

ELECTRICITY SUPPLY AND DEMAND STATISTICS

1. Introduction

Electricity generation, transmission and distribution account for less than one per cent of Nigeria's Gross Domestic Products [GDP], but fifty-four per cent of the share of Utilities (electricity and water supply) in the GDP. They constitute a small economic activity in Nigeria in relation to her size and population. However, it is a growth industry which, permitted to operate with minimal Government intervention, could be a major contributor to the national economy.

The electric power sub-sector in Nigeria is dominated by the Power Holding Company of Nigeria [PHCN], a Government parastatal. PHCN supplies most of the electricity consumed in Nigeria, supplemented with power generated from privately-owned plants.

In Nigeria, there is widespread private provision of electricity usually referred to as 'captive power supply'. In most cases, captive electric power supply has been a response to irregular public power generation and transmission.

Before the advent of hydro-generated electricity from the Kainji Power Station, electricity supply in country was largely by the thermal system. However, the hydro system ushered in by Kainji in the early 1970s started giving way to the thermal dominated system again some years later. This was due to the perennial water-flow problem of the River Niger at Kainji, escalating costs of establishing hydro-plants and their long gestation lags.

Electricity generation in Nigeria is characterised by excess capacity and inadequate supply. It has been observed that peak demand is often about one-third of installed capacity because of the non-availability of spare parts and poor maintenance.

A poorly-motivated workforce, vandalism and theft of cables and other vital equipment, accidental destruction of distribution lines, illegal connections and resultant over-loading of distribution lines, are additional major problems of the PHCN. These have been responsible for unannounced load shedding, prolonged and intermittent outages which most consumers of electricity in Nigeria have had to contend with over the years. The situation will change with the deregulation of the sub-sector.

2. Coverage, Scope, Uses and Users of Electric Power Supply and

Demand Statistics

According to category E division 40 of the International Standard Industrial Classification [ISIC], electricity statistics cover the production, collection, and distribution of electricity. Thus, it includes statistics on generation, collection, transmission and distribution of electric energy for sale to all categories of consumers.

Also included will be statistical information on privately-owned electric power plants, which sell a significant amount of electricity to consumers as well as produce electricity for their parent enterprises which can be reported separately from the other units of the relevant organisations.

Electricity supply as an economic infrastructural facility is indispensable to a nation's economic development. The efficiency of the supply of electricity will not only influence returns on investment in existing enterprises, it also plays a major role in the creation of an economic environment which influences decisions on potential investments. Statistical information on installed, available capacity and peak demand are needed for monitoring the margin between peak demand and installed capacity.

The planner's decision on the appropriate mix of power generating plants (thermal, hydro, nuclear, etc.) has to be based on reliable energy statistics as well as household and (especially) private enterprise decision on statistical information of the adequacy or otherwise of the existing sources of electric power supply.

Finally, some indicators used for making international comparison of economic development are total, primary and thermal energy consumption. While the computation of total energy consumption includes data on fuel-based sources (Excluding thermal electricity), the computation of both primary (geothermal, nuclear and hydro) and thermal electricity consumption requires information on electricity supply as defined above.

3. Sources and Methods of Compiling Electricity Supply and Demand Statistics

The Power Holding Company of Nigeria [PHCN], is virtually the only source of statistical information on electricity supply and demand in Nigeria. This is because PHCN has the monopoly of public distribution of electricity in Nigeria. Electricity purchased by the PHCN from Nigeria Electric Supply Company (NESCO), Shell Company and African Timber and Plywood Company (AT & P) is usually reported as such by PHCN. Also some agencies, notably the National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN), publish statistical information on electricity supply and consumption, as obtained from PHCN.

All the statistical information on electricity supply and demand are produced in the course of day-to-day administration and as reported to the headquarters by PHCN's Power Stations, Zonal offices, and the private generating plants which sell electricity to PHCN.

Four categories of administrative statistics are produced by PHCN. These are:

- (1) energy generation statistics.
- (2) energy transmission statistics.
- (3) energy distribution statistics.
- (4) energy sales statistics.

Each of the Power Stations completes Form 125 titled "Generation Returns". Information supplied include:

- name of Power Station.
- number of generating unit.
- energy type.
- turbine set.
- quantity of electricity generated in gigawatt hours.
- installed capacity.

Each of the zonal offices also completes sales returns on which, among others, information is supplied as summarised for all consumers as follows: consumer category (domestic, commercial, industrial), unit consumed and amount paid.

The processing of these returns consists of aggregation over Power Stations or zonal offices in order to obtain national estimates of the parameters. Other items of data which are produced by the statistics division of the PHCN are derived from the two returns on 'Peak Demand for Electricity' and 'Transmission and Distribution Losses'.

Energy generation and sales returns as obtained from the generating stations and zonal offices respectively are also forwarded to the NBS, CBN and relevant State ministries. These forms are the sources of statistics of electricity supply and consumption as published regularly by the NBS and CBN.

4. Current Methods of Data Storage and Dissemination

Although the PHCN has computerised its billing system, it has not done so for the production of its administrative statistics. The PHCN does not have adequate electronic data processing facilities to enable it computerise the production and storage of its administrative statistics.

Most of PHCN administrative statistics are stored in hard copies or flat files. Although statistical information on its activities (generation, transmission and distribution of electricity) are published in its **Annual Reports and Accounts**, regular sources of time-series information on electricity production and consumption are the **Annual**

Abstract of Statistics, published by NBS, and **Economic and Financial Review** published by the CBN.

Electricity production and consumption statistics are, therefore, not available in machine-readable form. However the operators of the National Bureau of Statistics have put together a database of 9 items containing a total of 135 details on electricity production and consumption data on which the PHCN should focus its attention in respect of data collection and reports.

5. NBS Data Base Coding System for Electricity Supply and Demand

The database coding system (Statement of Requirements) for Electricity Supply and Demand Statistics shows the structure of data as contained in National Bureau of Statistics's [NBS] Time-Series Database (TSDB). The United Nations International Standard Industrial Classification (ISIC), Divisional Code for Electricity Supply and Demand Statistics is 40. There are nine [9] Data Items Codes 4001-4009 as indicated below. The last two digits of 4001-4009 are the items number. The figures in parenthesis indicate the number of data details on which values are recorded [e.g. 4001: Electricity Generation Capacity of PHCN by Power Station (45)].

Generally, the National Bureau of Statistics [NBS] is using six-digit-code for attributes [variables]. The first two digits represent the division code, 3rd and 4th make up the item code and the last two [5th & 6th] are the details code.

Based on this coding system, the NBS data structure for Electricity Supply and Demand Statistics is as shown below:

6. CONCLUDING REMARKS

As a result of its dominant position in the generation, transmission, distribution and sale of electricity in Nigeria, the PHCN has the unique opportunity of establishing and maintaining a comprehensive data base of electricity production and consumption statistics. With these statistics, non-responsive generating stations or sales offices can easily be identified and compelled to comply. Also, although there are illegal consumers these can be reduced to the barest minimum by a more vigilant PHCN since illegal connections to PHCN's lines can be detected and penalised.

Metering and billing are the least efficiently executed tasks by PHCN. Although every consumer is supposed to receive two months' bill based on estimated consumption and a third or quarterly bill which

reflects actual consumption after the meters are read, in some cases the meters are never read in six months and in other cases the estimates are arbitrary. There is need for a better system of billing and motivation for meter-reading staff to improve their performance. Disaggregated data on consumption is difficult to capture using the current PHCN's approach.