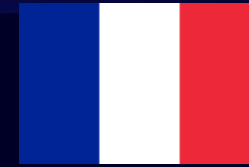


Paris Session 2022



EMT Model validation process implemented by RTE for connection of IBR

SC B4

PS1/Q1.2

P.RAULT (France)



Context

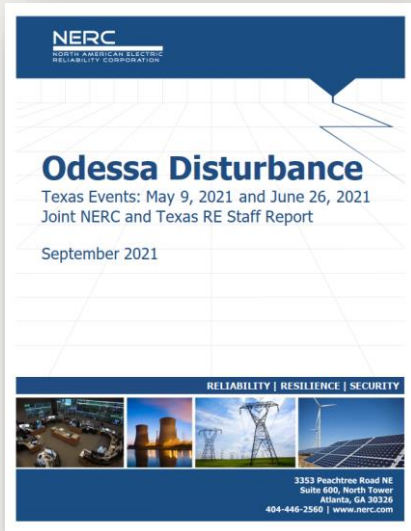
Large integration of IBR on transmission grid

Offshore wind: 18 GW generation in 2035, 40 GW in 2050

Large integration of PV and BESS

Grid code EMT model requirement in France:

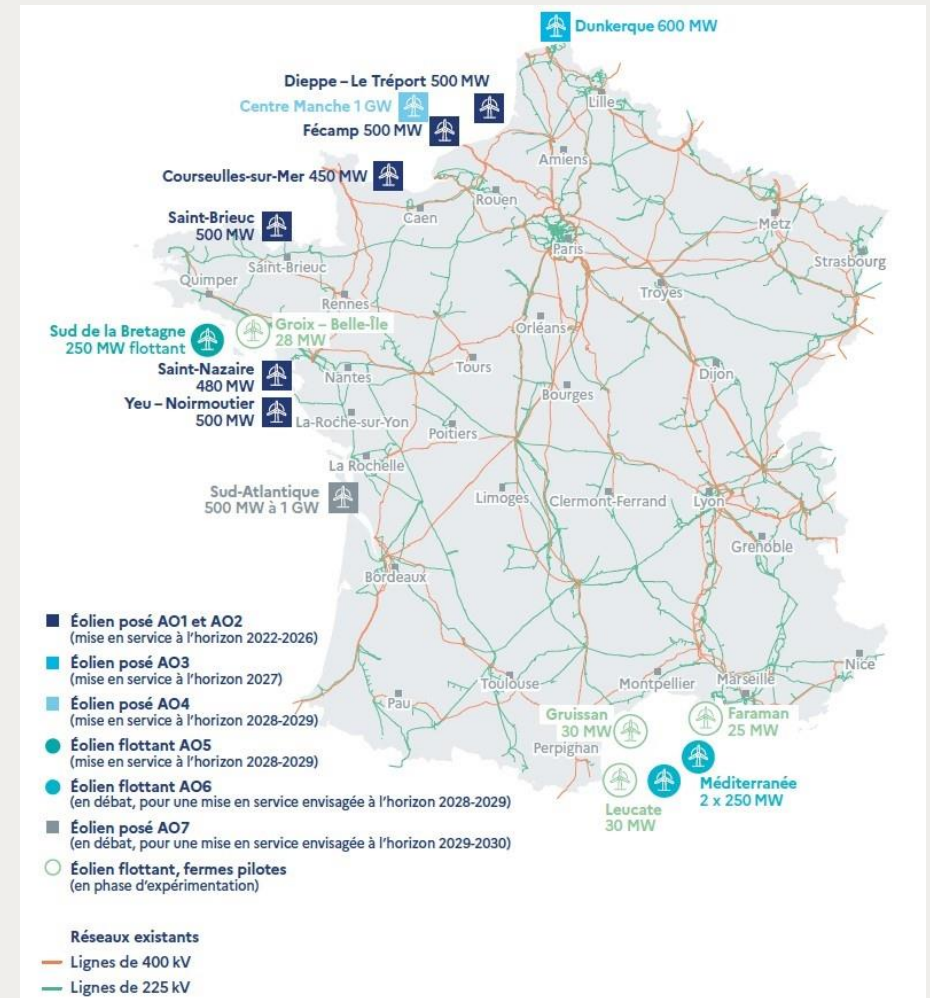
- EMT models are required for connection above 18MW or 110kV (C and D type Power Park Module)
- No black box for the power equipment accepted
- Main protections shall be included



EMT models for IBR are more and more required due to potential interactions as shown in many international experiences



EMT models delivered by suppliers are required but they need to be reliable and validated



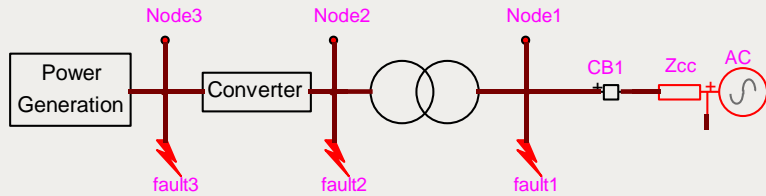
Offshore wind projects in France

EMT model validation process

Step by step approach

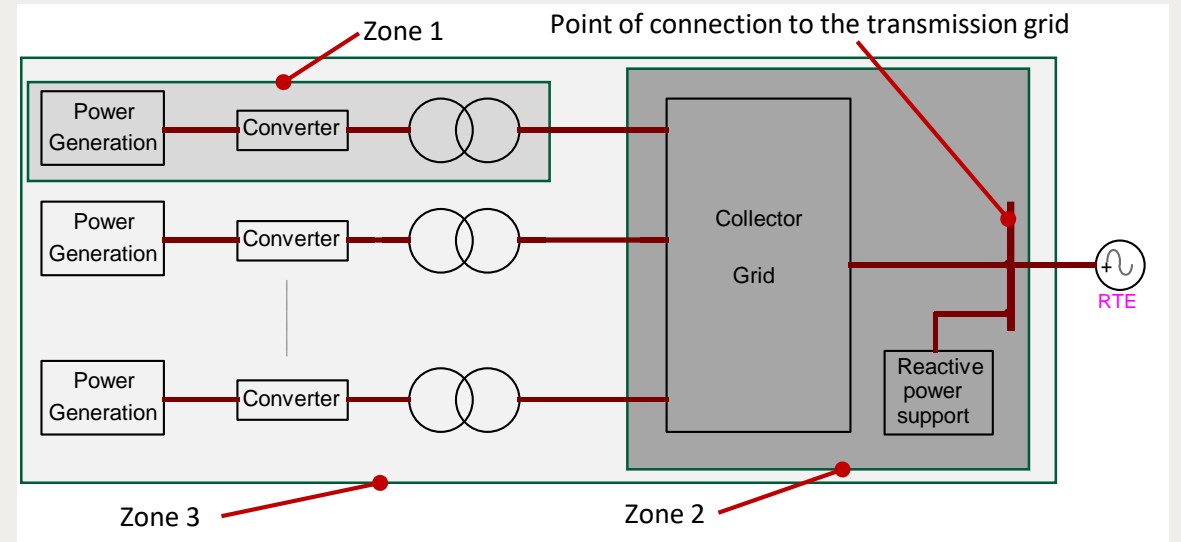
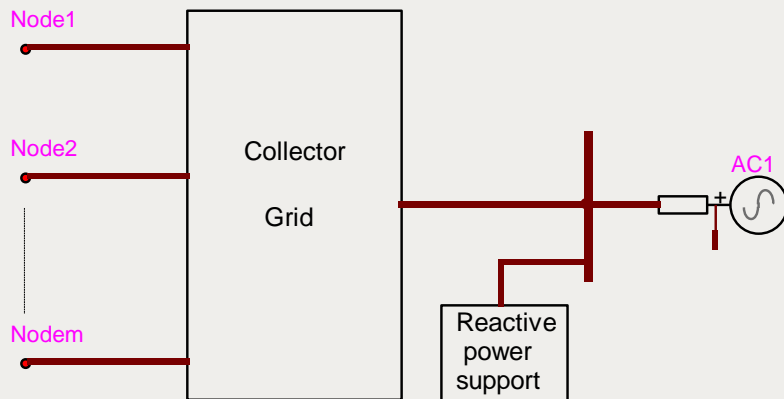
Step 1: Validation of 1 single power generation unit

Comparison between EMTP model delivered to RTE against the EMT model used by the developer to perform its dynamic studies



Step 2: Validation of the collector grid

Comparison between EMTP model delivered to RTE against the frequency domain model used by the developer to perform harmonic studies



Step 3: Comparison of the entire EMTP system with RMS model

Comparison between EMTP model delivered to RTE against the phasor domain model used by the developer to perform its dynamic studies

Step 4: Validation of the entire EMTP system

Comparison between EMTP model delivered to RTE against field measurement done during site commissioning (set point change, energization and startup sequence...)