



Electric Energy Systems University Enterprise Training Partnership

<http://www.ees-uetp.com/>

EES-UETP course

HVDC technology and HVDC grids

Barcelona, March 11-13 2024

Location: ETSEIB UPC, Av. Diagonal, 647, 08028 Barcelona, Spain

Organizers

- CITCEA-UPC, Technical University of Catalonia, Spain.
- Technical University of Denmark, Denmark
- University of Leuven, Belgium

Coordinators

Prof. Oriol Gomis-Bellmunt (Technical University of Catalonia)
Prof. Nicolaos A. Cutululis (DTU)
Prof. Dirk Van Hertem (KU Leuven)

Description of the course

HVDC transmission is being considered as key driver to enhance the energy transition worldwide. The rapid development of offshore wind power, especially in North Sea, is favoring –and is also favored by – development of DC transmission. Based on the development of modern conversion technology (voltage source converter) the plans for the interconnection of multiple renewable power sources, loads and AC grids through DC technologies are leading to an exciting transmission concept: HVDC grids.

HVDC grids and Supergrids have sparked so much interest that researchers and engineers across the globe are talking about them, studying them, supporting or questioning them. The main motivation of this course is to present a complete picture of HVDC grid technologies and offshore wind power by collecting and summarizing recent technological advances, academic research development and engineering applications.

The course is conducted in three days covering various aspects of HVDC technology, HVDC grids applications including offshore wind, HVDC systems operations and control, and protections. The course consists of lectures, hands-on exercises and live Q&A sessions with the lecturers. All lecturers are internationally recognized experts in the area and they come from both academic and industry.

The course covers the overall spectrum regarding HVDC technologies, including:
(1) the advantages of HVDC compared to AC technologies for power transmission;
(2) the key technologies and challenges for developing an HVDC grid;
(3) design, operation, control and protection of HVDC grids;

(4) offshore wind power technology, offshore energy islands and synergy with DC technology.

The course is based on the book "HVDC Grids: For Offshore and Supergrid of the Future", edited by the course coordinators.

Course program

DAY 1 - March 11th 2024				
Registration	8:30	9:00		
Intro to the course and HVDC systems	9:00	9:45	Oriol Gomis	UPC
Intro HVDC	9:45	10:30	Dirk Van Hertem	KUL
Energy islands- HVDC for offshore wind	10:30	11:15	Nikos Cutululis	DTU
Break	11:15	11:30		
HVDC power engineering	11:30	12:00	Carl Barker	GE
Operator perspective	12:00	12:30	tbd	
Offshore wind projects development	12:30	13:00	Hesam Khazraj	Vattenfall
Regulation and policy aspects	13:00	13:30	Dirk Van Hertem	KUL
Lunch	13:30	15:00		
Practise module 1 - Design of offshore wind transmission systems	15:00	18:00	N Cutululis & H Ergun	DTU & KUL
DAY 2 - March 12th 2024				
VSC & MMC 1 - power electronics	9:00	9:45	Adria Junyent	Imperial College
MMC 2 - principles of operation	9:45	10:30	Eduardo Prieto	UPC
DC/DC converters and CFC	10:30	11:15	Jun Liang	Cardiff
Break	11:15	11:30		
HVDC Circuit breakers	11:30	12:15	Staffan Norrga	SciBreak
Offshore wind technology	12:15	13:00	tbd	
HVDC cables	13:00	13:45	Markus Saltzer	NKT
Lunch	13:45	15:00		
Practise module 2 -VSC and MMC modeling	15:00	18:00	E Prieto & A Junyent	UPC - Imperial
DAY 3 - - March 13th 2024				
Operation and control principles for HVDC grids	9:00	9:45	M Cheah	UPC
HVDC systems operation / Interaction between AC and DC grids	9:45	10:30	Tbd	KUL
Ancillary services + Operation of offshore grids	10:30	11:15	Oscar Saborio	DTU
Break	11:15	11:30		
HVDC fault analysis & RMS/EMT modeling of systems with HVDC	11:30	12:15	Vinicius Lacerda	UPC
Protection for HVDC systems	12:15	13:00	Tbd	KUL
RTDS for HVDC systems	13:00	13:45	Tbd	KUL
Lunch	13:45	15:00		
Practise module 3 - Grid forming with HVDC converters	15:00	18:00	X Guillaud & F Colas	EC Lille

Intended Audience

The course would suit anyone who works in HVDC and/or offshore wind power integration related topics, especially would suit graduate power systems engineers, postgraduate students, power systems researchers who are starting to work in HVDC and/or offshore wind and junior engineers who want to extend their knowledge. This course is also a great opportunity to meet and communicate with the experts and colleagues who work in the HVDC field.

Venue

ETSEIB-UPC, Av. Diagonal, 647, 08028 Barcelona, Spain

Link:

<https://goo.gl/maps/7d3A66zATiZjE2Mw8>

Fees

- 367.5 Euro for attendees affiliated to members of the Association.
- 900 Euro for attendees from universities, small companies (up to 50 employees), or individuals, that are not members or associate members of the Association
- 1500 Euro for attendees from the industry (companies) that are not members of the Association

Registration

This course is organized within the framework of the EES-UETP Consortium.

More information on this course shall be available very soon at: <http://www.ees-uetp.com/upcoming.php>

Registrations are limited! You can register at: <https://forms.gle/weteSdce6xb8NVtn7>

Contact: oriol.gomis@upc.edu vinicius.lacerda@upc.edu