nationalgrid

THE POWER OF ACTION

Voltage Control Requirements from Static Plant

November 2010 GCRP

Voltage Control from 'static' plant

- Background
  - 'Voltage Control and Fault Ride Through' paper presented at the September GCRP
  - NGET put forward an approach to both issues within this paper
  - The Panel raised a number of issues but did not agree a clear way forward
  - This slide pack outlines the 'Continuous Voltage Control' issue and seeks explicit direction from the Panel

Voltage Control from ‘static’ plant

- Background – Relevant Grid Code Requirements

Control Arrangements

CC.6.3.6 …

(b) …

must be capable of contributing to voltage control by continuous changes to the **Reactive Power** supplied to the **National Electricity Transmission System** or the **User System** in which it is **Embedded**.

Voltage Control from 'static' plant

- Background – Relevant Grid Code Requirements

Excitation and Voltage Control Performance Requirements

CC.6.3.8 (a) Excitation and voltage control performance requirements applicable to **Onshore Generating Units**, **Onshore Power Park Modules** and **Onshore DC Converters**…

…

(iii) In the case of an **Onshore Non-Synchronous Generating Unit, Onshore DC Converter** or **Onshore Power Park Module** a continuously-acting automatic control system is required to provide control of the voltage (or zero transfer of **Reactive Power** as applicable to CC.6.3.2) at the **Onshore Grid Entry Point** or **User System Entry Point** without instability over the entire operating range of the **Onshore Non-Synchronous Generating Unit, Onshore DC Converter** or **Onshore Power Park Module**.

Voltage Control from ‘static’ plant

- Issue
  - During Grid Code compliance discussions some users have indicated that there will be delays in the repeated operation of the mechanically switched elements
    - Delays of up to 10 minutes encountered
    - Some designers have assumed that delays equivalent to Delayed Auto Reclose times (~15 seconds) can be deemed continuous
    - Reactive capability shortfall in the intervening period
  - This leads to a discontinuity in the provision of automatic voltage control with a potential detrimental impact on security and quality of supply in terms of
    - Voltage stability
    - Voltage fluctuations
  - Manufacturers indicate that reactive capability can be maintained using larger statcoms or by using thyristor switching
    - Impractical at sites existing or under construction
  - Up to 33 developments identified which may be affected

Voltage Control from 'static' plant

- NGET's view
  - Voltage control systems with inherent delays in the reinstatement of the full voltage control range do not meet system requirements as expressed in the Grid Code
    - Delays in excess of 15 seconds mean that systems are clearly not 'continuously acting'
  - The immediately affected generation projects are now subject to delays and/or uncertainty over completion
    - Process of assessment underway on a project by project basis
    - The impact on the Transmission and Distribution systems of a limited number of users with this issue is likely to be manageable
  - There is a need to establish a clear requirement for future projects
    - Failure to provide true continuously acting voltage control over a large proportion of the generation fleet would impact on system security

Voltage Control from 'static' plant

- NGET's approach put forward at September GCRP
  - Set an immediate interim benchmark of 15 seconds (close-open-close) and 2 seconds (capacitor discharge)
  - Maintain existing requirement for true continuously acting voltage control
  - Set a future date by which all new plant will need to meet the requirement without caveats
    - Proposed Implementation date 1st January 2013

Voltage Control from 'static' plant

- The Panel is asked to consider the following options
  1. Treat all affected developments as non-compliant
     - Potentially ~30 derogated developments
     - No incentive for installations with long delays to improve
  2. Adopt NGET's proposal for an interim interpretation
     - Removes uncertainty for immediately affected developments
  3. Amend Grid Code to reflect NGET's proposal for an interim interpretation
     - Removes uncertainty for immediately affected developments
     - Need to assess change for wider impact
  4. Review the application of hybrid reactive power and voltage control solutions in meeting the Grid Code requirement
     - What are the incremental costs of 'true continuous' operation?