

FLEXIBLE AC TRANSMISSION SYSTEM

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ABSTRACT

The AC transmission system has various limits classified as static limits and dynamic limits [1-3]. These inherent power system limits restrict the power transaction, which lead to the under utilization of the existing transmission resources. Traditionally, fixed or mechanically switched shunt and series capacitors, reactors and synchronous generators were being used to solve much of the problem. However, there are restrictions as to the use of these conventional devices. Desired performance was not being able to achieve effectively. Wear and tear in the mechanical components and slow response were the heart of the problems. There was greater need for the alternative technology made of solid state devices with fast response characteristics. The need was further fuelled by worldwide restructuring of electric utilities, increasing Environmental and efficiency regulations and difficulty in getting permit and right of way for the construction of overhead transmission lines [4]. This, together with the invention of Thyristor switch (semiconductor device), opened the door for the development of power electronics devices known as Flexible AC Transmission Systems (FACTS) controllers. The path from historical Thyristor based FACTS controllers to modern state-of-the-art voltage source converters based FACTS controllers, was made possible due to rapid advances in high power semiconductor devices [1-3]. FACTS controllers have been in use in utilities around the world since 1970s, when the first utility demonstration of first family of FACTS named as Static Var Compensator (SVC) was accomplished. Since then the large effort was put in research and development of FACTS controllers.

KEYWORDS: AC Transmission, High-Power Electronics, Flexible AC Transmission, SVC