



The Future of HVDC in the APAC Region: Cross-Border Interconnections and Energy Security

by Asad Tariq, *Research Analyst – at Power Technology Research*

- The APAC HVDC market is expected to grow with CAGR of 5% from 2022 onwards till 2026.
- The APAC HVDC market is dominated by LCC HVDC technology mainly due to high power transmission capability over the long distances and the affordability of the LCC HVDC technology.
- In the recent years several HVDC projects were installed in the APAC countries including Japan, Australia and Pakistan.

As per the assessment of Power Technology Research, the APAC HVDC market is expected to grow with CAGR of 5% from 2022 onwards till 2026. This projection is in line with the major transmission capacity expansion projects to cater the growing industry as well as increasing load demand in the key countries of the region. China and India have been the leading demand centers for the HVDC systems in the region over the last decade due to their growing demand for electricity and the trend of industrialization in their respective countries. China installed 205 GW of HVDC transmission capacity, India installed 20 GW of HVDC transmission capacity while South Korea installed 6.1 GW of HVDC transmission capacity from 2012-2021.

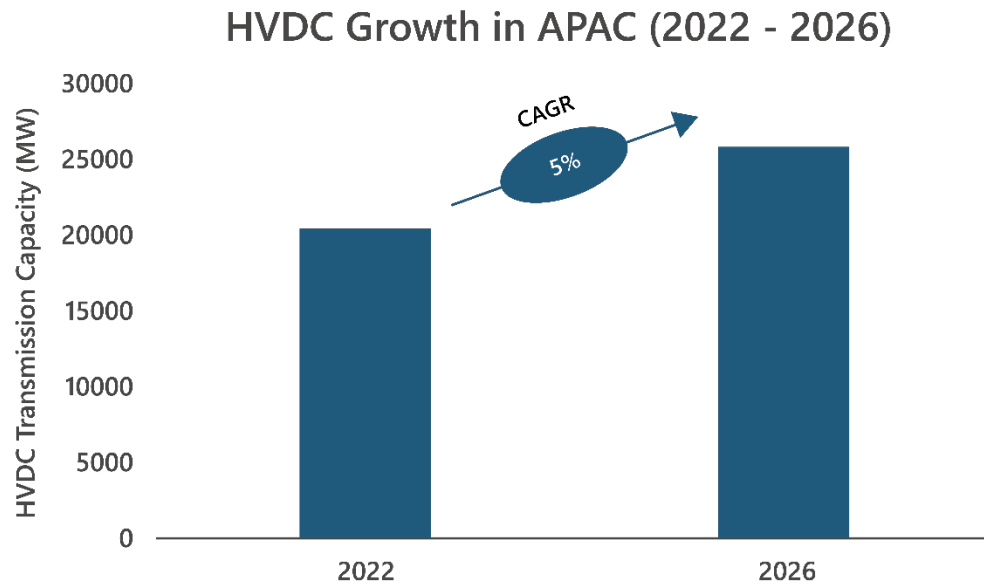


Figure 1: HVDC Growth in APAC (2022-2026).
Source: Power Technology Research

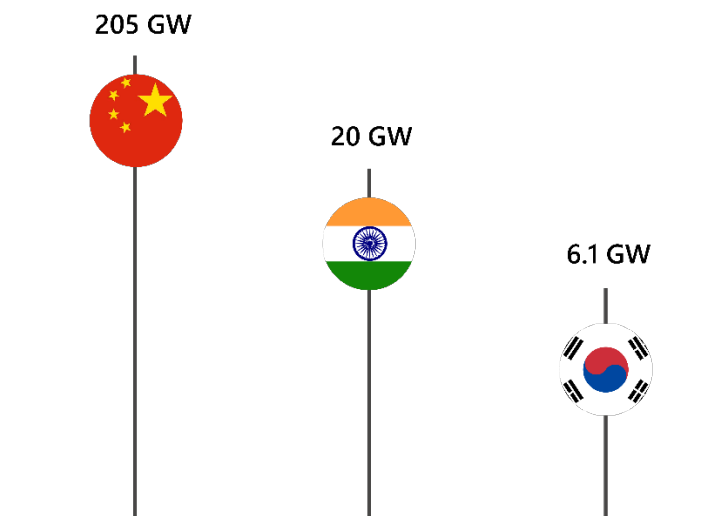


Figure 2: Top Three Countries in Terms of Annual Capacity Additions in HVDC Transmission Capacity (2012-2021).
Source: Power Technology Research

Technology Preference in the Region

The APAC HVDC market is dominated by LCC HVDC technology mainly due to high power transmission capability over the long distances and the affordability of the LCC HVDC technology as compared to VSC HVDC technology. Till 2000, the APAC HVDC market was completely dominated by LCC HVDC technology, and the monopoly remained unchallenged until 2010. Although, in the early 2000s Australia deployed several VSC HVDC systems to transmit power across country.

APAC HVDC market adopted the VSC HVDC technology at a slower pace as compared to the European and the North American HVDC market. From 2012-2021 VSC HVDC technology did gain traction in the APAC market due to expansion of renewables in the region specifically in China where several VSC HVDC systems began their commercial operations. Japan and India have also invested in deploying VSC HVDC technology in recent years.

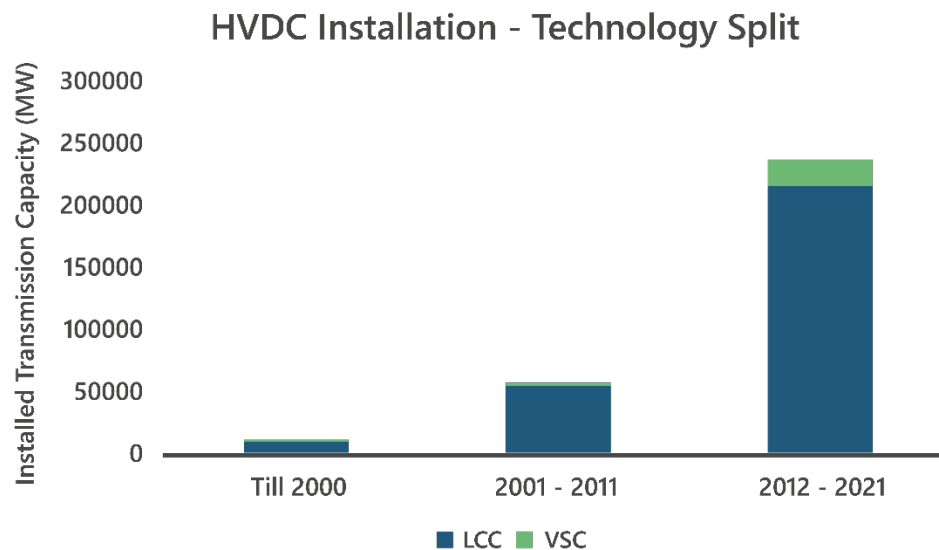


Figure 3: HVDC Installation Technology Split.
Source: Power Technology Research

Key Market Developments in APAC

In the recent years several HVDC projects were installed in the APAC countries including Japan, Australia and Pakistan. In 2019, Hitachi Energy was granted a contract to deliver back-to-back VSC HVDC system to Japan that is expected to have the capacity to deliver power up to 900 MW by 2027. In order to serve the load centers, Tokyo-Chubu LCC HVDC system was deployed by ABB in Japan in 2021. The LCC HVDC system has a bidirectional transmission capacity of 1 GW. Australia has announced plans to supply electricity to Singapore through a 10 GW solar power plant via offshore route and with the help of HVDC transmission technology. The HVDC power cable project will be led by SunCable and it is expected to be completed by 2027. Under China Pakistan Economic Corridor, Pakistan has installed +/- 660 kV Matiari -Lahore HVDC transmission line last year which is expected to transmit 35 billion kWh per annum.

Looking Ahead

HVDC market of the APAC region is largely driven by the transmission expansion plans of different countries that are moving to transmit power to demand centers over long distances. However, China and South Korea have deployed HVDC technology to integrate renewable energy generation with the power grid. HVDC technology is currently in the early stages of development in the region and in the upcoming years it is expected that the countries in the region (mostly underdeveloped countries) will deploy LCC HVDC technology instead of VSC HVDC because it is a cheaper technology. Cross border interconnections are gaining traction in the APAC region as countries move to establish electricity trade networks within the region for the purpose of energy security and to reduce the basket price of electricity. It is also anticipated that as the countries push to increase the share of renewables in the generation capacity mix the HVDC technology will gain traction in the region.

Contact:

Hassan Zaheer - Exec. Director Client Relations & Advisory

+49-89-12250950

(hassan.zaheer@ptr.inc)