Offshore wind grid connection using VSC-HVDC technology

Abstract-The energy transition is the largest future project ever seen worldwide. More electricity is to be generated from renewable energies in order to facilitate withdrawal from nuclear energy in the medium term and coal-fired power in the long-term. Wind energy generated far away at sea is one of the main pillars in the energy transition. HVAC (high voltage alternative current) technology is employed for the connection of small wind farms located at shallow waters close to the coast. With the offshore wind industry proceeds stably into distant deep water area, VSC-HVDC (voltage sourced converter based high voltage direct current) as the predominant technology is widely used for connecting large-scale offshore wind farms far out at sea with advantages like considerably higher volumes of energy transmitted and lower losses incurred. Europe takes the lead in this regard and TenenT is one of the pioneers. China has already committed to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060, offshore wind deployment is booming. I will illustrate the development of HVDC Flexible technology by GEIRI (Global Energy Interconnection Research Institute) and its applications home and abroad.