

## Current Status and Perspective on HVDC R&D of KERI

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### Abstract

This presentation deals with the current activity and future direction on high voltage direct current (HVDC) system research of Korea Electrotechnology Research Institute (KERI). HVDC technology has attracted attention recently in the power transmission system as a solution for the problems in high voltage alternating current (HVAC) system such as the losses by the capacitive current in long distance overhead cable lines and interconnection between unsynchronized AC systems in conventional AC transmission system. From the initial stage, line-commutated converter typed HVDC (LCC-HVDC) using thyristors has been installed and being operated. However, LCC-HVDC system has some technical restrictions like commutation failure, possible reverse power flow and consumption of about 50% reactive power for power transmission. On account of the recent developments in semiconductors such as IGBT, voltage-sourced converter (VSC) typed HVDC (VSC-HVDC) can overcome drawback of LCC-HVDC. VSC-HVDC system has advantages of easy change of power flow direction, no need of reactive power and black-start capability. In several VSC topologies, modular multilevel converter (MMC) topology has taken main interest in VSC-HVDC system construction. In addition to the merits of existing multilevel (2 or 3 level) converter typed VSC with performance of small converter AC voltage steps and low rate of voltage rise, MMC-HVDC can lower the generation of harmonics, high-frequency noise and switching losses. Korea also recognizes the importance and usefulness of HVDC technology and has constructed and operates LCC-HVDC systems and tries to develop LCC- or VSC-HVDC system with better performance than the existing systems. KERI keeps pace with these tendencies and put spurs to the research and development of a novel MMC-HVDC system having advanced control algorithms with enhanced reliability and improved protective performance.