



Applications of PSCAD – Renewable Integration

Madrid, Spain

*NH Madrid Paseo de la Habana
Paseo de la Habana, 73*

PSCAD™ Modelling and Renewable Integration Studies

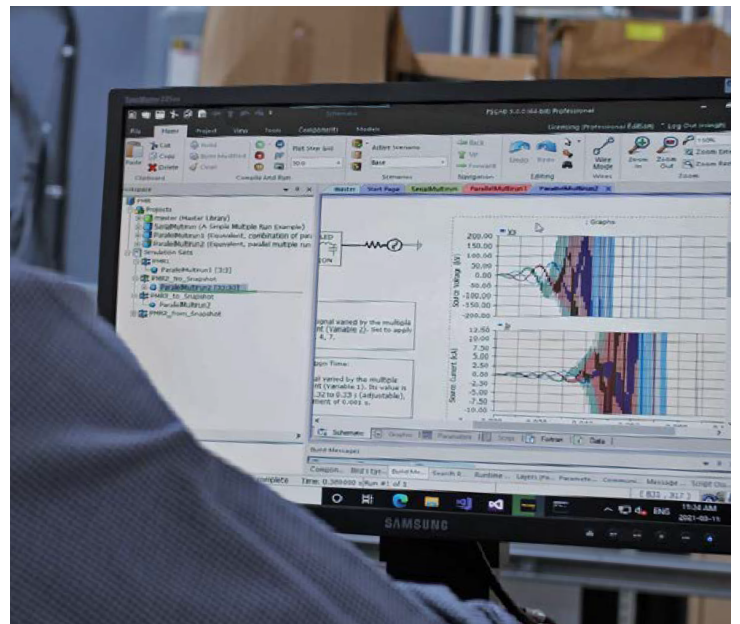
This course is intended for practicing engineers in power systems working in utilities, manufacturing, consulting, or academia who are interested in developing an in-depth understanding of the modern tools available for electromagnetic transient studies. Practical examples, based on the consultant's extensive experience, will be specifically presented to provide a practical aspect to the workshop topics.

Course Description

This is a hands-on interactive PSCAD course with a focus on modern grid connection requirements and challenges in IBR dominant grids. This course will address relevant engineering principles and practical applications for utility, consultant, and R&D engineers. Tutorials based on practical real world case studies will be used to demonstrate and analyze challenges and solutions for the modern electric grid.

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Registration and Additional Info:
Visit: pscad.com/training-events
Contact: training@pscad.com



Course Outline

Day 1: Grid-connected VSC technology

Introduction to the Application of PSCAD (EMT) Simulations for Renewable Integration Assessment – A PowerPoint discussion

Review of Inverter Technology

- 2-Level Inverter example with basic control loops

Grid following inverters – hands-on tutorials and discussions

- PLL and d-q conversion
- Decoupled Controls
- PPC and inverter level controls

Implementing Specific control features – Including hands-on tutorials

- Voltage controller (or Q/PF)
- Active power and frequency control
- Current Limiters
- Fault Ride Through and control freezing
- Fault current injection
- Frequency response
- Negative Sequence Current injection

Grid Forming Inverter technology – example: Black start application

Day 2: Wind and Solar PV technology and model testing

Detailed, vendor level generic models

- Type 1, Type 3, and Type 4 (Full converter)
- Solar PV and Power Plant Controller (PPC)
- FACT Devices- STATCOM example

Model testing on a Single Machine type setup – Includes hands-on tutorials

- Model acceptance test procedure – setup and automation (inverter-based example)
- Model benchmarking (synchronous machine-based example)
 - Benchmarking EMT vs RMS models
 - Developing custom control models in PSCAD
 - Exciter model with PSS, UEL, OEL with proper initialization

Day 3: EMT Wide Area Network studies

Developing and validating a PSCAD wide area model:

- Model conversion from PSSE/DigSILENT (PRSIM – Data conversion from PSSE/DigSILENT)
- Model validation
- Updating the Network Model with vendor Dynamic Plant Models
 - Induction Motor Modeling
 - Representing motor loads
 - Synchronous Machines
- Parallel Network Interfacing (PNI) and multi-time step (Multi-rate) simulation for wide-area studies
- Developing study ‘scenarios’
- Python scripting and automation

Full Impact Assessment

- Performing FRT and network dynamic studies
- System strength and control interactions

Grid support options

- Synchronous Condenser, SVC/STATCOM

Sub Synchronous Interactions (SSTI and SSCI)

- Screening techniques

Practical problem illustrations based on experience

Question and Answer session