Le réseau de l'intelligence électrique

# Tutorial on HVDC-VSC Systems

From 20th to 24th of November 2017
Lyon, France

Organized by :

Tutorial on HVDC-VSC Systems
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## Tutorial content

The tutorial gives practical and technical information on HVDC-VSC schemes and operations based on real projects. Simulation tools are provided to the audience. They are used to illustrate concepts and performances of HVDC systems.
The tutorial includes also training on physical control replicas and a real-time simulator.

## Intended Audience

This course is intended for engineers, researchers, operators and maintenance personnel, to provide an up-to-date technical expertise for HVDC-VSC projects.

# RTE and RTE-International

RTE is the French Transmission System Operator. With about 8,500 employees, RTE operates the largest transmission system in Europe (500 TWh transmitted, 100.000 kms of lines) and has a strong experience recognized worldwide.

RTE International promotes and markets RTE's know-how and expertise abroad, with a wide range of services (consulting, technical assistance and training) provided by RTE experts giving a guarantee of highest quality services and field experience. Main areas of expertise cover asset management, system operation, tariffs, market design and smart grids.

## More information :

***www.rte-international.com***

***www.rte-france.com***

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# Tutorial duration and location

**The price of training included the tickets of transport**

Five days from Monday 20th to Friday 24th of November 2017.

The course will be held in Lyon, France at the RTE Training Center (6 avenue lionel-terray 69330 Jonage).

Hotels are accessible near the training center and in the city center of Lyon.

# Transport time

From Gare Part-Dieu, Villette

To Meyzieu Z.I.

It will take you 30 minutes to get to the training centre

Training Center


Center of Lyon

The Airport Lyon Saint Exupéry

## Contact:

trainingseminar@rte-france.com

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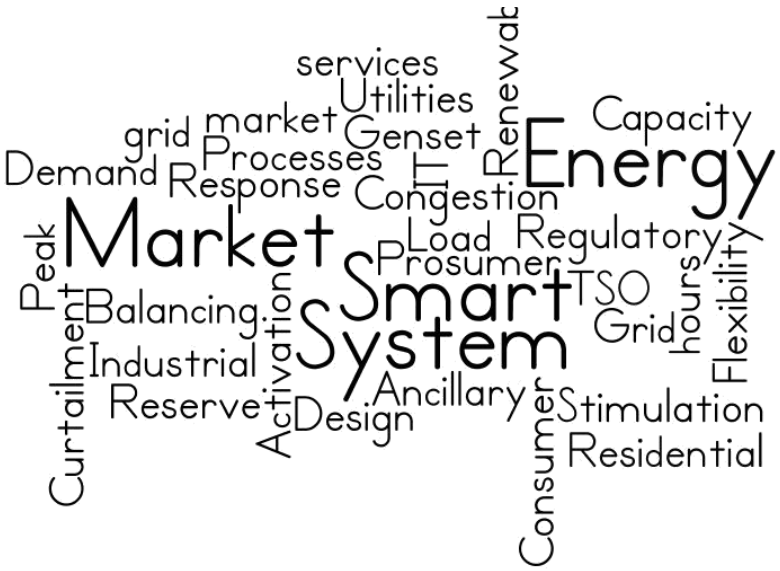
Rte International

## Training Seminar Objectives

The objective of the tutorial is to give a good technical hands-on on HVDC VSC systems.
The tutorial covers the following topics:

- Introduction to VSC-MMC technology
- Control and protections of VSC-MMC stations
- Specifications for HVDC VSC projects
- Maintenance of HVDC converters
- Simulation tools to the-risk HVDC schemes




## Program of the Tutorial

English spoken Training Seminar

**Day 1 – Introduction to VSC-MMC technology for transmission grid**

Converters and valve topologies
Basics on VSC converter operations
Converter operating area
Introduction to EMT studies and VSC modeling – first hands on to run test cases

**Day 2 – Control and protections of VSC converter station embedded in AC grids**

General description of VSC controls
Specific upper level and low level controls for MMC converters
General overview of converter protection strategy and implementation in real systems
Impacts of VSC converter on AC protection relays (balanced and unbalanced conditions)

**Day 3 – Specifications for HVDC-VSC projects**

General description of specifications from an HVDC system owner and operator
Focus on functional specifications for HVDC VSC link
Losses calculations
Dynamic performance testing during FAT and SAT
Dynamic performance requirements tested with EMTP

**Day 4 – HVDC integration in AC network and maintenance**

Analysis performed by RTE on the grid including HVDC: short-circuit current contribution, load-flow, Voltage, risk assessment, etc.
Mid Term Coordinated Capacity calculation with other TSOs to make the link with the Ten Year New Development Plan
Integration of a HVDC in the European context
Integration of HVDC operation at the operator level

**Day 5 – Maintenance of HVDC converters – real-time simulation to de-risk HVDC schemes**

Modeling of VSC converter stations: Basic description of models for small signals studies, frequency analysis, transient stability, EMT studies
Focus on EMT modeling and studies in a real project (offline and real-time)
Usage of control replicas in a real project
Lab training on a real control replica (SVC physical control)

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# How to register?


1. **Go to the online form (click here please)**
2. **Complete the form as requested**
3. **You will receive confirmation of your registration**
4. **Once your registration is confirmed, the invoice will be send by email.**
5. **You will receive soon thereafter a brochure with some tips to book your hotel in Lyon, and more information about the trainers and the planning.**

| Attendee tariff | Price (including taxes) |
|---|---|
| Full fare | 2 800 € |
| Academics | 2 200€ |

## Terms and Conditions

**Registration**
To book your registration, please fill the google form and accept all the terms and conditions.
Please note that number of attendees is limited and that your participation needs to be confirmed by RTE International.
Registration should be done by October 15th, 2017 at the latest.
Your participation will be confirmed and access to the event will be given only when your full payment is received.
After registration, you will receive necessary information to plan your journey.

**Prices & Conditions**
The fee covers attendance to the 5-day seminar, seminar documentation, refreshments during all breaks, five lunches and one networking dinner selected by organizers and transport from Lyon training centre. Other expenses are not included. Discount academics are possible, please refer to prices as detailed above.

**Communication**
All communication must be done exclusively by email. English is the contractual language.

**Cancellation & Modification**
In case of cancellation after October 15th, 2017, the payment will not be refunded. In the case a registrant informs not being able to attend the seminar after registration, he is free to appoint a substitute attendee. Please notify by email of any modification. The detailed content and/or the timing of the agenda may be changed at any time by organizers. Organizers reserve the right to cancel the event until October 15th, 2017 , in such a case participation fees duly received shall be refunded to the registrants concerned.

**Force Majeure**
In the case of force majeure preventing organizers from fulfilling their contractual obligations, including for safety reasons, organizers shall not be considered as responsible and shall not be bound by any obligation to repair damages suffered by anyone because of non-performance or defective performance of all or part of their contractual obligations.

**Data Protection**
The information collected is subject to be used for future communication related to our products and services. Data recipients are RTE International, the organizers of this training seminar. According to the French Law, you have at any time, a right of access, rectification and opposition to all of your personal data by sending an email to trainingseminar@rte-france.com.

**Governing Law**
The governing law is French Law, supplemented by agreements ratified by France.