

## Initial draft of Fast Fault Current Injection questionnaire

1. Please provide the name & details of your organisation.
2. In which of the following areas of technology is your experience (and at what scale of MVA & connection voltage is your experience):-
  - a. Onshore Wind Turbines,(state across which types 1-4)
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  - c. HVDC (2-level VSC-HVDC, MMC-HVDC, parallel/embedded VSC-HVDC, equivalent medium voltage versions of the above)
  - d. Solar PV
  - e. tidal
  - f. Battery Storage
  - g. Hydro based on Variable speed drive,
  - h. Other storage.
  - i. Dynamic network compensation equipment (SVCs, STATCOMs etc)
  - j. Synchronous compensation.
  - k. Hybrid combinations of the above technology (if so please state these combinations)
3. Do you have experience in the development or implementation of VSM- based control systems. If so please outline in what contexts/ which of the above areas.
4. With respect to the outline specification attached;
  - a. Which specific areas of this specification would benefit from further clarification in your view, and what specific clarifications would support development/ and or optimisation of design to these principles
  - b. Where specific areas of this specification have the potential in your view to drive specific solutions,
    - i. Are these in your technology area expected to be the most efficient solutions?
    - ii. If not what alternative approach to specification would you suggest would provide flexibility to achieve those specifications whilst delivering against the system requirement.
  - c. Are there any additional areas of specification that you would welcome in connection with the attached- if so in what areas and why?
5. With respect to the attached outline functional specification, please identify by above technology type, the existing extent of areas where:-
  - a. A capability of existing plant to respond in line with the attached specification is currently achievable/ achieved, and/ or the technology could be modified in control to achieve this approach.

- b. In each of the above please identify whether the extent of the outline specification is met.
  - c. Where the extent of the outline specification is met please identify the considerations that would limit capability.
  - d. Where the technology cannot meet the outline capability in full, would hybrid or new approaches be possible to overcome these issues. In both cases are there practical considerations (physical space/ planning permission, timeframes to develop) which would limit any initial deployment path.
  - e. What would be your current timeframe to develop VSM capabilities,
  - f. What would be your lead time to develop VSM based on GB specification assuming it will be created by April 2019?
6. Would you like to discuss further these aspects with National Grid in more detail (note all discussions would respect confidence and may be accompanied by suitable NDA arrangements as requested).

National Grid would at this stage seek to receive as open and informative a bilateral discussion of capabilities as possible. Ahead of responding to the wider Expert workgroup it will summarise all feedback and would contact you to confirm you are comfortable with the nature of that feedback which will seek to summarise the common themes of engagement.