

AEIT HVDC

international conference 2025

Operational Experience and
Technological Development
for Application Worldwide

Genova, Italy ■ May 29-30 ■ 2025



Overview

High Voltage Direct Current (HVDC) transmission draws a growing interest of TSO in Europe and all over the world.

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

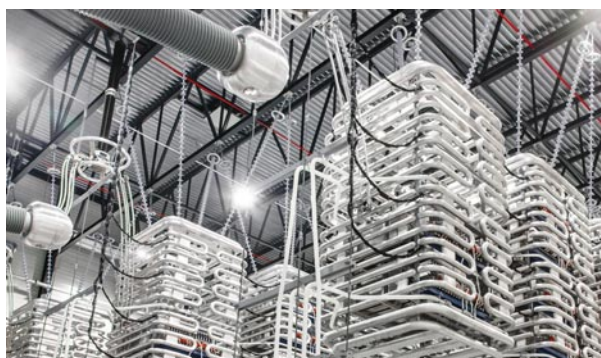
AEIT HVDC International Conference 2025 will serve as an international forum for the presentation and exchange of system and technological advances, research results and real applications in the broad fields of HVDC Power Systems.

The 2025 edition of the conference also aims to feature presentations on medium and low-voltage topics, reflecting the ongoing interest from DSOs and in view of future initiatives, thus addressing applications in distribution networks and microgrids, including both terrestrial and marine contexts, such as power systems for ships and harbors.

In addition to the HVDC, MVDC and LVDC projects, technologies, operating experiences and applications listed further on in the topics of interest, the following issues are also within the scope of the conference:

- HVDC, MVDC and LVDC applications, technologies, and future perspectives
- Sustainability and environmental aspects
- New developments within the HVDC cable system
- Market perspectives.

AEIT HVDC International Conference 2025 will bring together leading utilities, universities, transmission system operators, distribution system operators, consultants, equipment suppliers, and solution providers to help shape the future of power transmission industry.



PROGRAMME

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Dirk Van Hertem • KU Leuven, Belgium
Dario Zaninelli • Politecnico di Milano, Italy

Thursday, May 29

9,00/18,45

09:00 ▶ Registration & Welcome Coffee

09:45 ▶ Welcome Statements

Giuseppe Parise • *AEIT General President*

Federico Delfino • *Magnifico Rettore Università di Genova*

Marcello Capra • *Senior Advisor MASE and Italian Delegate SET Plan EU*

Alberto Birga • *AEIT Sezione Ligure Chair*

Stefano Massucco • *AEE Society Chair and Local Chair*

Enrico Maria Carlini • *Terna* • *CIGRE Italy President* • *AEIT General Vicepresident* • *AEIT HVDC 2025 General Chair*

10:15 ▶ Keynote Speech ▶ Hypergrid Terna • Enrico M. Carlini - *Terna*

10:35 ▶ Contribution to the HVDC Landscape • Daniele Buscemi - *Trench Group*

10:55 ▶ Towards Zero Losses in Energy Transmission: Bridging the Gap Between Advanced Research and Industrial Solutions for the Grid • Pietro Corsaro - *ASG Superconductors*

11:15 ▶ Round Table I

Experiences and Perspectives for HVDC technologies and grids

Chair: Dirk Van Hertem • *KU Leuven, Chair SET Plan IWG DC*

Panel:

Hitachi Energy • Arman Derviskadic

Rongxin HUIKO Electric • Paolo Bordignon

Redelfi • Sabina Pinto

Ricerca sul Sistema Energetico - RSE • Chiara Gandolfi

Siemens Energy • Volker Hussennether

Terna • Giorgio M. Giannuzzi

GE Vernova • Eros Stella

13:00 ▶ Lunch

14:00 ▶ Technical Session I ▶ Modelling, Analysis & Control

Chair: Roberto Caldon • *AEIT*

▶ **01_01 • On Digital Twin for Multi-terminal HVDC: Application to Fault Location on the DC side**
• Sunil Unnikrishnan - *The MathWorks, The Netherlands*; Rajarshi Dutta - *MathWorks India, India*; Feng He, Francesca Perino - *The MathWorks, Italy*; Sid A. Attia - *The MathWorks, Germany*

▶ **01_02 • Assessment of the Impact of HVDC Links on Frequency Containment Capacity in a Portion of the Italian Transmission Network** • Andrea Bonfiglio, Matteo Fresia, Marco Invernizzi, Renato Procopio - *University of Genoa, Italy*; Giorgio Maria Giannuzzi, Giuseppe Lisciandrello, Luca Orrù, Cosimo Pisani, Giovanni Rinzo - *Terna, Italy*

▶ **01_03 • Evaluating Renewable Energy Control Strategies Integrated with HVDC Droop Control for Sicily's Frequency Stability** • Mohammad Qawaqneh, Gaetano Zizzo, Antony Vasile, Salvatore Favuzza - *University of Palermo, Italy*; Angelo L'Abbate, Lorenzo Vitulano - *Ricerca sul Sistema Energetico - RSE, Italy*

▶ **01_04 • Two-stage decoupled Security-Constrained Redispatching for hybrid AC/DC grids**
• Emanuele Ciapessoni, Diego Cirio, Andrea Pitto - *Ricerca sul Sistema Energetico - RSE, Italy*

▶ **01_05 • Implementing HVDC Line Modeling in MOST Simulation Environment for Multi-period Optimal Power Flow** • Sebastian Dambone Sessa, Francesco Sanniti - *University of Padova, Italy*; Angelo L'Abbate, Lorenzo Vitulano - *Ricerca sul Sistema Energetico - RSE, Italy*

▶ **01_06 • Advancing HVDC Control & Protection Systems: the role of Software-in-the-Loop Approaches** • Arman Derviskadic, Benedikt Kurth, Joan Hernandez - *Hitachi Energy, Sweden*

▶ **01_07 • Lightning Performance Assessment of the New ± 500 kV HVDC Overhead Lines of the Italian Transmission Grid** • Alexios Ioannidis, Francesco Palone, Massimo Marzinotto, Roberto Spezie - *Terna, Italy*

15:30 ► Technical Session II ► Modelling, Analysis & Planning

Chair: Angelo L'Abbate - Ricerca sul Sistema Energetico-RSE

- **02_01 • Reviewing High Voltage Transmission Technologies for Future Transmission Grids** • Ricardo Gallo Caicedo, Giacomo Bastianel, Hakan Ergun, Dirk Van Hertem - *KU Leuven/ETC-EnergyVille, Belgium*
- **02_02 • Analysis of the Lightning-Induced Overvoltages on the Land Cable Insulation of an Electrode Circuit: A Case Study of the Italian HVDC Grid** • Alexios Ioannidis, Sino Patti, Samuel De Maria, Massimo Marzinotto, Roberto Spezie - *Terna, Italy*
- **02_03 • Modelling methodology of a Preliminary Electrical Design of an HVAC or HVDC Offshore Wind Farm** • Federico Cerchi, Nicolò Nobile, Alessandra Imperadore - *RINA Consulting, Italy*
- **02_04 • Planning new cross-Mediterranean HVDC submarine infrastructures: a methodological approach for integrating techno-economic analysis and environmental/spatial assessment** • Angelo L'Abbate - *Ricerca sul Sistema Energetico - RSE, Italy*; Mircea Ardelean - *West University of Timisoara, Romania*
- **02_05 • Voltage Flicker Compensation Through an HVDC Connected Offshore Wind Farm** • Arkaitz Rabanal - *Norwegian University of Science and Technology, Norway*; Elisabetta Tedeschi - *Norwegian University of Science and Technology, Norway and University of Trento, Italy*
- **02_06 • HVDC Project Execution through the power of BIM and Digital Twins** • Maikel Perez Cabana, Chandras Sekhar Rachannagari, Vaibhav Shrivastava - *Hitachi Energy, Sweden*
- **02_07 • Reactive Power Compensation System for the Chilean HVDC Transmission Line** • Jorge Araneda, Yuyuniz Galvez, Luis Morán - *Universidad de Concepción, Chile*; Luis Vaccaro - *University of Genoa, Italy*

17:00 ► Coffee break

17:15 ► Technical Session III ► System Components, Technologies, Tests

Chair: Mario Nervi - University of Genoa

- **03_01 • Life Estimation of Extruded HVDC Cables under Prequalification Test Conditions** • Bassel Diban, Giovanni Mazzanti, Rolando Ezequiel Diaz - *University of Bologna, Italy*
- **03_02 • The design of the new ± 525 kV HVDC overhead line tower for the crossing of Po River** • Luca Buono, Gaia Leone, Alessia Moresi, Francesco Palone, Lorenzo Papi, Pierluigi Vacante, Roberto Spezie - *Terna, Italy*
- **03_03 • HVDC Offshore Return Electrodes: light or heavy?** • Massimo Brignone, Daniele Mestriner, Mario Nervi - *University of Genoa, Italy*; Massimo Marzinotto - *Terna, Italy*
- **03_04 • Evaluation of the Residual Current Breaker (RCB) Influence on the Optimal Sizing of Hybrid HVDC Circuit Breakers** • Renato Sgriscia, Stefano Lauria - *Sapienza University of Rome, Italy*; Francesca Pizzimenti, Francesco Palone - *Terna Rete Italia, Italy*
- **03_05 • Submarine Return Electrodes vs. Dedicated Metallic Returns: A Comparative Cost/Benefit Analysis** • Davide Pietribiasi, Marco Cuzzocrea - *Prysmian, Italy*; Mario Nervi - *University of Genoa, Italy*
- **03_06 • Enhanced Mechanical Operations to enable flexible control and protection in AC/DC grids** • Corrado Rizzi, Giovanni Malatesta, Alessandro Stucchi, Marco Riva - *ABB, Italy*; Su Zhao, Anna M. Andersson - *ABB, Sweden*
- **03_07 • Experiences on sizing and condition monitoring of composite insulators for HVDC disconnector application** • Eros Stella, Rodolfo Saraceni, Marco Nosilati, Davide Momesso, Enrico Zozzolo - *GE Vernova, Italy*

18:45 ► Closure

20:45 ► Conference Dinner

ANME

Friday, May 30

9,00/18,00

09:00 ► Round Table II

Innovation and Developments in HVDC/MVDC/LVDC

Chairs: Angelo L'Abbate, Eleonora Riva Sanseverino • *Italy's representatives in SET Plan IWG DC*

► Keynote Speech • Dirk Van Hertem - KU Leuven, Chair SET Plan IWG DC

Panel:

ABB - Marco Riva

AIZOON - Michele Palanza

ASG Superconductors - Gianni Grasso

ASM Terni - Huda Mughari

Fincantieri/Cetena - Federico Olcese

GE Vernova - Christof Sihler

Prysmian Group - Davide Pietribiasi

Ricerca sul Sistema Energetico - RSE - Chiara Gandolfi

Rina - Andrea Bombardi

Terna - Massimo Marzinotto

11:30 ► Coffee break

11:45 ► Technical Session IV ► MVDC – LVDC, Systems

Chair: Stefano Massucco • AEIT-AEE

► **04_01 • How MVDC distribution can impact AC grids: research topics and CHIL validation** • Pietro Carmine, Riccardo Chiumeo, Alessio Clerici, Giovanni Goletti, Alessandro Veroni - *Ricerca sul Sistema Energetico - RSE, Italy*

► **04_02 • The THEUS project towards transmission and distribution hybrid AC/DC grids: focus on Italian activities** • Mattia Cabiati, Diego Cirio, Daniele Clerici, Chiara Gandolfi, Angelo L'Abbate, Marco Rossi, Alessandro Veroni - *Ricerca sul Sistema Energetico - RSE, Italy*; Tommaso Bragatto, Alberto Geri, Marco Maccioni - *Sapienza University of Rome, Italy*; Massimo Cresta, Huda Mughari, Francesca Santori - *ASM Terni, Italy*; Massimiliano Amato, Marco Riva - *ABB, Italy*; Johanna Navarrete-Emretsson - *ABB, Sweden*

► **04_03 • Subtransient Fault in a DC Distribution Network with Considering Upstream Grid** • Milad Rahimpour Behbahani, Filipe Ricardo Gadotti, Philipp Schmitz, Steffen Schlegel, Dirk Westermann - *Technische Universität Ilmenau, Germany*

► **04_04 • Validation of Hybrid AC/DC Distribution Grids in the HYPERRIDE Project: Integration, Operation, and Performance in a DSO Environment** • Huda Mughari, Massimo Cresta - *ASM Terni, Italy*; Roberto Antonini - *Artel, Italy*; Stefan Costea - *EATON, Czech Republic*; Tommaso Bragatto, Alberto Geri - *Sapienza University of Rome, Italy*; Sergio Orlando - *EATON, Czech Republic*; Anja Banjac, Zoran Miletic - *Austrian Institute of Technology, Austria*; Francesco Bellesini - *Emotion, Italy*; Gerhard Jambrich - *Austrian Institute of Technology, Austria*

► **04_05 • Optimizing Energy Management in LVDC Microgrids: a Comparative Study of Linear and Non-linear EMS Formulations** • Tommaso Robbiano, Matteo Fresia, Stefano Bracco - *University of Genoa, Italy*; Sebastián García, Antonio Parejo - *University of Seville, Spain*; Miguel De-Simón-Martín - *Universidad de León, Spain*

► **04_06 • DC Microgrids for Industrial DC Application: Focus on Energy Management and Storage Optimization** • Stefano Lilla, Fabio Napolitano, Andrea Prevedi, Fabio Tossani, Carlo Alberto Nucci - *University of Bologna, Italy*; Andrea Alessia Tavagnutti, Daniele Bosich, Giorgio Sulligoi - *University of Trieste, Italy*; Giorgio Marega - *AEIT Friuli Venezia Giulia, Italy*

13:00 ► Lunch

14:00 ▶ Technical Session V ▶ Converters Modelling & Design

Chair: Mario Marchesoni • *University of Genoa*

▶ **05_01 • A study on the application of a novel family of bidirectional AC/DC modular multilevel power converters in HVDC stations** • Nicola Toscani, Matilde Grandi, Matteo Benvenuti, Francesco Castelli Dezza - *Politecnico di Milano, Italy*; Mattia Amatruda, Vincenzo Agnetta - *Terna, Italy*

▶ **05_02 • Exploring Coordination of LCC and VSC HVDC Systems for Reliable Power Transfer under Variable Load Conditions** • Muhammad Ahmad Khan, Vito Calderaro, Giuseppe Graber, Vincenzo Galdi - *University of Salerno, Italy*

▶ **05_03 • Harmonized Converter Station Design for Tyrrhenian Link and Adriatic Link and Outlook towards Italian HyperGrid** • Marco Cortese, Francesca Pede, Mattia Deriu - *Terna Rete Italia, Italy*; Volker Hussennether, Markus Lehmann, Torsten Priebe, Roberto Sandano, Christian Krieger, Aditya Sood - *Siemens Energy Global, Germany*

▶ **05_04 • Design and modeling of DC-link voltage control in Modular Multilevel Converters** • Stefan Kraft, Julian Hohmann, Felix Goeke, Christian Rehtanz - *TU Dortmund University, Germany*

▶ **05_05 • Small-signal analysis of a bipolar grid-forming MMC-HVDC link for offshore wind integration** • Francisco Javier Cifuentes Garcia, Francesco Giacomo Puricelli, Jef Beerten - *KU Leuven & Etch EnergyVille, Belgium*

▶ **05_06 • Energy Storage Systems for Grid Stability: Functional Benefits and Battery Performance Metrics** • Sabina Pinto, Domenico Marino - *Redelfi*

15:15 ▶ Technical Session VI ▶ Operation Experience & Project

Chair: Rossano Musca • *University of Palermo*

▶ **06_01 • TERN: New Approach to HVDC Integration and Coordination** • Marco Cocco, Giorgio Giannuzzi, Roberto Gnudi, Roberto Meloni, Giuseppe Masones - *Terna Rete Italia, Italy*

▶ **06_02 • Anomalies detection in current measurement systems for HVDC transmission. Case studies analysis in real operating environment** • Giorgio Giannuzzi, Roberto Gnudi, Costanza Ruggieri - *Terna, Italy*; Valentina Cosentino, Giovanni Artale - *University of Palermo, Italy*; Dario Di Cara - *National Research Council, Italy*

▶ **06_03 • Switching Impulse Withstand of HVDC Overhead Lines in Italy: gap factor and clearance evaluation** • Luca Buono, Franco Di Bona, Francesco Palone - *Terna, Italy*

▶ **06_04 • The way forward towards the Italian «Hypergrid» infrastructure projects** • Arman Derviskadic, Benedikt Kurth - *Hitachi Energy, Sweden*; Alberto Persico - *Hitachi Energy, Italy*

▶ **06_05 • Impact of the Hypergrid HVDC Interconnections on the Oscillations of the Italian Power System** • Rossano Musca, Eleonora Riva Sanseverino, Mariano Ippolito - *University of Palermo, Italy*

▶ **06_06 • Lightning Performance of the New 500 kV Italian OHLs: the Milano Montalto case** • Luca Buono, Gaia Leone, Alessia Moresi, Francesco Palone, Lorenzo Papi, Roberto Spezie, Pierluigi Vacante - *Terna, Italy*

▶ **06_07 • Integration of Photovoltaic and Energy Storage in MVDC Railway Microgrids** • Ivan De Palma, Nicola Mortelliti, Domenico Maria Scotto Di Fasano, Marta Stellin, Luca Pantalone, Claudio Spalvieri - *Rete Ferroviaria Italiana, Italy*



16:45 ► Technical Session VII ► HVDC System Study: Methods and Procedure

Chair: Fabio D'Agostino • *University of Genoa*

► **07_01 • A Statistical Approach for Evaluating Electric Field Stabilization in HVDC Cables** • Alessio Di Fatta, Pietro Romano, Antonino Imburgia, Guido Ala - *University of Palermo, Italy*; Giuseppe Rizzo, Grazia Bernardi, Marco Albertini, Roberto Candela, Stefano Franchi Bononi - *Prysmian, Italy*

► **07_02 • A Review of Data-Driven Modal Analysis in Power Systems with Power Electronics Integration** • Chendan Li, Federico Silvestro - *University of Genoa, Italy*; Xiufeng Liu - *Technical University of Denmark, Denmark*; Marta Molinas - *Norwegian University of Science and Technology, Norway*; Zhijin Wang - *Jimei University, China*

► **07_03 • Linearization Techniques for Optimizing PEBB-Based DC Power Corridor Using Mixed-Integer Linear Programming** • Marco Gallo, Fabio D'Agostino, Federico Silvestro - *University of Genoa, Italy*; Chathan M. Cooke, Julie S Chalfant - *Massachusetts Institute of Technology - MIT, USA*

► **07_04 • AI-Based Impedance Encoding-Decoding Method for Online Impedance Network Construction of Wind Farms** • Xiaojuan Zhang, Tianyu Jiang, Haoxiang Zong, Chen Zhang - *Shanghai Jiao Tong University, China*; Chendan Li - *University of Genoa, Italy*; Marta Molinas - *Norwegian University of Science and Technology, Norway*

► **07_05 • Cauer Ladder Network Representation of the Earth Return Impedance of Submarine HVDC Cables Based on FEM** • Ruting Tang - *Politecnico di Milano, Italy & Xi'an Jiaotong University, China*; Luca Di Rienzo, Carlo De Falco - *Politecnico di Milano, Italy*; Massimo Bechis - *Prysmian, Italy*; Shuhong Wang - *Xi'an Jiaotong University, China*

► **07_06 • Low-level simulation of a grid-following inverter with synthetic inertia** • Matteo Lodi, Alberto Oliveri, Matteo Saviozzi - *University of Genoa, Italy*; Francesco Conte - *Campus Bio-Medico University of Rome, Italy*; Pietro Baggi - *SIEL, Italy*

18:00 ► Conference Closure



Venue

University of Genoa • **Aula Magna del Rettorato**
Via Balbi 5 • Genoa, Italy

On Site Secretariat

The Conference Secretariat will be open on site as follows

Thursday, May 29, 2025 • **09:00-19:00**

Friday, May 30, 2025 • **09:00-18:00**

Secretariat

AEIT • Via Mauro Macchi 32 • 20124 Milano, Italy

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Website: **<https://convegni.aeit.it/HVDC2025>**

PROGRAMME



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