Paris Session 2022

# How controlled switching technique supports integration of offshore wind to the grid

## SC A3 PS1 Q3

As described in 10401, 10876 and 10357, advancement of basic technologies contributes to the challenges targeting decarbonisation, decentralisation, and digitalisation in power grids. In addition, integration and coordination of such knowledges would play an important role for it. Can specialists give any prospective views of new technologies applicable to T&D equipment?

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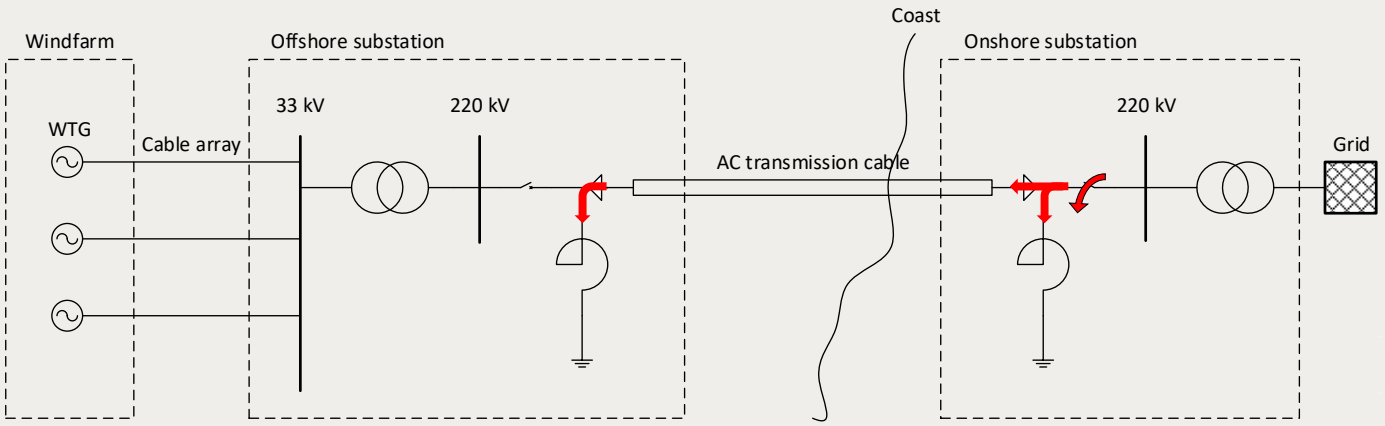
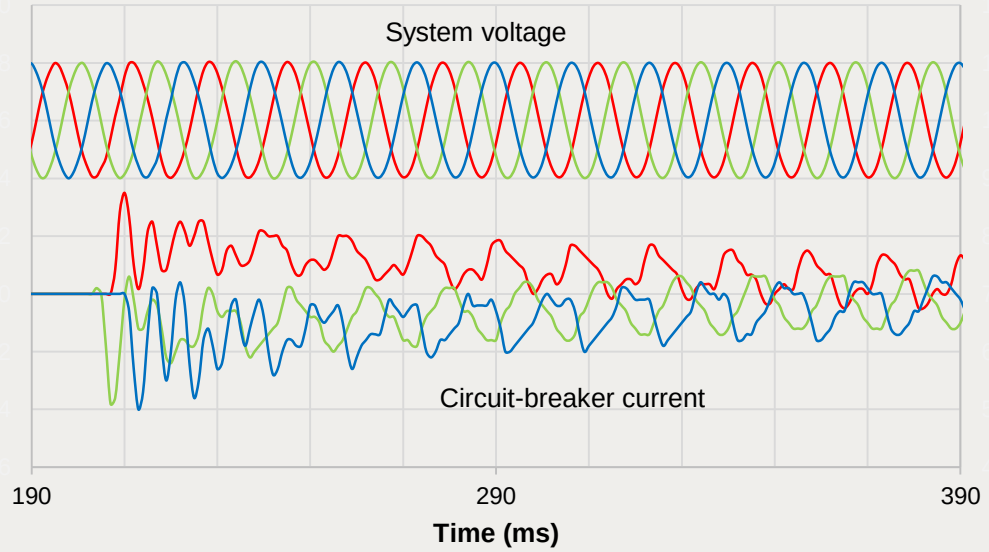
# Offshore wind generation integration concern

## Export cable energizing from land (132 kV – 230 kV)

- Current zero missing phenomena (comp. > 50%)
- Risk of CB failure to interrupt the current in case of protective relay operation

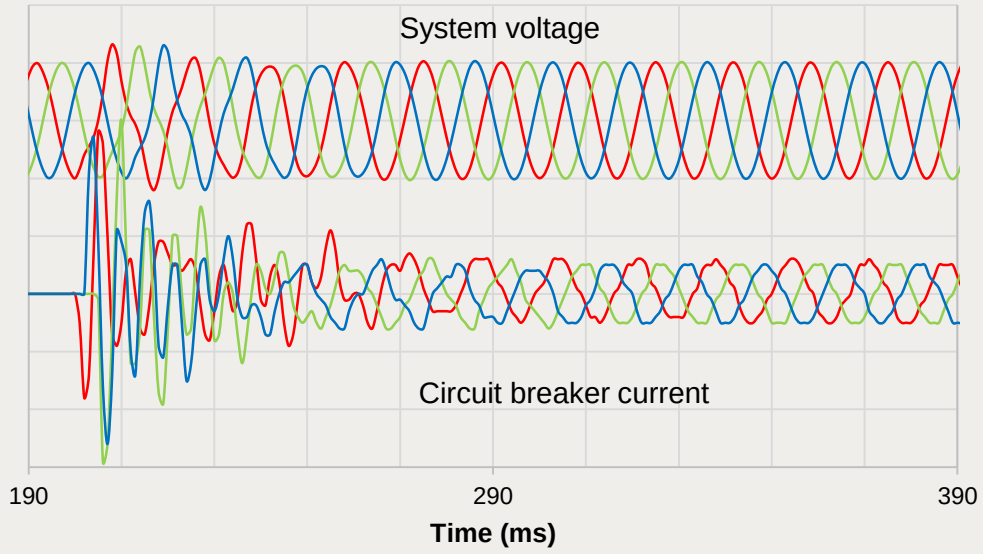


# How to defeat current zero missing phenomena

## Countermeasures

- Protection strategy, fixed delay tripping, single pole tripping
- Energizing sequence, switchable shunt-reactor at land
- Closing resistor, not available <362kV
- Controlled closing, flexible



# Renewable integration through controlled switching

- Ability to cover a wide range of switching applications: shunt reactors, capacitor banks, filters, transformers, lines, cables
- Common solution to mitigate switching transients: inrush currents, voltage dips, overvoltages, reignition
- Single standard asset to be managed by users
- Most versatile solution for future network change

Thank you for your attention !