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Today, most African countries face a significant lack of access to quality electrical energy. Indeed, in fact, the problem of electric energy distribution in Africa is characterized by poor energy management [1]. This makes it difficult to guarantee a permanent balance between supply (production of electricity) and demand (subscribers).

Niger has great potential for primary energy (uranium, oil, coal, etc.) but still enables to ensure quality and sufficient electric energy [2] [3]. There is also an increasingly seeing significant use of non-linear loads in the domestic, industrial, and hospital sectors. Which include: laundry machines, X-ray equipment, operating room equipment, screen televisions, air conditioners, mobile phone computers, etc.

In hospitals, almost all activities depend on electricity. This is due to medical activities (examinations, consultations, and oxygen production). Thus, energy is an essential element in running a hospital [4].

These loads are sources of energy quality distortion since even if the supplied voltage to these devices is sinusoidal; the current absorbed by this electrical equipment is not [5]. Also, to ensure good patient care, or simply put for a quality health care system, one must necessarily ensure a continuous supply of qualitative electrical power across hospital devices.

Indeed, several studies and research have been carried out regarding quality improvement from electrical supervision, to the use of disturbance correction techniques, then the use of artificial intelligence, finally to the application of energy transition [6].

The benefit of this article lies in the establishment of a diagnosis regarding the quality of power supplied to Amirou Boubacar Diallo National Hospital of Niamey. For this, a computation for the electricity quality assessment will be, this theory will help to better control the measured electrical variables with FLUKE 1735 power analyzer, then the measurement techniques used for the data collection and processing be specified, finally the article will match the results to be analyzed and interpreted.

The concept of the quality of electrical energy is diverse. This is why there are different definitions depending on the problem that the author encounters in his relevant network. The most complete definition is that which will take into account all the electrical disturbances that may alter the contractual values set as standard. Thus, one can say that the quality of electricity is defined by four different concepts but all together at a time: supply continuity, voltage wave quality, stability of the frequency and voltage balance [8].

This standard sets the quality of the supply voltage provided mainly by four electrical variables (the rms value, the unbalance, the frequency and the rate of distortion) [8].

Like other indicators, voltage characterizes the correct functioning of a power source in amplitude. Across this power source must be acceptable values for the correct operation of the devices connected to it. The low voltage that corresponds to the electrical distribution network is either evaluated as phase-to-phase (phase-phase) or single (phase-neutral) voltage. For phase-to-neutral voltage, EN50160 standard sets the admissible level of rms voltage at 230 V ± 10%. The latter is based on:

There is voltage unbalance in a distribution network when the voltages supplied across the generator do not have the same effective value at a time. Note that this voltage unbalance is mainly caused either by a network line impedance asymmetries or current inequalities in distribution lines. The permissible unbalance rate on low voltage networks must be below 2% according to EN 50160 standard, the unbalance is calculated by applying the following formula [9]:

In case of electricity production by an alternator, it is necessary to keep the frequency of the synchronous power source at a fixed value, if not the electrical device will attend premature deterioration. The frequency of a power source is defined by the number of cycles per second. It is limited to 50 HZ ± 1% according to the European Standard.

For the low voltage network, contractual values are fixed by IEEE std 519 to prevent harmonic disturbances effects. Thus, the limits of the Global Harmonic Rate in a 120 V to 69 kV voltage in a distribution network in a hospital environment is limited to 3% [7].