

ABSTRACT

The power utilities are face significant challenges in maintaining power quality standards with the increasing demand for reliable and high-quality power supply. Power quality issues such as voltage fluctuations, harmonic distortions, and reactive power imbalances can lead to equipment failures, inefficiencies, and increased operational costs. Static Synchronous Compensator (STATCOM) emerges as a promising solution to address these challenges by providing dynamic reactive power support and voltage control. The fundamental principles of STATCOM operations highlighting its ability to regulate voltage and mitigate power quality disturbances. Various control strategies employed in STATCOM systems, including voltage control, reactive power compensation, and harmonic elimination techniques, are reviewed. Additionally, the integration of STATCOM into power systems, including its placement and sizing considerations, is explored.