

# Paris Session 2022



## EMT simulations for Fault-Ride Through (FRT) Settings of Renewable Energy Plants, Meshed Distribution Network & Black-start PACs Studies

### SC B5 PS1 Question 1.03 : Addressing Protection related Challenges in Network with low-inertia and low fault-current Level

Are phasor-domain inverter models sufficient for most protection coordination studies and what are the key criteria for deciding when EMT simulations are preferred for evaluating protection performance over conventional phasor-domain short circuit Studies?

Nirmal NAIR, New Zealand

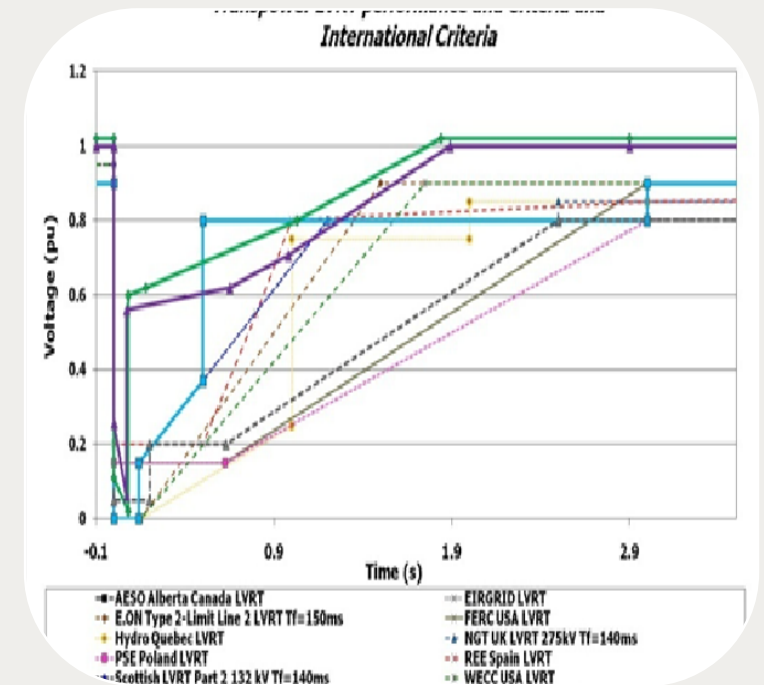
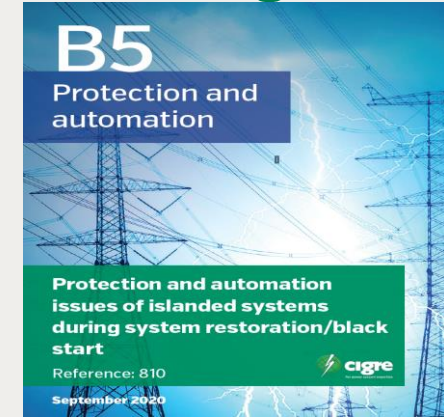


UNIVERSITY OF  
AUCKLAND  
Waipapa Taumata Rau  
NEW ZEALAND

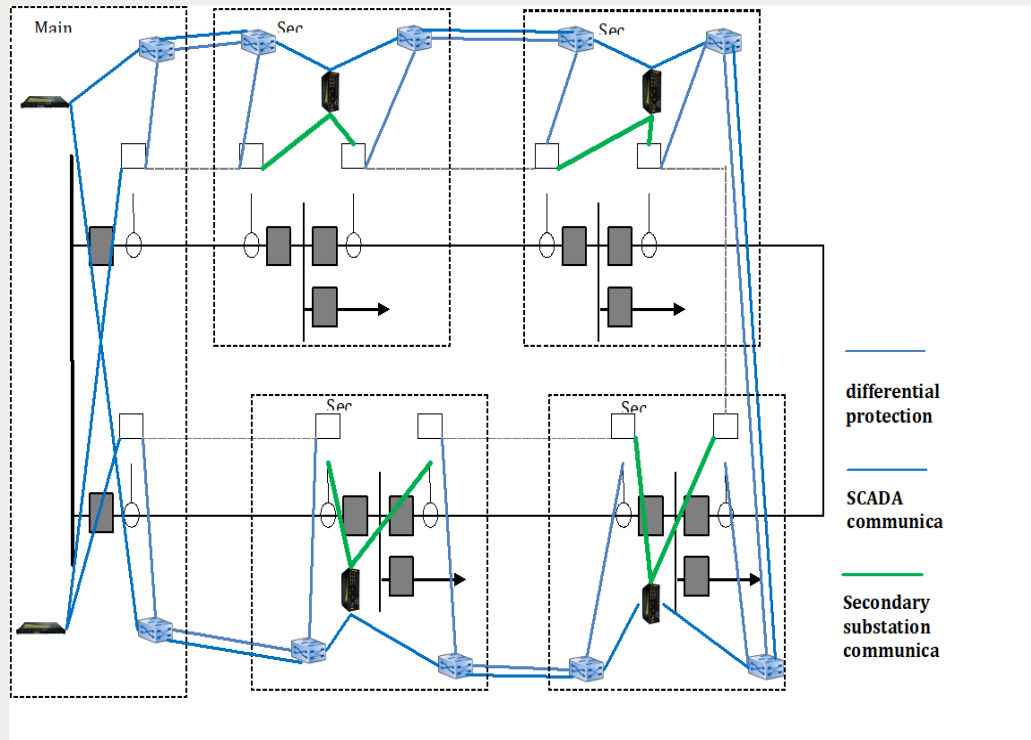
# EMT Simulations for Fault-ride through studies for Wind Integration

- This contribution based on TB 810 material recently published.
- Existing black-start simulation and protection studies will need to be better understood for both traditional and emerging system dynamics on low-inertia and low-fault current networks.
- Three examples given here to answer question PS 1: Q 1.03.
- **First Case:** Blackout propagation have been attributed to Fault-ride through settings of large-scale wind farms in recent years.
  - A particular incident with regards to multiple lightning strikes accompanying a high-impact low probability event in South Australia has been discussed in TB 810
  - Should the large-scale wind generation plant trip or not during large-scale grid disturbance, usually accompanied by a fault will need to be revisited and EMT simulations can help
- **Second and third exemplars** described in the next slide.  
(Details available from TB 810)

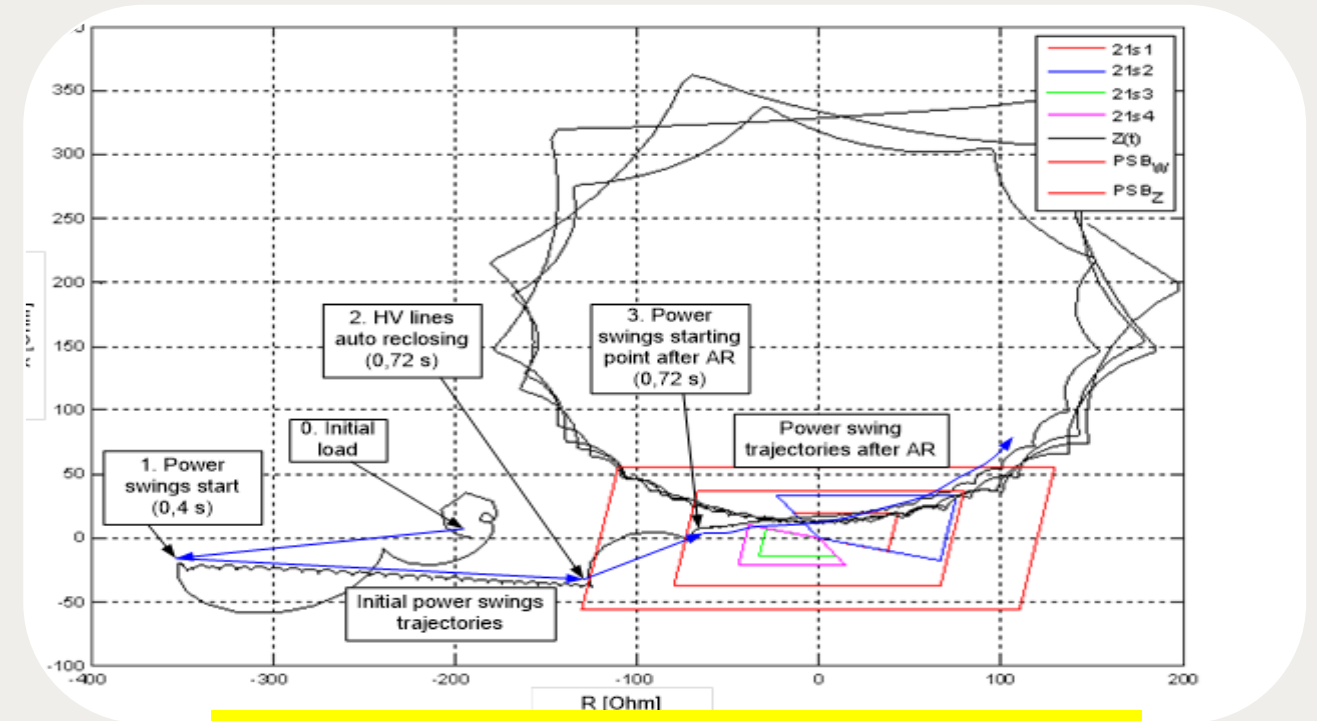
Group Discussion Meeting



# EMT Simulations need for Low inertia Low fault current networks: Meshed Distribution Networks and Black-start Protection Studies



**Low SC Current- Protection Philosophy and Setting Changes**



**Lower System Inertia- Challenges in accommodating black-start dynamics alongside normal power swing-distance protection coordination**