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TECHNICAL REPORT

LVDC systems -
Part 102: Low-voltage DC electric island power supply systems

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IEC TR 63282-102 has been prepared by IEC technical committee 8: System aspects of electrical energy supply. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
8/1760/DTR	8/1784/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

This document is to be used in conjunction with and as a supplement to IEC TR 63282 up to 1 500 V DC.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63282 series, published under the general title *LVDC systems*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

The vast majority of global population lives in the developing countries, and a significant portion of the developing countries have no, or poor, access to electricity. According to the United Nations Foundation, there are still around 1,2 billion people who do not have access to electricity and around 1 billion more who depend on unreliable electric networks. Energy access is a complex task in rural areas as most of the villages/hamlets are located at remote and/or hilly terrain. Barriers to energy access include uneconomic grid expansion and high transportation costs for fuel. However, these remote areas are rich in availability of locally available resources such as waste from agricultural field, solar intensity, wind utilization, etc., so how to use local resources to provide electricity supply has become a challenge in remote rural areas.

Electric island LVDC (Low voltage direct current) systems have recently been recognized by a number of stakeholders as an alternative solution for energy access in rural area. Several countries have already shown interest in the development of DC systems in order to improve the quality of their inhabitants' life together with the development of the local economy.

This document defines electric island LVDC systems for rural or remote areas, and on ships which normally operate with no connections to a national grid infrastructure. The purpose of this document is to provide some effective technical information to support the construction of electric island LVDC systems. It provides the unique characteristics of electric island power supply system and the key elements such as optional voltage level, topology and operation control, and provides some cases.

This document harmonizes with IEC TR 63282 for voltage level and power quality, and as a supplement to IEC TR 63282, but the application scenarios are slightly different and the power quality in this document are more prominent because there is no connection to a nation's primary grid.

This document mainly consists of three parts. The first part (Clause 4) gives the characteristics of the system, and describes the characteristics of the power source, load and the power quality of the electric island LVDC systems. These characteristics are designed to inform a number of stakeholders of the information to be aware of when building electric island LVDC systems. The second part (Clause 5) gives the system composition and technical description, and describes the load requirements, power source requirements, protection and operation of the electric island LVDC systems. Finally, five typical cases are given (Clause 6).

1 Scope

The scope of this document is to assess the existing technical requirements (by TC 64, TC 82, SyC LVDC) and close any gaps related to electric island LVDC power supply systems in rural or remote areas without electricity up to a maximum of 1 500 V only. Additionally, it covers the case of LVDC auxiliary power supply systems for ships.

Specific technical items for electric island LVDC systems are explained in this document. Rationale for the proposed voltage level, topology, power quality, etc. are given.

This document gives inputs to several TCs in charge of the standardization of different issues and coordinated by SyC LVDC.

2 Normative references

There are no normative references in this document.