

In our literature review, we explored several studies. First, Jia et al. (2018) developed an optimization method for placing synchronous condensers to enhance short circuit ratios in power grids, particularly those integrating renewable energy sources. Their method, applied to a Danish power system, aimed at cost minimization while boosting grid stability. Next, Marken et al. (2011) discussed the various benefits of synchronous condensers in grids with high renewable energy penetration. They highlighted modern technological advances that improve both grid stability and dynamic response, especially in isolated systems and those near HVDC installations. Lastly, Zhou et al. (2019) conducted a comparative analysis between synchronous condensers and static VAR compensators for dynamic voltage support. Their study underscored the superior performance of synchronous condensers in maintaining voltage stability under low voltage conditions, validated by extensive performance analysis and grid simulations