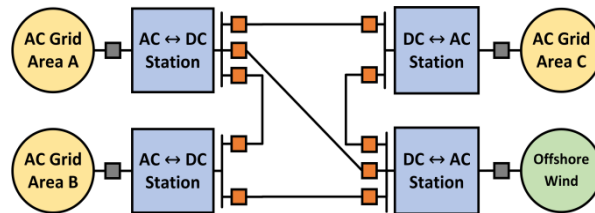


Technology assessment and economic modelling of HVDC Interconnectors

Issue

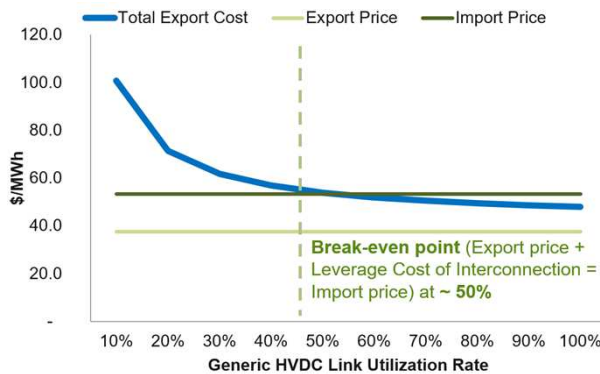
While bulk energy transmission/interconnection is possible using both High-Voltage AC (HVAC) and HVDC links, HVDC is more suitable for long overhead distances and offshore transmission. Energy transmission using DC technology is increasing due to a greater need to transport energy longer distances as well as the increasing integration of offshore windfarms as well as the many technological advantages compared to AC (DC is expected to exceed a global installed capacity of 440 GW around 2022). New HVDC stations are capable of supporting neighbouring AC grids with ancillary energy services and intermediate DC stations are required also in case of interconnecting asynchronous neighbouring AC networks, such as the Al-Fadhili station interconnecting asynchronous GCC countries networks. However, it necessary to carry out economic and technical analysis to assess different investment options for the involved stakeholders (e.g., building local generation vs. building an interconnector that imports energy from neighbouring areas). An integrated technical and economic, tool provides significant assistance in this process.

The use of HVDC connectors increases continuously worldwide.



Solution

A comprehensive technical and economic study has been carried out to summarise key aspects of different HVDC transmission options. Analysing the available station technologies (Voltage-Source vs. Current-Source converters), as well as transmission and protection options to understand the impact of using various alternatives. A relevant HVDC technology progress outlook, showcasing its impact on the future global transmission scene was also included. In addition, two detailed economic models (top-down and bottom-up) based on statistical and technical data were developed and benchmarked to assess potential investment costs for future projects under a wide range of possible scenarios (e.g., offshore vs. onshore, VSC vs. LCC).



Assessment of the total cost and market price/cost to provide a break-even point for each project.

Impact

The HVDC interconnectors study provides a thorough technical and economic reference for different energy transmission stakeholders, such as Iberdrola and other utilities. Accordingly, the conducted study identifies the key development factors for each system component for an easier benchmarking process. The future technology outlook provides a roadmap of the market's preference for the next decade and the economic models provide a powerful tool in assessing the investment viability and risks within a reasonable order of magnitude.

