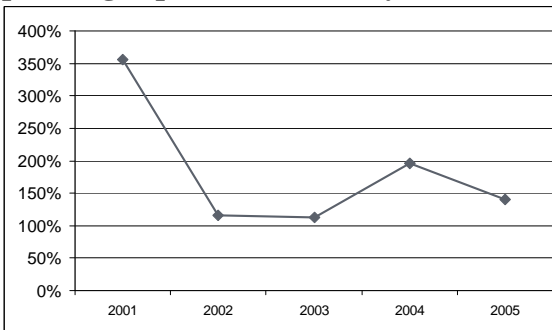
Electricity consumption, Annual per capita of total consumption (kWh/person)



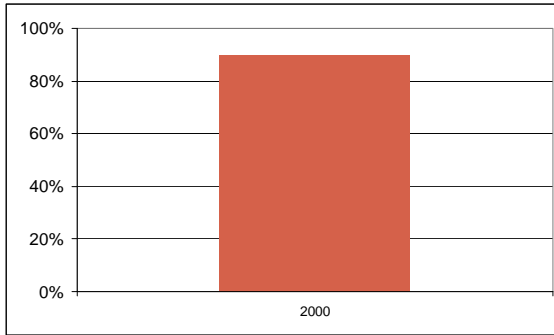
Losses, Total system (%)



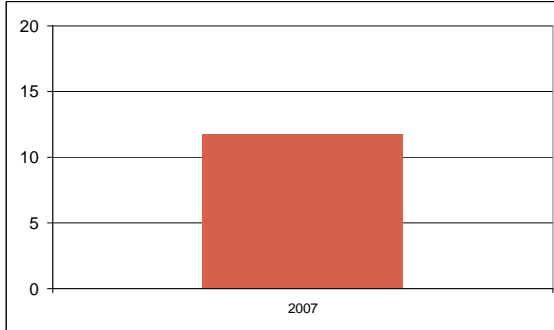
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

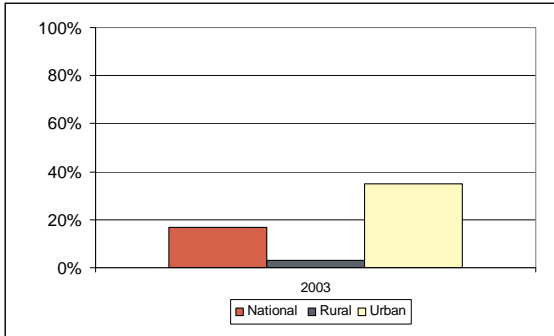


Outages, number in a typical month (number)

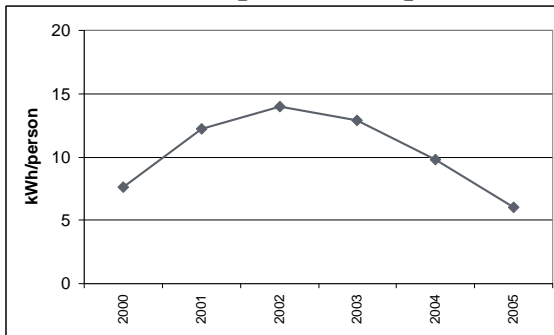


Sierra Leone

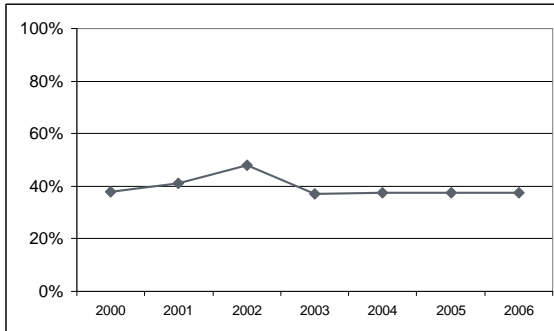
Access to electricity, Households (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

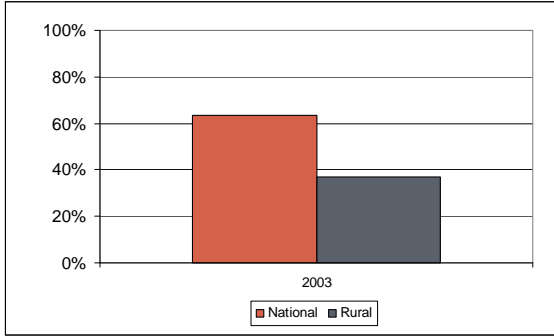


Losses, Total system (%)

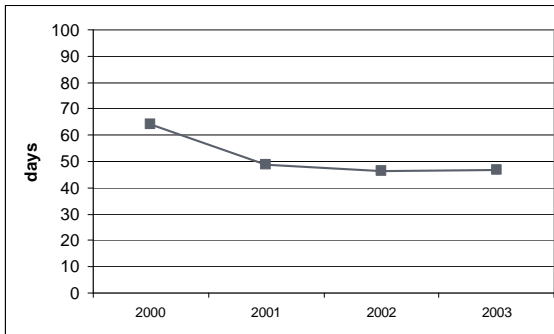


South Africa

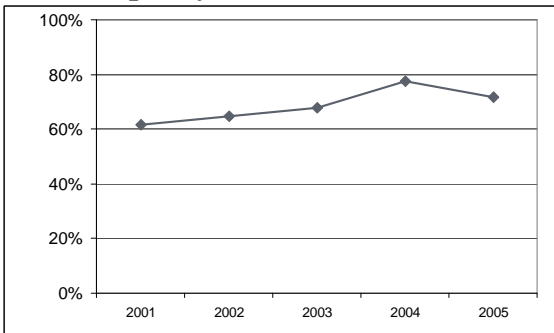
Access to electricity, Households (%)



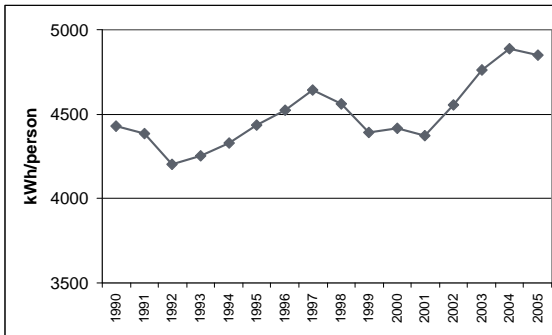
Accounts receivable (days)



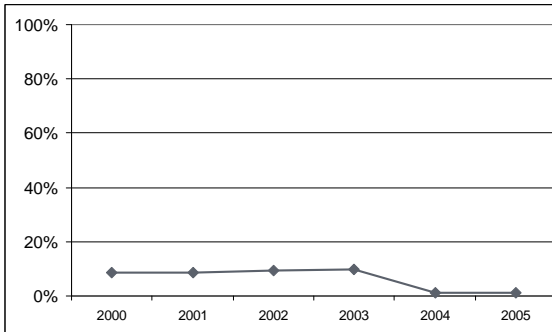
Capacity factor, Annual (%)



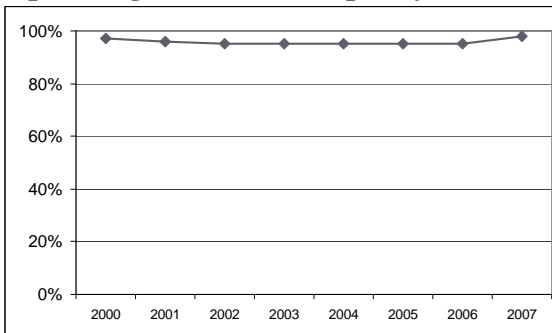
Electricity consumption, Annual per capita of total consumption (kWh/person)



Losses, Total system (%)

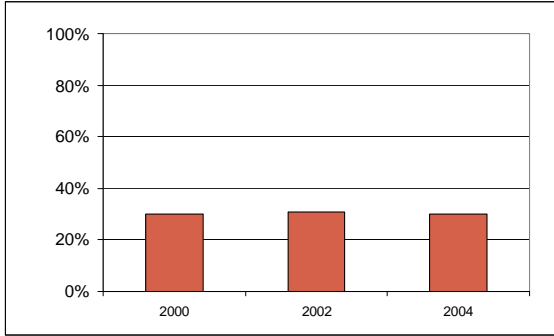


Operating-to-installed capacity ratio (%)

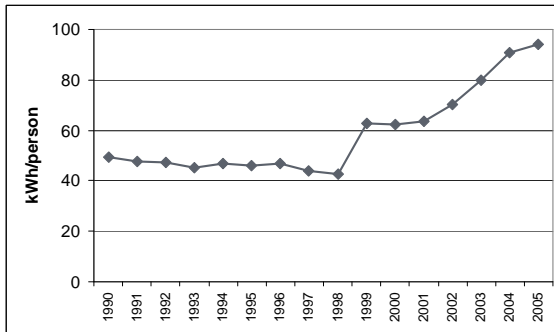


Sudan

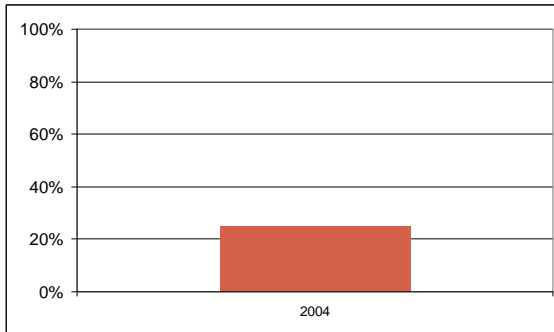
Access to electricity, Households, National (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

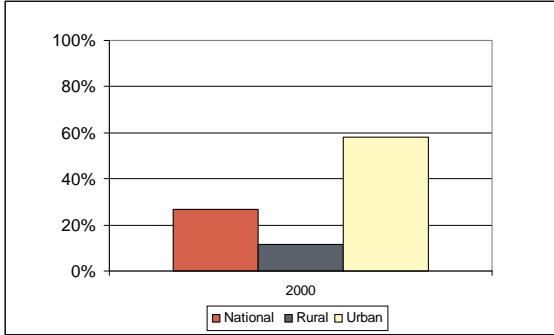


Losses, Total system (%)

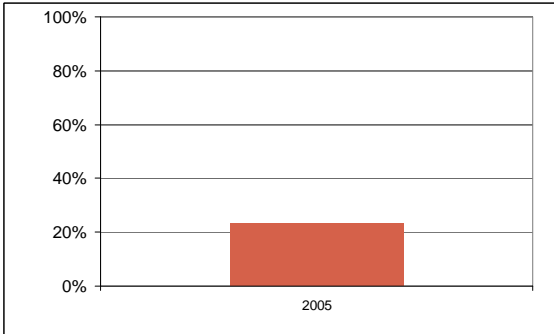


Swaziland

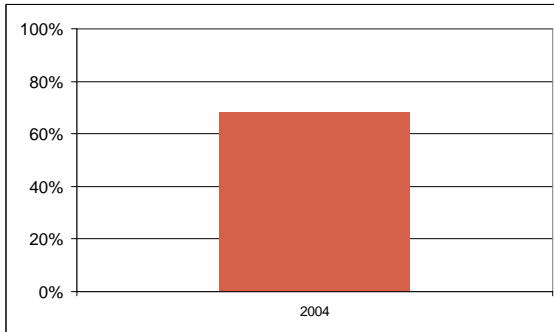
Access to electricity, Households (%)



Capacity factor, Annual (%)

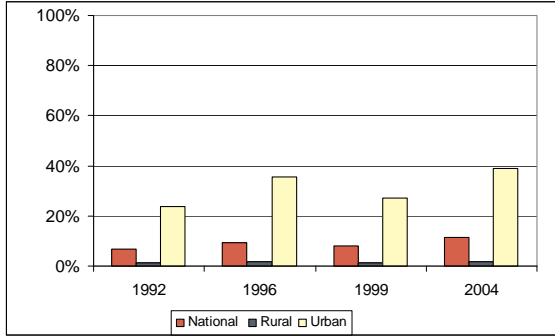


Losses, Total system (%)

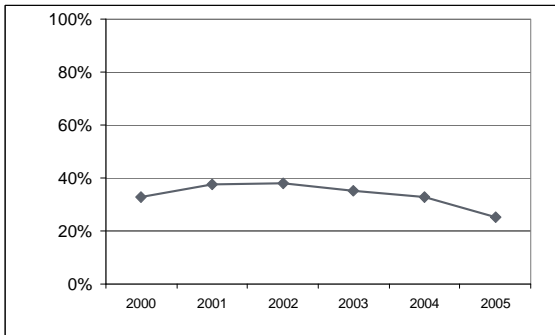


Tanzania

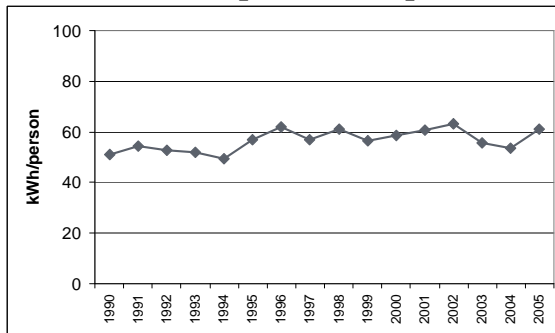
Access to electricity, Households (%)



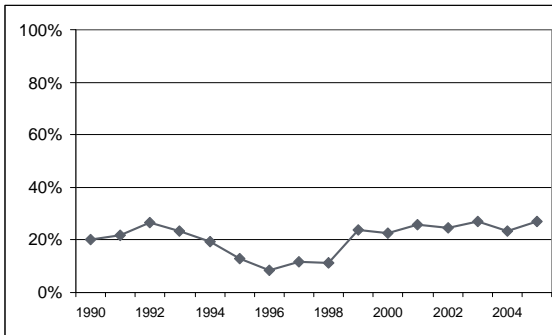
Capacity factor, Annual (%)



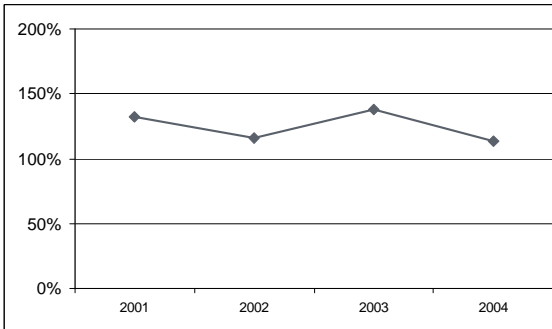
Electricity consumption, Annual per capita of total consumption (kWh/person)



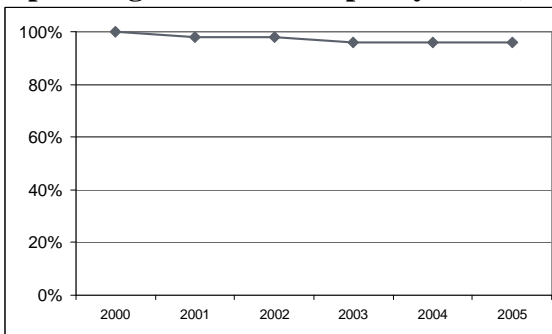
Losses, Total system (%)



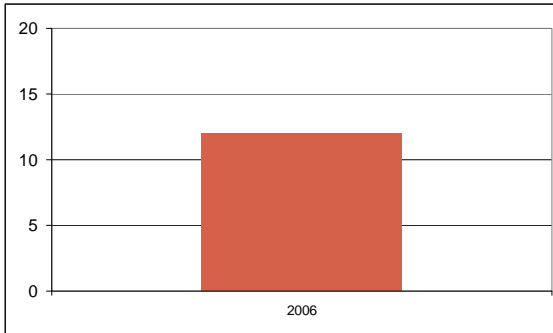
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

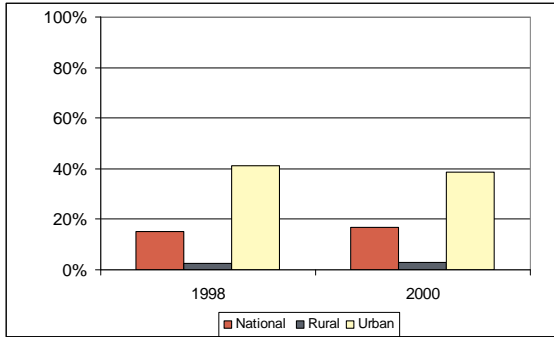


Outages, number in a typical month (number)

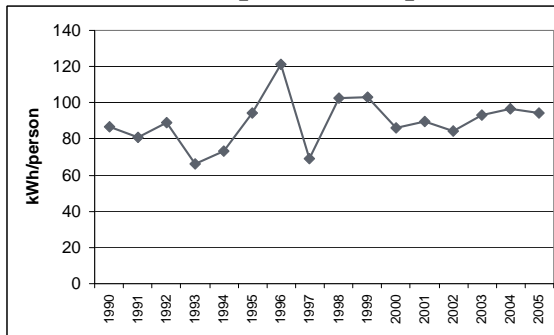


Togo

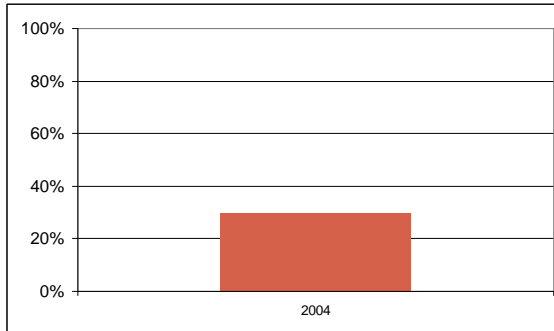
Access to electricity, Households (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)

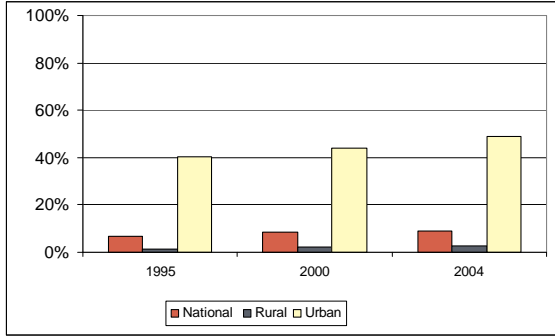


Losses, Total system (%)

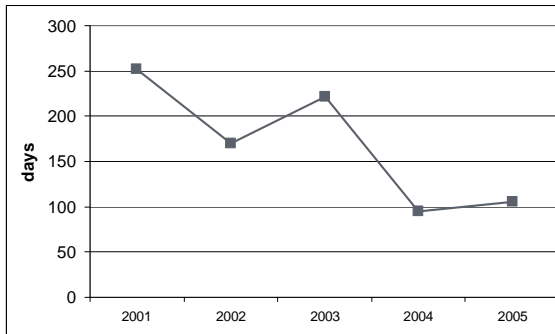


Uganda

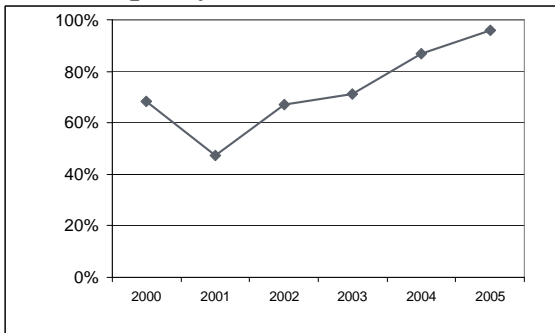
Access to electricity, Households (%)



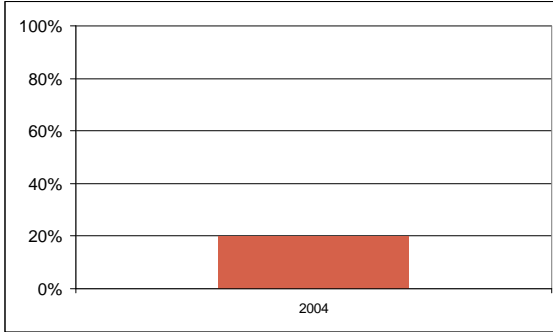
Accounts receivable (days)



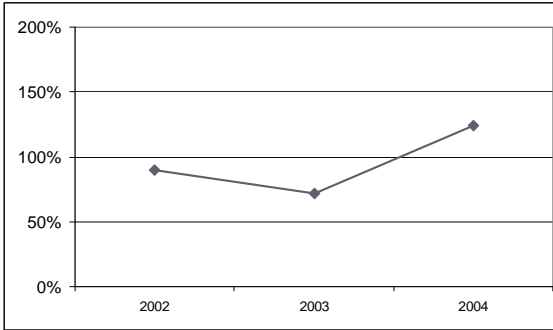
Capacity factor, Annual (%)



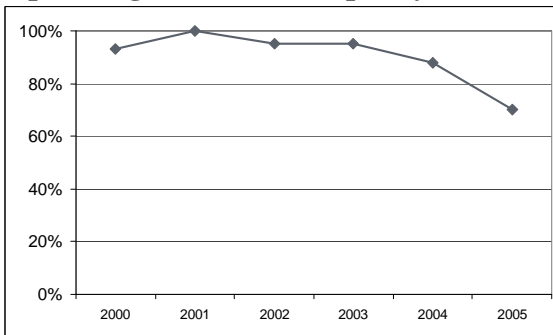
Losses, Total system (%)



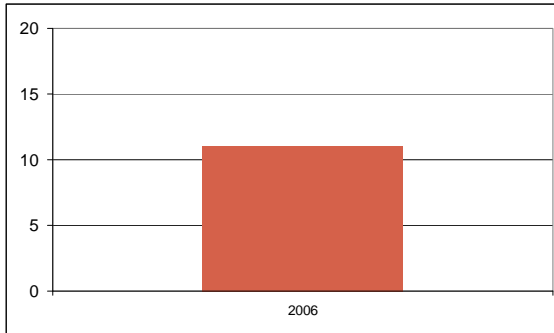
Operating expenses covered by revenues (%)



Operating-to-installed capacity ratio (%)

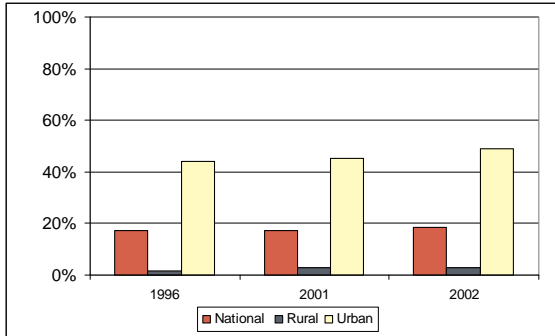


Outages, number in a typical month (number)

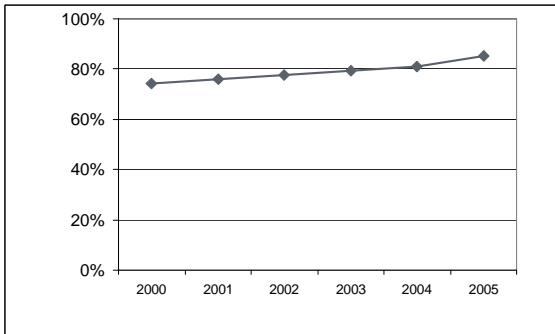


Zambia

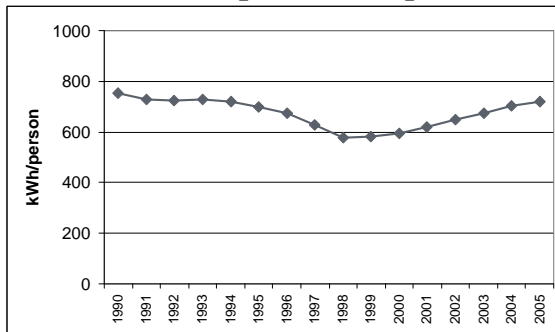
Access to electricity, Households (%)



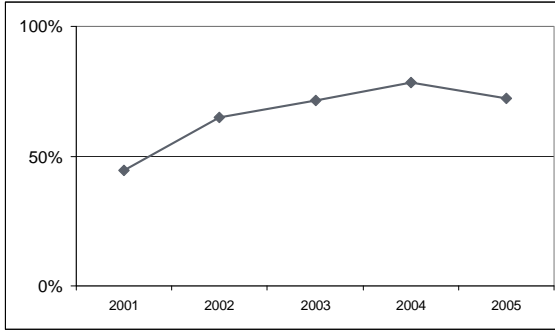
Capacity factor, Annual (%)



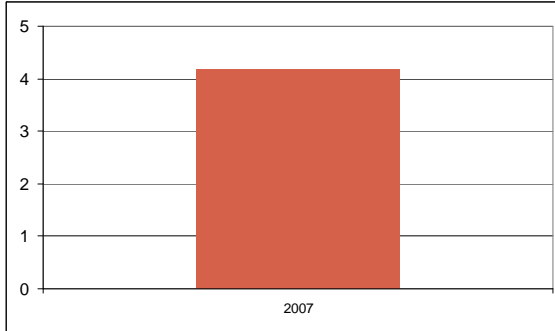
Electricity consumption, Annual per capita of total consumption (kWh/person)



Operating expenses covered by revenues (%)

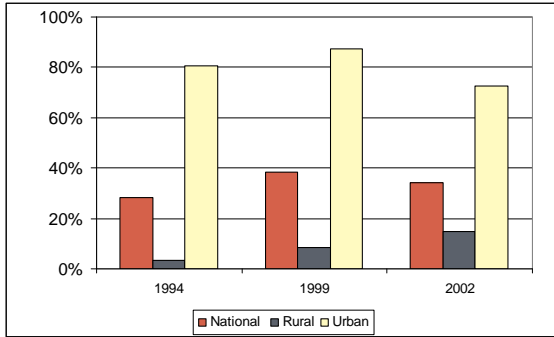


Outages, number in a typical month (number)

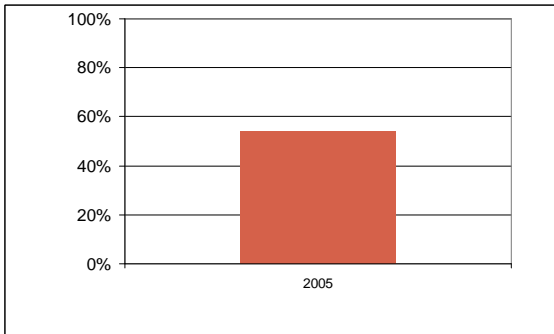


Zimbabwe

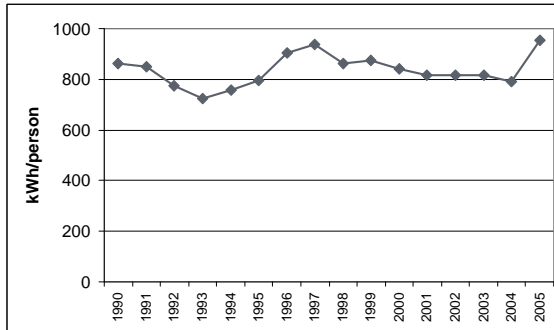
Access to electricity, Households (%)



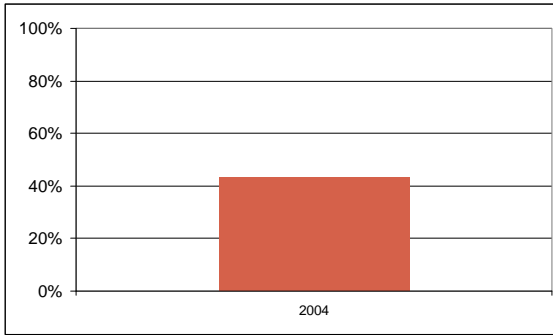
Capacity factor, Annual (%)



Electricity consumption, Annual per capita of total consumption (kWh/person)



Losses, Total system (%)



Literature:

Africa Development Indicators, World Bank, 2006

Africa Infrastructure Country Diagnostic (AICD), Flagship Report, World Bank, 2009

Africa Infrastructure Country Diagnostic (AICD) power sector database, World Bank, 2008

Benchmarking Analysis of the Electricity Distribution Sector in the Latin American and Caribbean Region, World Bank Report, 2007

Case study of the United Energy Distribution Company (UEDC) of Georgia:
http://www.muirad.com/pages/images/uedc_story.pdf

Cote d'Ivoire electricity sector financial model. Mimeo.

Demographic and Health Surveys, MEASURE DHS, ICF Macro, 1990-2006
http://www.measuredhs.com/aboutsurveys/search/search_survey_main.cfm?SrvyTp=type&listtypes=1

Development Data Platform (DDP) database, World Bank, 1990-2009.

Economic Indicators and Energy Balances of Non-OECD Countries, IEA (International Energy Agency), 2006.

Electricity Tariffs in SSA countries, Working paper, Africa Infrastructure Diagnostic, World Bank, 2009

Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing and Transition Countries, World Bank Report, 2005

Energy Information Administration (EIA), International Energy Data, US Department of Energy, <http://www.eia.doe.gov/emeu/international>

Energy Statistics Database. IEA (International Energy Agency), <http://www.iea.org>.

Eskom annual reports, South Africa, 2000-2006

Ethiopian Electric Power Corporation (EEPCo) website, <http://www.eepco.gov.et>

Fatimata Ouedraogo, Descriptive Manual: Energy Sector Performance Indicators, Africa Infrastructure Country Diagnostic, Africa Infrastructure Diagnostic, World Bank, 2007

Gassner, Popov and Pushak. 2008. An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing Countries, Washington, DC, World Bank.

Ghana Energy Development and Access Project (GEDAP) publications.

IDA-14 Results Measurement System Update, World Bank, 2009

Improving infrastructure service delivery, Commercial Reorientation of Electricity Sector Toolkit (CREST), World Bank, 2006

Jamasb, Tooraj, Newbery, Davis and Pollitt, Michael, Core Indicators for Determinants and Performance of the Electricity Sector in Developing Countries, World Bank Policy Research Working Paper #3599, 2005

Performance Monitoring & Benchmarking in an Electricity Sector in Transition, Presentation by J. O. Makoju, Power Holding Company of Nigeria Plc., World Bank, March 6-10, 2006

Power Holding Company of Nigeria (PHCN) financial model, Mimeo.

Power Holding Company of Nigeria (PHCN), MTR analysis, Mimeo.

Power Sector Performance Monitoring Indicators, World Bank Report, 1995

Preparation of Electricity Sector Core Performance Indicators, Report, TEPCO and PA Consulting, World Bank, 2007

Selection of Utility Distribution Key Performance Measures, Study Summary, PA Consulting Group and USAID-AFTEG, 2004

Sierra Leone electricity sector data sheet. Mimeo.

Société Nationale d'Electricité (SENELEC) website, <http://www.senelec.sn>.

Southern African Power Pool (SAPP) annual reports.

Sub-Saharan Utility Performance and Benchmarking Study, Data Book, World Bank, 2006

The Little Data Book on Africa, World Bank, 2006

World Bank Development Data Platform (DDP) database.

World Bank Enterprise Surveys, <https://www.enterprisesurveys.org/>

World Bank Group Enterprise surveys. <http://www.enterprisesurveys.org>.

World Development Indicators, World Bank

World Energy Outlook, International Energy Agency, (IEA), 2002, 2004, 2006.

Yepes, T, J. Pierce, V. Foster, Making Sense of Africa's Infrastructure Endowment: Benchmarking Approach, Africa Infrastructure Country Diagnostic, Working Paper #1, World Bank, 2005

