

Dynamic Analysis of Renewable Energy Generation

2 Day Course

Objective:

The objective of the course is to provide PowerFactory users with the relevant knowledge to effectively perform dynamic analysis of renewable energy generation sources, when integrating this form of generation to the electrical network. The course covers the required dynamic analysis required for grid code compliance, plant design and optimization.

NOTE: The course aligns to the South African Renewable Power Plant Grid code requirements

Pre-requisites:

- **MUST have attended PowerFactory Basic & 'Introduction to Renewable Generation Analysis' course.**
- A good working knowledge of the basic techniques used in PowerFactory.

No of participants:

At Customer specified premises: Minimum: 6; Maximum: 12.

At Digsilent Buyisa Training Centre: Minimum: 10; Maximum 16.

Online: Minimum 6; Maximum 16.

ECOSA CPD Accredited and Points:

- The course is fully accredited with the Engineering Council of South Africa (ECOSA).
- 2 CPD points for completion.

Who Should Attend:

The course is intended for;

- Planning, operations and maintenance engineers and technicians
- Power system operators
- Project Developers
- Manufacturers
- Consultants



POWERFACTORY

PRICE PER PARTICIPANT:

- For course pricing, kindly visit our website at: <https://digsilent.co.za/training-courses/>
 - For quotes to deliver the training at a customer's premises please contact us via email info@digsilent.co.za or Telephonically (+27) 087 351 6159.
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- ❖ Prices are exclusive of VAT
 - ❖ Please note that cost excludes your Company's internal administrative costs.
 - ❖ All prices may change without prior notice - please contact Digsilent Buyisa for the latest prices before booking.
 - ❖ **DISCOUNTS** are offered for companies sending more than one delegate per course.
 - ❖ Trainings held at Digsilent Buyisa Training Centre includes light breakfast, lunch and tea-time snacks and refreshments.

Training schedule

DAY 1

- 08:30** **Fundamentals of Power System “Dynamic” Analysis**
Overview of the Fundamentals of Power System Dynamic Analysis.
- 09h00** **PowerFactory Dynamic Controller templates:** composite models and frames, templates and default PowerFactory renewable power plant controller models.
- Exercise 1.1: Modelling renewable power plants with dynamic controllers**
Modelling a 25 MW wind farm using templates
- 10:30** **Tea/Coffee break**
- 11:00** **Executing a Dynamic Study**
Defining parameters/signals and events. Initialising a study and plotting results
- Exercise 2.1: Initialising the dynamic models with no events**
Initialising the model and checking for stability without any disturbances in the network.
- 12:30** **Lunch break**
- 13:30** **Voltage Ride Through Studies**
Grid code Voltage Ride Through requirements for RPPs. Conducting LVRT/HVRT studies. Calculation of fault impedance and analysis of results.
- Exercise 2.2: LVRT Study**
Study the low voltage ride through capability of the PV Farm.
- 14:30** **Exercise 2.3: HVRT Study**
Study the high voltage ride through capability of the Wind Farm.
- 15:00** **Tea/Coffee break**
- 15:30** **Exercise 2.4: Iq Study**
Plot the reactive current support and check the compliancy of the farm as per the grid code

DAY 2

08:30 Frequency Response

Grid code requirement for RPPs. Conducting frequency response studies in PowerFactory.

Exercise 3: Frequency Response

Model power plant controllers and observe P and Q response of the plant.

Power Plant Controllers (PPCs)

Setup of PPCs in PowerFactory.

10:30 Tea/Coffee break

11:00 Controllers for Synchronous Generators

Model power plant controllers and observe P and Q response of the plant.

12:30 Lunch break

13:30 Controllers for Synchronous Generators

Selecting the synchronous machine frame, automatic voltage regulators, governor models, power system stabiliser models, over/under excitation limiters, synchronous machine composites.

Exercise: Transient Stability (synchronous machines)

15:00 Coffee break

15:30 Battery Energy Storage Systems (BESS)

Modelling Battery Systems in PowerFactory, BESS templates

16:30 End of the second day