Paris Session 2022

Simulation Requirements for De-risking North Sea Wind Power Hub

SC4: Power System Technical Performance

PS3 Q19 - What modelling tools (EMT or phasor-domain) and IBR dynamic modelling approaches (vendor-specific or generic models) have been used worldwide to develop forward looking dynamic models of years ahead power systems accounting for forthcoming network changes and emerging technologies?

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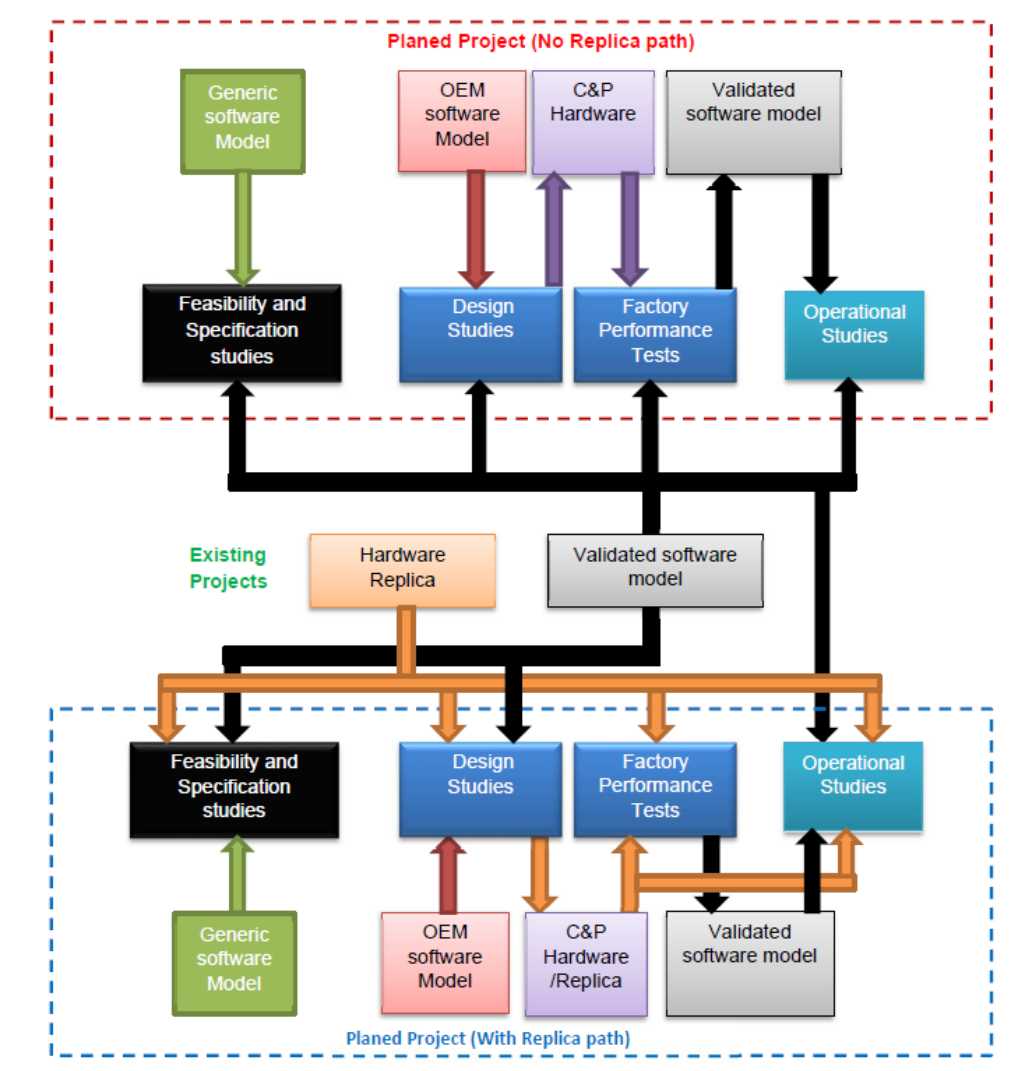
Simulation requirements for North Sea Wind Power Hub

- Energy hub projects presents new challenges for the modelling and system studies:
  - 100% power electronic dominated system with zero or a very small amount of conventional loads
  - Evolving system with multi-terminal HVDC and multi-vendor scenarios
  - No prior experience

- A combination of offline and real-time simulations using hardware-in-the-loop testing is envisioned

Study Methodology without Hardware Replica models

- Hardware models enables to incorporate the actual control equipment used – includes actual signal conditioning, communication delays, etc.
- Can perform FAT on replicas while cubicles installed
- Can be used for commissioning and trouble shooting



Model requirements with and without Hardware Replica Models

- Both approaches shall used validated software and hardware models
- Critical input/output signals shall be accessible
- A detailed description of the critical controllers should be available if not accessible

TSOs shall clearly define the model accessibility requirements and minimal set of validation tests