

## Energy Security Concerns Post the Russia-Ukraine Conflict to Trigger Growth in the UK's HVDC Market

by Asad Tariq, Research Analyst at Power Technology Research

- Following the Russia-Ukraine conflict, the UK has increased the target for its offshore wind generation capacity to 50 GW by 2030.
- Currently, projects accounting for 86 GW of generation capacity are in the pipeline in the UK and are expected to be realized in the coming years (around 2030).
- The UK and its neighboring nations will invest in HVDC technology to cover the gap of nearly 12 GW of transmission capacity.

Following the Russia-Ukraine conflict, the UK has increased the target for its offshore wind generation capacity to 50 GW by 2030, out of concerns for energy security. This will require timely as well as large-scale investments in the transmission network of the country in order for the UK to achieve its green energy and security goals. In recent years, the HVDC (high voltage direct current) transmission technology has emerged as one of the most viable options to evacuate offshore wind energy from the ocean to load centers, mainly due to features that lead to much lower power losses during transmission as compared to the AC transmission technology.

Currently, projects accounting for 86 GW of generation capacity are in the pipeline in the UK and are expected to be realized in the coming years (around 2030). This significant growth in the offshore wind sector is largely driven by massive leasing round announcements by The Crown Estate and Crown Estate Scotland, accounting for 8 GW and 25 GW of offshore wind generation capacity, respectively. It is interesting to note that the projected expansion of the offshore wind generation capacity of the UK even surpasses expected developments in China and the U.S.

## The Impact of the UK's Renewable Expansion

The UK's inclination towards expanding offshore wind generation is not an isolated event. In fact, it has encouraged constituent countries to set ambitious offshore wind energy generation targets of their own. For instance, SSE Renewables has made a formal request to the Irish Government to increase its current target of 5 GW (cumulative) offshore wind capacity by 2030. To that end, SSE Renewables has initiated work on three main offshore wind energy projects with a combined generation capacity of around 2 GW in Ireland.

SSE Renewables, in coordination with the government of Scotland and the UK, is also planning to tap into abundant renewable resources in the North of Scotland and transmit them to demand centers in Great Britain.

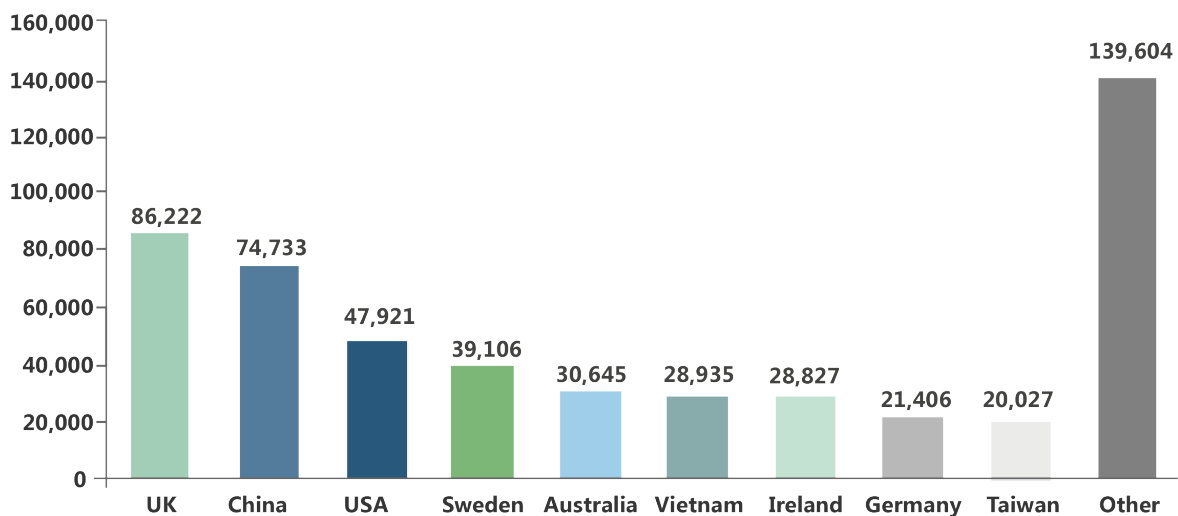


Figure 1: Planned HVDC projects by country (MW).

Source: Renewable UK

## HVDC Expansion in the UK

The selection of technology while integrating offshore wind generation resources with the onshore grid infrastructure is critical for the successful expansion of the offshore sector. Globally, to date, HVDC technology is considered as the most economical and efficient solution for the integration of offshore wind generation assets with the grid. The UK, currently, has plans to increase the installed generation capacity to 38.4 GW, including cross-border HVDC interconnections accounting for 16.2 GW of capacity and nationwide accounting for 8.8 GW of capacity.

The UK maintains a special focus on developing cross-border interconnections with other countries in the region. In terms of installed capacity, the UK is moving to establish HVDC interconnections with France, Ireland, and Germany accounting for additional transmission capacity of 5.8 GW, 3.7 GW, and 2.7 GW, respectively.

Key HVDC transmission projects which will increase the cross-border transmission capacity of the UK with other countries include Grid Link Interconnector (UK-France), Eastern Link HVDC (Nationwide), NeuConnect (UK-Germany),

MAREX Organic Power Interconnectors. All of these interconnections will be utilizing Voltage Source Converter HVDC technology, known for its quick response and high efficiency.

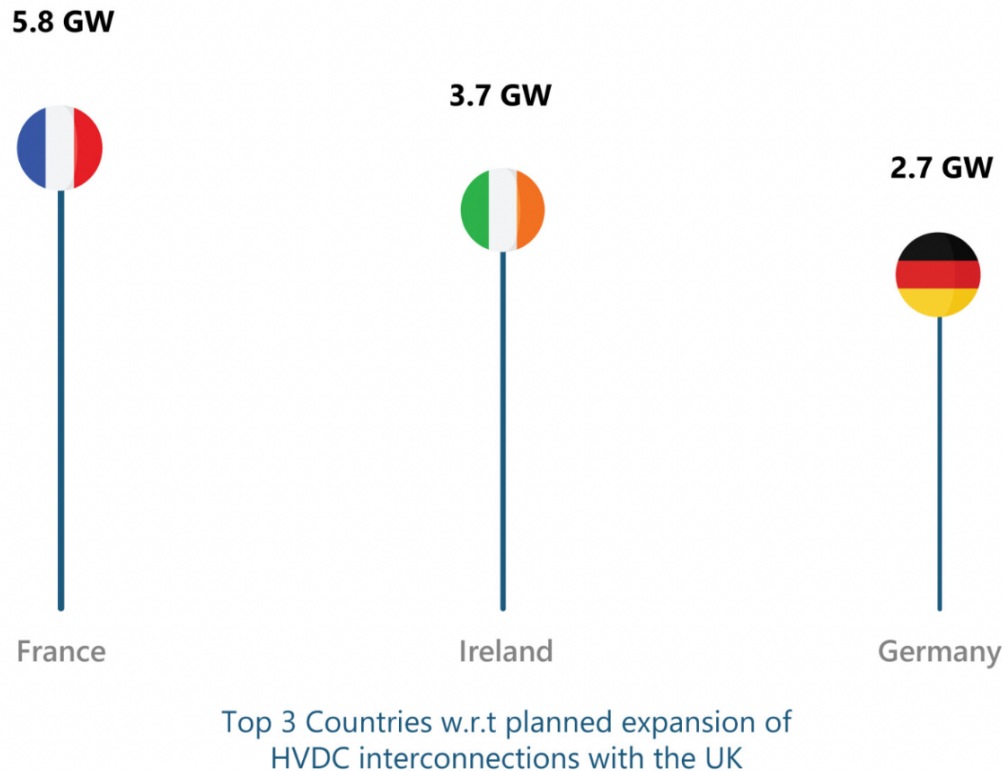


Figure 2: Top 3 Countries with respect to the planned expansion of HVDC interconnections with the UK.  
Source: Power Technology Research

## Looking Ahead

The UK has exhibited a strong inclination towards the expansion of its offshore wind generation capacity, in order to enhance the energy security of the country in light of the Russia-Ukraine conflict. The UK has, in turn, increased the targets for offshore wind generation in the generation mix which would require a proportionate enhancement in the transmission infrastructure. Currently, the planned addition of HVDC transmission capacity of 25 GW will take the total installed transmission capacity of the UK to nearly 38 GW, by 2030.

According to the projected growth of the offshore sector, the UK HVDC transmission capacity must be able to transmit 50 GW of the offshore generation. This suggests that the UK and its neighboring nations will invest in HVDC technology to cover the gap of nearly 12 GW of transmission capacity.

**Contact:**

Hassan Zaheer - Exec. Director Client Relations & Advisory

+49-89-12250950

([hassan.zaheer@powertechresearch.com](mailto:hassan.zaheer@powertechresearch.com))