

## Zanzibar Interconnector 132kV Submarine Cable in Tanzania

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### ABSTRACT

Zanzibar Island is located off Tanzania in East Africa in the Indian Ocean. This island recently experienced chronic electricity shortage because of aging of existing equipment. A new 132kV XLPE insulated submarine power cable interconnector was installed to improve power supply reliability and to deal with higher electricity demand in the future. A type test was performed to confirm the mechanical and electrical properties of the cable design. The cable laying work from Zanzibar Island to the mainland consisted of 37km length and maximum 60m water depth. The construction work was completed in March 2013.

### KEYWORDS

Submarine cable, HVAC, Africa, XLPE cable, Installation, Interconnector

### INTRODUCTION

Tanzania, located on the eastern coast of Africa, has a very low penetration of electricity with less than 15% of the population connected to the national grid. The lack of reliable power is a major constraint to economic growth in Tanzania. Significant efforts are underway to rehabilitate Tanzania's out of date economic infrastructure and alleviate poverty with the help of international development funding through the Millennium Challenge Corporation (MCC).

The Tanzania energy sector component included the following main project areas:

- Manufacture and installation of a new 132 kV submarine cable from mainland Tanzania to the island of Zanzibar
- Construction of the associated new 132 kV overhead lines on both the mainland and on the island
- Construction of new substations and rehabilitation of existing substations in six regions of Tanzania
- Rehabilitation and extension of rural distribution networks in seven regions
- Feasibility study and detailed technical design preparation for a new hydro power plant in western Tanzania
- A capacity building programme for the two local utilities, Tanzania Electric Supply Company (TANESCO) and Zanzibar Electricity Company (ZECO)

Zanzibar is a semi-autonomous state which is a part of Tanzania. Figure 1 refers.

The Zanzibar Islands comprise of two main islands namely Unguja (more commonly known as Zanzibar) and Pemba. Unguja covers an area of 1464 sq. km and Pemba Island covers an area of 868 sq. km. According to the 2012 census, the population of Unguja was 896,721.



Figure 1: Interconnector map

### PROJECT BACKGROUND

Tanzania Electric Supply Company (TANESCO) and Zanzibar Electricity Corporation (ZECO) are responsible for electricity generation, transmission and distribution in mainland Tanzania and Zanzibar respectively.

Prior to this project, Zanzibar was served through an existing 132 kV interconnector via an overhead line from Ubungo in Dar es Salaam to Ras Kiromoni on the coast, then via an oil filled submarine cable to Ras Fumba on Zanzibar and finally via an overhead line to Mtoni distribution substation.

Load growth on the existing oil filled cable, rated at 45 MW, was approaching the transfer limits of the cable. The old oil filled cable was installed in 1987 and served Zanzibar reliably for the more 30 years but was coming the end of its reliable useful life expectancy. Breakdowns of the interconnected power system occurred during 2008 resulting in repair works of one month and again for almost three months in 2009-2010.

As there was no back-up submarine cable and inadequate emergency generation in Zanzibar, these breakdowns resulted in widespread electrical blackouts with the majority of users having to rely on their own private generators which were expensive to operate.

An initial feasibility study was prepared on behalf of ZECO in 2006 which identified the provision of a new submarine cable interconnector as the most feasible option to provide a long term reliable supply and to meet the future demand growth in Zanzibar.