

HVDC

international workshop

Operational experience and technological development for application worldwide

Venice, Italy ■ March 28-30, 2017



Workshop overview

High Voltage Direct Current (HVDC) transmission draws an ever-increasing interest of TSOs in Europe and all over the world.

Major developments in technology make HVDC in many cases more reliable, easy to apply and operate, economically affordable. Wider applications are now possible and many projects are under development, making HVDC an even more interesting business than before also for manufacturers and engineering companies.

The following topics are within the scope of the Workshop:

- HVDC operational experience.
- Outlook of HVDC projects planned and at design or construction stage.
- Latest (ongoing) and next coming developments in HVDC technology (converter stations, cables, overhead lines).
- Market perspective

Qualified representatives of TSOs, Research companies, Manufacturers, Engineering consulting firms, will present their experience and developments and their mind about future applications.

Participation is expected of international representatives of electrical and electromechanical industries, consultants, research centres, etc..

Secretariat:

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Technical Programme

Details on the technical program of the Workshop will be available by contacting the following address: roberto.caldon@unipd.it

Tuesday 28th March (afternoon)

Tutorial

A tutorial course on innovative aspects of HVDC technology and the impact in the Transmission Network will be held before the opening of the Workshop (with a sufficient number of participants)

- *Interaction of HVDC systems with the AC networks* • CESI
- *Experience of VSC HVDC technology and project in China Southern Power Grid* • Hong Rao - SEPRI

- *Multilevel High Power Converters for Voltage-Source HVDC and relevant Research Endeavours* • G.E.
- *AC network harmonic impedance and HVDC harmonic performance* • CESI
- *Control of HVDC grid converters and offshore wind farms for the provision of ancillary services and grid code compliance* • A. Pitto - RSE
- *HVDC Cables for high performance transmission lines* • D. Pietribiasi, M. Marelli - Prysmian

Wednesday 29th March

Workshop First day sessions

Keynote address

Ongoing and next coming developments in HVDC:

- *Power electronic devices and Converters - HVDC technologies update* • Oriol Gomis-Bellmunt - CITCEA-UPC | ETS d'Enginyeria Industrial de Barcelona (TBC)
- *Operating experience of existing HVDC Systems - Operating experience of HVDC in Power Systems characterized by inverted based dispersed generation* • G. Giannuzzi, M. Rebolini - TERNA
- *SK4, bipolar hybrid (LCC+VSC) HVDC link* • ABB
- *Improving power systems with innovations in HVDC technology* • H. Müller - Siemens
- *Temporary overvoltages in ungrounded neutral HVDC - VSC systems: a question of uncertainties* • M. Marzinotto, F. Palone, M. Rebolini - TERNA
- *Design and operation experience of the World's first Multi-terminal VSC-HVDC System* • H. Rao, Y. Luo, J. Chen, S. Xu, P. Bordignon, H. Weng - SEPRI, RXPE
- *Testing experiences on extruded cable systems up to 525kV in the first third party worldwide laboratory* • U. Vercellotti - CESI

Outlook of HVDC projects:

- *Hybrid interconnections between synchronous areas - Test and Operation of $\pm 350\text{kV}/1000\text{MW}$ Back-to-Back VSC-HVDC in China Southern Power Grid* • H. Rao, S. Xu, C. Zou, P. Bordignon, R. Yi - RXPE
- *New HVDC Projects implementation/refurbishment - Technical requirements and specification of large HVDC transmission systems* • CESI
- *Celilo, refurbishment of a huge LCC HVDC installation with innovative solutions* • ABB
- *Research and Development of Multi-terminal Hybrid UHVSC-HVDC in China Southern Power Grid* • H. Rao, S. Xu, Y. Zhou, P. Bordignon, R. Yi - SEPRI (CSG), RXPE
- *Technical issues in the development of HVDC return sea electrodes for High Power links* • M. Nervi, P. Molino - University of Genova, S. Malgarotti - CESI
- *Flexible Power Flow Control in HVDC grids* • Jun Liang - Cardiff University

Thursday 30th March

Workshop Second day (morning) sessions

- *HVDC grid operation - Converter interoperability in multi-vendor HVDC-VSC systems* • O. Despouys - RTE
- *HVDC grids and offshore wind farms: ongoing contribution from BEST PATHS Demo 1* • Azpiri Irazabal - Iberdrola, Carlos E. Ugalde-Loo - Cardiff University
- *Evaluation of offshore HVDC grid configuration options* • K. Bell - Strathclyde University
- *Fast Frequency Support from Meshed HVDC Schemes: Control Design and Experimental Verification* • Daniel Adeuyi - Cardiff University
- *HVDC Grid protection* • Willem Leterme - KUL
- *Multi-terminal HVDC operation in a weakly interconnected system: results from Best Paths Demo 3* • D. Cirio, A. Iaria, A. Pitto - RSE

Tutorial and Workshop Details

Dates: **Tutorial** 28 March 2017 (afternoon)
Workshop 29 March - 30 March 2017

Location: Venice International University - St. Servolo Island Campus - Venice - Italy

Web Site: <http://convegnaieit.it/HVDC2017>

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