EPE-PEMC 2012: ECCE Europe
15th International Power Electronics and Motion Control Conference
Novi Sad, Republic of Serbia

INVITED SPECIAL SESSION:
"Developing DC transmission and Distribution systems"

organised by

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Call for Papers

In the recent years there has been significant research on developing facilitating technologies for DC power systems from industrial power levels through distribution systems to highest power transmission systems. It is recognized that most industrial/domestic loads and storage systems would preferably connect to DC supply in order to avoid numerous AC/DC conversions. The DC distribution systems can utilize smaller cables with less costs and losses, eliminate reactive power and significantly reduce distance or stability limitations. The DC microgrids are favored solution for connecting converter-interfaced loads and renewable sources and they are one of the underlying technologies for smart grid vision. The DC transmission grids, as an extension of HVDC, will facilitate much larger power transfers over longer distances and they are enabling technology for intercontinental DC supergrids and regional subsea grids like proposed North Sea DC grid.

The AC power transmission and distribution has been universally accepted worldwide in the 20th century primarily because of the simplicity with voltage stepping and fault isolation. Although simple DC systems have been demonstrated, one of the most significant technical challenges facing power industry is the development of cost effective, highly reliable and high performance DC systems. The rapid development of power electronics components and systems in the past 10-20 years plays crucial role in achieving performance and reliability of DC systems at a level comparable with AC systems.

The voltage-source and current source AC/DC converters are nowadays widely accepted at GW power levels, but the cost, losses, harmonic pollution and issues with DC (or AC) faults are still significant barriers in wider adoption. The recent technology breakthrough with MMC (modular multilevel converters) technology markedly eliminates losses and harmonics, as adoption issues.

Some manufacturers already offer MW size DC wind generators as a commercial product. The DC/DC power conversion has been achieved at medium/high power levels in industrial applications and marine propulsion and it is now required for wind farm DC collection grids. The remaining technical challenges are linked with cost-effectiveness in scaling to MW/GW power levels, system weight and volume, bidirectional power flow and other performance issues with interfacing storage systems, DC fault isolation, and others.

The semiconductor-based DC fault isolation is already being tested in high-voltage laboratories. An electronic DC circuit breaker with 2ms breaking time and a competitive costs of 1/6th of full VSC is now a technical reality. However, the system level protection coordination over large geographical distance in *ms* time frame is the principal technical challenge in developing DC supergrids. The semiconductor based fault current limiters may offer intermediate solution for DC faults in smaller scale DC systems.

Submission procedure: The same as for regular papers.
Submission deadline: 19th December 2011

All the instructions for paper submission are included on the conference website:
http://epe-pemc2012.com/