



## SMART Power Flow Controllers – A Necessity for Future Power Grid

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Tuesday, November 15 • 11:00 AM – Noon (PT) • EME 26

### OVERVIEW

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Power flow control techniques have been practiced, from using inductors, capacitors, transformers and load tap changers in the earlier days of electrical engineering to power electronics-based solutions in recent years. Even though the costs and complexities of the available solutions vary widely, the basic underlying theory of power flow control is still the same as it always has been. The question is which solution one should employ. The answer depends on knowing what the true need is. The power industry's pressing need for the most economical ways to transfer bulk power along a desired path may be met by building new transmission lines, which is a long and costly process. Alternately, it may be quicker and cheaper to utilize the existing transmission lines more efficiently. The key is to identify the underutilized transmission lines and harness their dormant capacities to increase the power flows to the lines' thermal limits.

The presentation is designed to provide the basic principles of power flow control theory, an overview of the most commonly used power flow controllers, and future trends. The audience will hear from an expert who actually designed and commissioned a number of power electronics-based FACTS controllers since their inceptions in the 1990s.

### BIO

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**Dr. Kalyan Sen** is the President & Chief Technology Officer of Sen Engineering Solutions, Inc. ([www.sentransformer.com](http://www.sentransformer.com)) that specializes in developing SMART power flow controllers—a functional requirements-based and cost-effective solution. Kalyan worked 33 years in academia and industry. He was a key member of the Flexible Alternating Current Transmission Systems (FACTS) development team at the Westinghouse Science & Technology Center for which he became a Westinghouse Fellow Engineer. He contributed to concept development, simulation, design, and commissioning of FACTS projects at Westinghouse. He conceived some of the basic concepts in power flow control technology for which he was elevated to the IEEE Fellow grade with the citation: *for the development and application of power flow control technology*. He is the Co-inventor of the Sen Transformer.

