

## 7.0 SUBSTATIONS RELIABILITY ENHANCEMENT PROJECT

### Background

The importance that users of electricity attach to its reliability has been increasing in the same manner that the load itself is growing. Instances of customers vandalizing utility facilities are now very rampant. There are also a number of complaints relating to low system voltages, power swings, surges and flicker not only limited to industrial customers but to the general populace. In general even the poorest users of electricity have come to appreciate the continuous provision of electricity for at least street lighting, for watching TV and playing music and are now demanding it full time.

Industry is also becoming sophisticated and competitive requiring economies of scale and scope to remain in business. Inadequate and the unavailability of electricity at all times therefore defeat this objective and its subsequent impact on economic development of the country.

It is for these reasons that the need to upgrade and enhance the operational reliability of our substations has been established. The objective of the project is to identify components of the transmission network, at various substations, causing the unreliability and low power quality in the power system and rectify these to provide adequate transformer capacity to meet the load growth and single contingency cases. It will also provide reliable and quality power supply to customers, flexibility in the operation of the power system and maintenance of the power equipment.

The Substations Reliability Enhancement Project (SREP) incorporates the requirements for “system operations and reliability enhancement”. Since the establishment of the national grid in 1965, only a few attempts have been made to either upgrade or rehabilitate substations infrastructure.

About 50% of the substations still incorporate old and obsolete equipment installed in 1965.

The Substations Upgrade Project (SUP) was therefore initiated in 2006 mainly to upgrade and increase the capacity and operational reliability levels of power transformers and also take advantage of the projects to replace some facilities at the respective substations. The works are ongoing at a number of substations. The substations Reliability Enhancement Project (SREP) is therefore expected to be the continuation of the SUP, with emphasis on;

- Replacement and/or upgrade of old and obsolete protection, control and metering systems and auxiliary services equipment.
- Reconfiguration of substations electrical arrangements to offer increased flexibility.
- Replacement of all oil circuit breakers with SF<sub>6</sub> breakers.

- Achieve single transformer contingency reliability criteria for all substations with maximum demand of 5MVA and above.
- Increase local reactive power compensation in order to improve upon system performance thus improved voltages, reduced losses etc.

**Project Objective**

The Ghana Grid Company (GRIDCo) intends to upgrade and enhance the operational reliability of its equipment at the Bulk Supply Points (BSPs). In line with this objective, GRIDCo intends to replace the identified obsolete and faulty components of the transmission network, at various substations, that are contributing to unreliable and low power quality in the power network. The project also seeks to improve upon the flexibility in the operation of the power system and maintenance of power equipment.

**Scope of Works**

The scope of work includes but not limited to:

- The replacement of obsolete protection, control and metering systems and the provision of modern test equipment etc.
- Replacement of all aged substation equipment such as battery banks and rectifiers, circuit breakers and disconnect switches etc.
- Replacement of aged air-conditioning systems at the substations.
- Reconfiguration of substations and provision of dedicated circuit breakers on each transformer at Cape Coast, Winneba, and Akwatia.
- Provide SF6 breakers in place of the OCBs at locations where the phenomena of parallel clearing can occur such as at Achimota and Tafo Substations.
- Provide standby generators at some major substations.
- Provide additional MV capacitor banks at major substations.
- Rehabilitation of power transformers to be relocated.

The various substations that have been earmarked under the project have been grouped into lots as follows:

<b><i>Lot No.</i></b>	<b><i>Name of Substations</i></b>
<b><i>LOT 1</i></b>	<ul style="list-style-type: none"> <li>▪ Sunyani</li> <li>▪ Sawla</li> <li>▪ Yendi</li> <li>▪ Bolgatanga</li> <li>▪ Tamale</li> <li>▪ Techiman</li> </ul>

<b>LOT 2</b>	<ul style="list-style-type: none"><li>▪ Achimota</li><li>▪ Winneba</li><li>▪ Cape Coast</li><li>▪ Takoradi</li><li>▪ Prestea</li></ul>
<b>LOT 3</b>	<ul style="list-style-type: none"><li>▪ Obuasi</li><li>▪ Kumasi</li><li>▪ Akwatia</li><li>▪ Kpong</li><li>▪ Tafo</li></ul>
<b>LOT 4</b>	<ul style="list-style-type: none"><li>▪ Asiekpe</li><li>▪ Ho</li><li>▪ Kpeve</li><li>▪ Kpando</li><li>▪ Aflao</li></ul>

**Duration for Contract Implementation**

The duration for contract implementation shall be 24 months.