

Source: PHCN

**Fig. 3-5 Trunk Transmission Line (330 kV) Extension Plan**

**(3) Distribution Facilities**

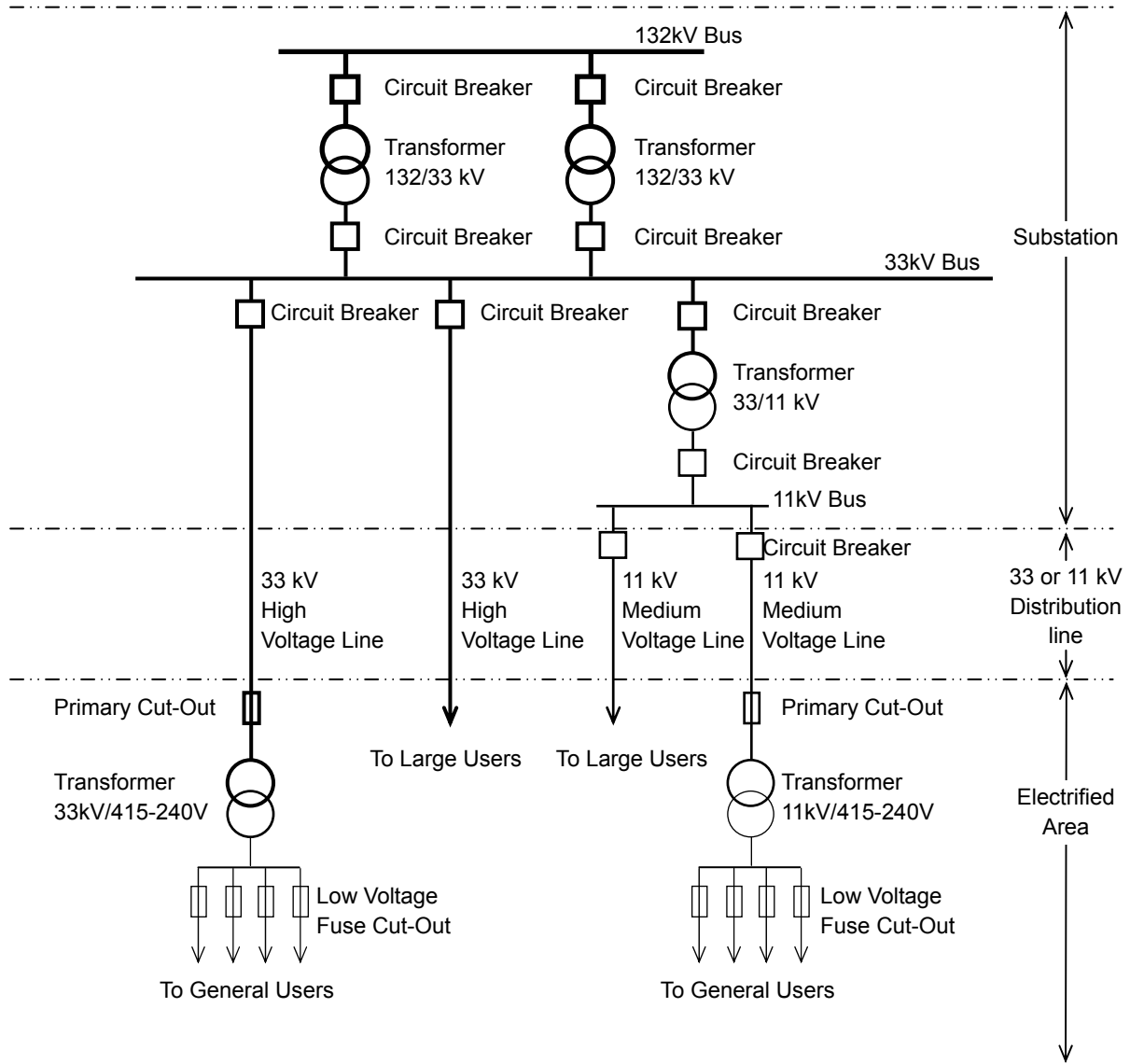
Distribution in Nigeria is provided by three phase, three wire aerial cables with a medium voltage (either 33 kV or 11 kV). Low voltage supply (415/240 V) is made to general users. 33 kV neutral points are grounded from the 33 kV bus bars of the distribution substations via grounding transformers. An 11 kV system is used in areas where the load density is high and where the user sites are scattered. In general, the 33 kV power supply is directly stepped down to a lower voltage for distribution to each user. As the 33 kV distribution lines are longer than 100 km in some areas, they can suffer from a significant voltage drop as well as power loss. To compensate for this, voltage regulators, capacitors and other phase modifying equipment have been installed. Auto-reclosers are also installed to minimise the area damaged by thunderbolts and other natural incidents in addition to pole-mounted section switches to minimise the area of a power cut at the time of maintenance work.

Three phase, four wire low voltage power is distributed. The receiving voltage at the user end is 415 V as the line voltage for the three phase load and 240 V as the single phase voltage and the neutral points are directly grounded. The distribution transformers are normally installed on the ground and three phase transformers of 33 kV/415 – 240 V or 11 kV/415 – 250 V are used. The standard capacity of these transformers is 200 KVA, 300 KVA or 500 KVA. The poles are basically concrete poles for both medium and low voltages. Table 3-7 outlines the distribution facilities in Nigeria while Fig. 3-6 shows the typical configuration of the distribution system.

**Table 3-7 Outline of Distribution Facilities in Nigeria (2004)**

Category	Item	Scale
Distribution Line	(1) Total Length of 33 kV Distribution Lines	approx. 40,780 km
	(2) Total Length of 11 kV Distribution Lines	approx. 35,380 km

Source: PHCN



Source: Study Team

**Fig. 3-6 Basic Configuration of the Distribution System in Nigeria**

Although the PHCN plans to replace the deteriorated existing equipment (poles, transformers and switches, etc.), it is facing the following problems in reality due to the deterioration of the existing equipment which is mainly caused by the funding shortage.

**Problems for Distribution Facility Plan**

- ① The inability to expand the facilities to meet the rapid demand increase means a continual state of over-loading, resulting in equipment breakdown.
- ② Increased technical power loss caused by a voltage drop
- ③ Increase of the number of unforeseen accidents (grounding and short-circuiting) caused by fallen trees, etc. due to the lack of periodic maintenance work
- ④ Unforeseen accidents due to the erroneous operation or functional deterioration of the aged equipment
- ⑤ Lack of an appropriate increase of the transformer capacity to meet the actual demand
- ⑥ Long power cuts at the time of accidents due to the absence of system protection equipment
- ⑦ Unnecessary enlargement of the area affected by an accident due to the absence of auto-reclosers on the distribution routes
- ⑧ Extension of system failures to other sound systems due to the absence of pole-mounted switches at the main junctions of the 33 kV distribution lines
- ⑨ Inability to make fresh investment in equipment due to the low level of the electricity charge

### **3.2 National Development Plans**

#### **3.2.1 National Economic Empowerment and Development Strategy**

In 2004, the Government of Nigeria formulated the National Economic Empowerment and Development Strategy (NEEDS) which is equivalent to a poverty reduction strategy paper (PRSP) and which indicates the poverty reduction strategy up to 2007. The NEEDS lists the following mandates for the power sector.

- Expeditious implementation of the electric power sector reform programme
- Generation of 10,000 MW a day by 2007 by the existing plants, new host generation and reasonably priced independent power plants (4,200 MW → 10,000 MW)
- Development of the transmission capacity (5,838 MVA → 9,340 MVA)
- Development of the distribution capacity (8,425 MVA → 15,165 MVA)
- Reduction of the transmission and distribution loss (45% → 15%)
- Exploration of alternative energy sources, such as coal, solar power, wind power and hydropower
- Increase of the collection rate of the electricity charge (70% → 95%)
- Deregulation of the power sector to allow increased private sector participation

The NEEDS identifies the necessity to promote agriculture and the food processing industry and to improve educational and medical facilities for the development of rural areas and hopes to see the progress of rural development through a stable supply of electricity.