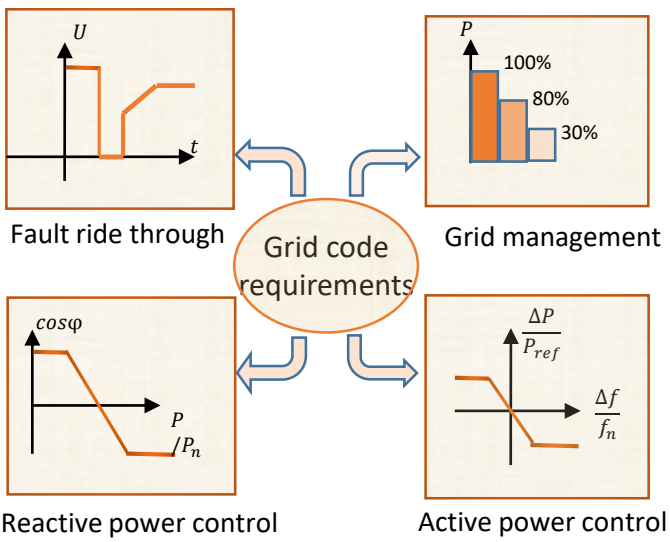
NEPLAN® Grid code compliance

System interconnection studies for large power plant

Challenges	Verification of grid code compliance of renewable generation in order to achieve connection to the grid
Customer	Plant owners (Demonstrate compliance) and transmission system operators (Assess compliance)
Advantages	Grid code compliance ensures stable and safe operation of the network connected to any kind of power generation plant
Solution	NEPLAN with the modules Load flow, short circuit dynamic simulation (RMS and EMTP)

Technical requirements

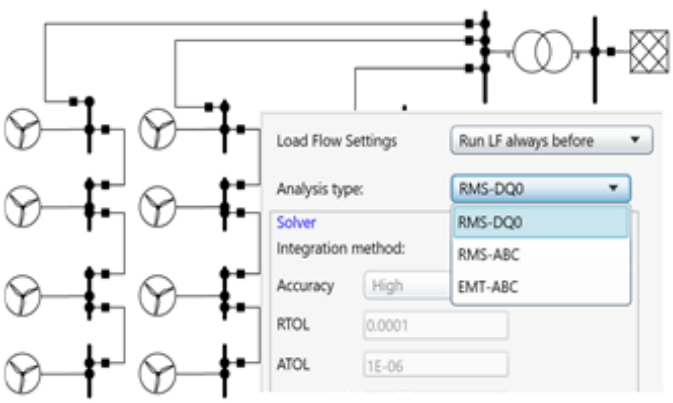
1. Fault ride through requirements (FRT):
   - Low/Hight voltage ride through
   - Reactive current injection during voltage dip
2. Reactive power control:
   - Control strategies: Cosϕ/Q=cte/f(U)/f(P)
   - Maximum capability (Over/Under-excited)
   - P/Q priority
3. Active power control:
   - Reduction of active power at over-frequency
   - Active power response at low frequency
4. Grid management
   - Controlled active power by grid operator
   - Power gradient constraint



Our solution (RMS and EMTP)

Demonstrating grid code compliance and achieving a grid connection is performed accurately by the advanced NEPLAN Dynamic Simulator that is used by system operators and electric utilities around the glob for power system analysis.

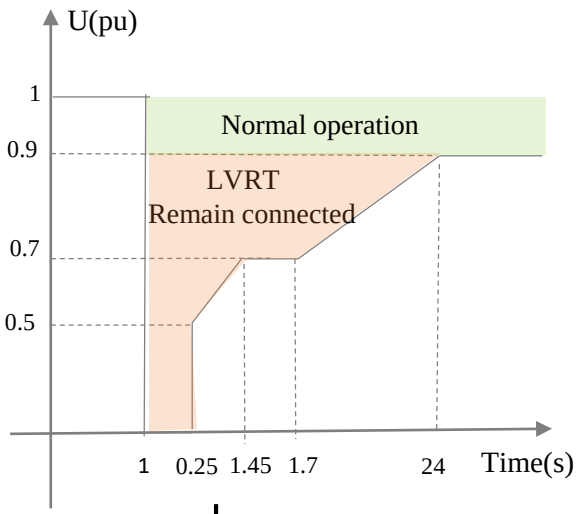
NEPLAN can perform the dynamic simulation either in three-phase reference frame (RMS-ABC) or using the positive sequence modelling approach (RMS-DQ0) . The RMS-ABC approach may be required if the grid code include the LVRT simulation with asymmetrical faults.



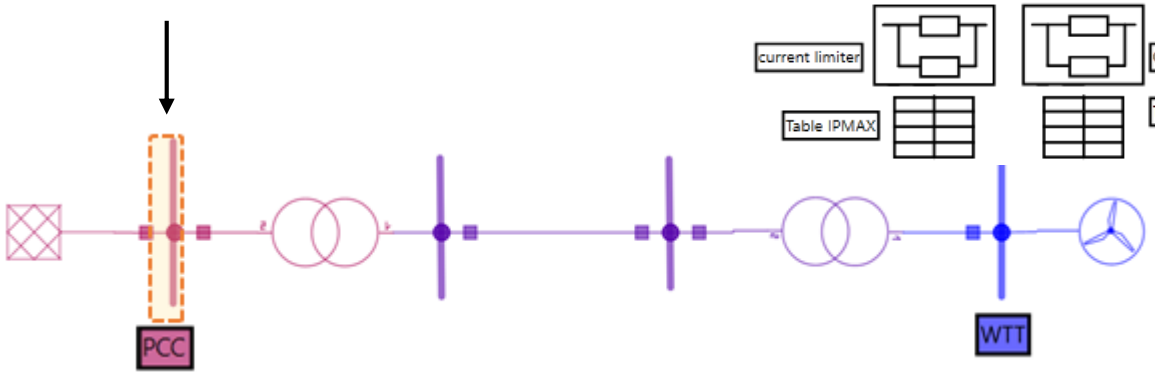
NEPLAN
Smarter Tools

Simulation of system interconnection studies has never been easy !

- Generic models with a comprehensive structure for PV and Wind turbines (IEC 61400-27-1/CIRED)
- The generic models include external modules to be connected/disconnected to the model.
- Application of a specific voltage profile for LVRT using a user-written model
- User-defined control/equipment may be created either by SYMDEF or using drag and drop approach with simple connectivity between function blocks
- Automatic initialization of system state variables
- Emulate the design of different manufacturers simply by changing appropriate parameters of built-in devices.



- Voltage profile defined as pairs (time, voltage)
- Any number of entries
- Any voltage profile can be implemented



Results and reporting

- An advanced visualization and mathematical post-processing tool
- Intelligent plots with unit conversion and graph layout for results comparison
- Charts export and printing functionality
- Condition can be defined to stop the simulation when the grid code is not fulfilled