

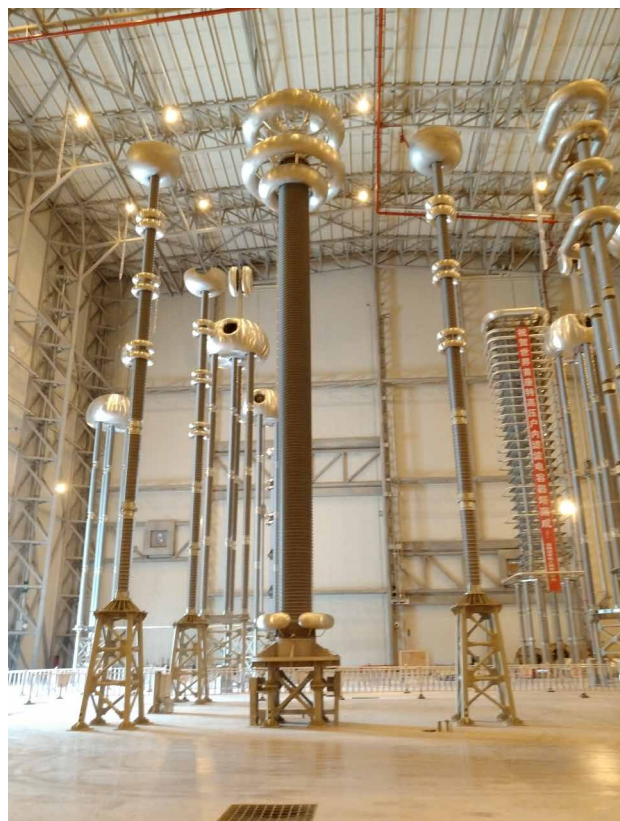
NR Is the Leading VSC-HVDC Supplier Worldwide



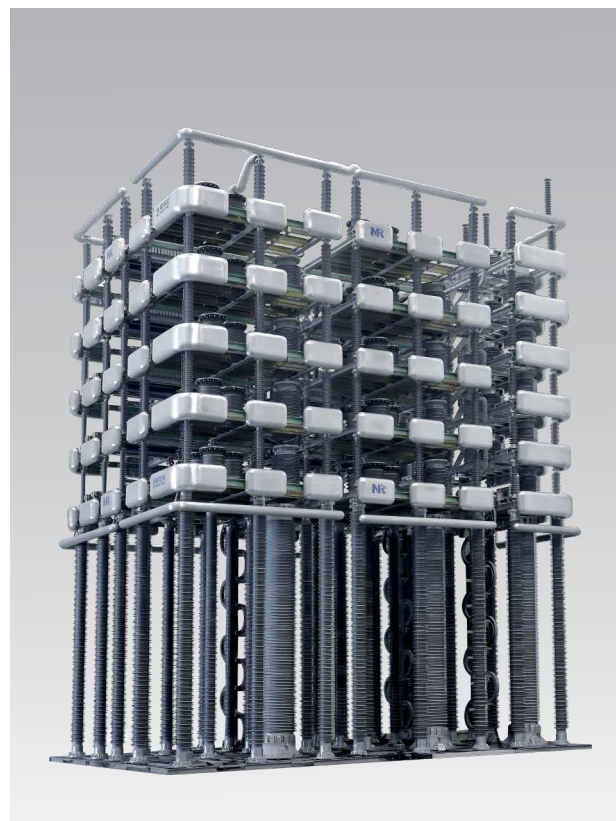
VSC Converter Valve



C&P System



OCT&ECT&EVT



DC Breaker



NR Leading VSC-HVDC Solution

Towards A More Flexible and Stable Power Grid



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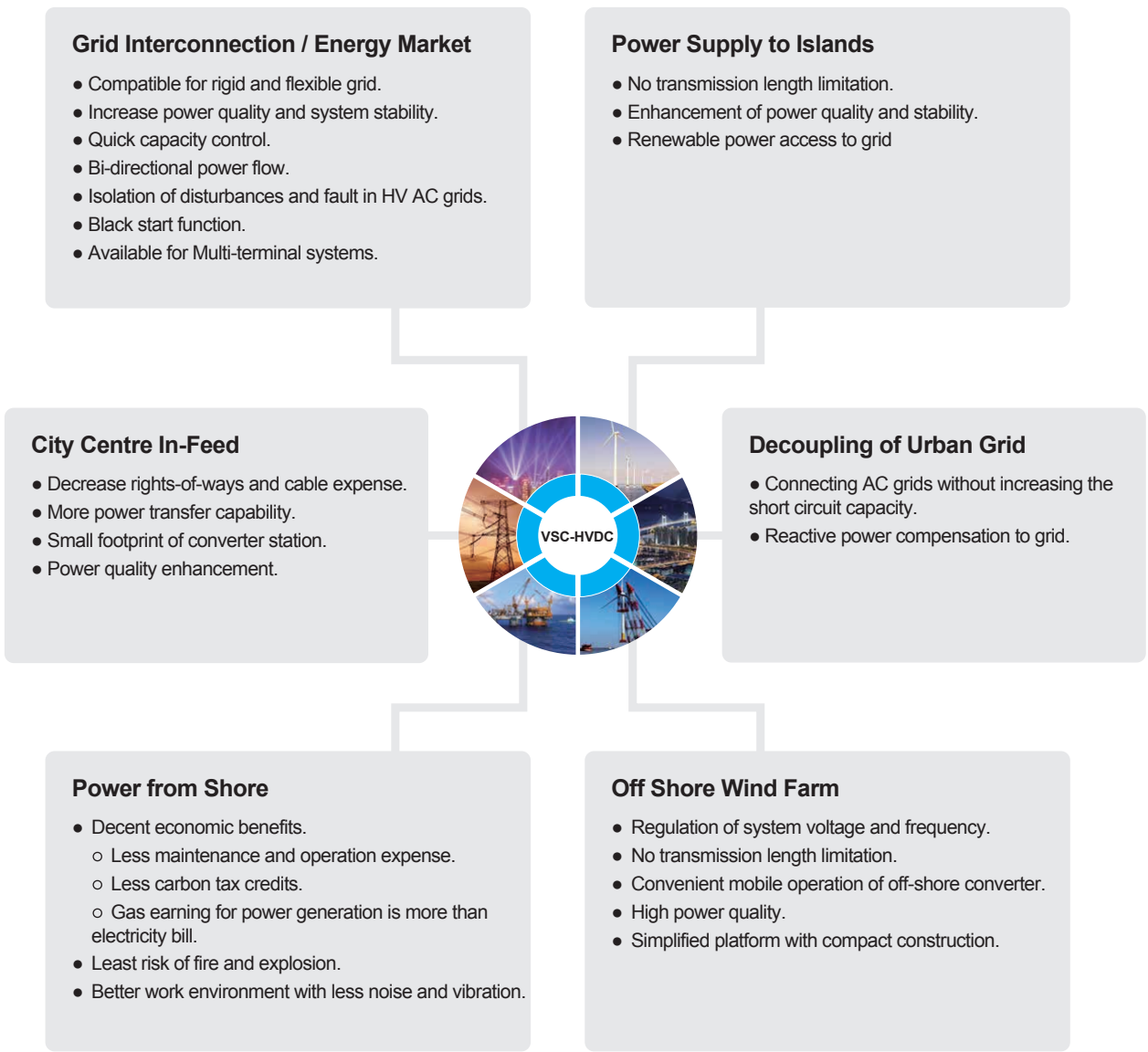
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NR VSC-HVDC Solution

HVDC is a well proven technology designed for long distance bulk power transmission, asynchronous grids interconnection, renewable energy accommodation and etc. It delivers more power over long distance with less right-of-way and fewer overheadlines or cables. The VSC-HVDC applies IGBT module has technical advantages and more application fields consequently.



VSC-HVDC Reference

- Zhangbei ±500kV/3GW/3GW/1.5GW/1.5GW 4-terminal DC Grid in China
- Sanshandao ±500kV/2GW/3GW offshore wind farm VSC-HVDC in China
- Gansu-Zhejiang ±800kV/8GW VSC-HVDC project in China
- COA-WOA ±500kV/3GW VSC-HVDC project in Saudi Arabia
- Guangdong ±300kV/3GW BTB HVDC project in China

±500kV Zhangbei DC grid, China

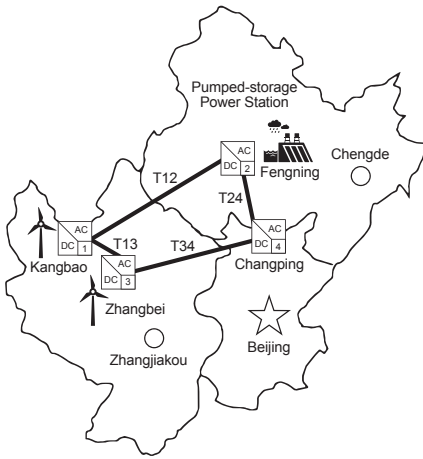
Zhangbei VSC-HVDC grid is a 4 terminal DC grid with ±500kV DC voltage rating, with each terminal rated as 3000MW/3000MW/1500MW/1500MW. Zhangbei area and Kangbao area are the bases for renewable generation, these renewable power is transmitted to load center-Beijing. While Fengning will act as a pump storage plant to counteract intermittence of renewables.



Rated DC voltage	±500kV
Rated power	3000MW/3000MW/1500MW/1500MW
Topology	Bipolar
Converter technology	MMC
Type of construction	Overhead transmission lines

Basic Information of Zhangbei DC Grid

Considering highly fluctuation voltage of wind and solar power, when a high volume of green energy connects to weak AC grid directly, may result in a very unstable grid-connection for renewable sources. For the purpose of solving the challenges above, VSC-HVDC became the best option.



System Schematic Diagram

Sanshandao ±500kV/2GW/3GW Offshore Wind Farm VSC-HVDC in China

The Sanshandao offshore wind farm VSC-HVDC Project is constructed in three phases, with Phase I currently under development. Adopting a DC voltage level of ±500 kV, the offshore converter station has a rated capacity of 2 GW and the onshore converter station a rated capacity of 3 GW. Phase I is scheduled for commissioning in October 2026.