

**Grid Code Review Panel**  
**GC0075 Hybrid Static Compensators - Update**

**Date Raised:** 20 Nov 2013

**GCRP Ref:** pp13/67<sup>1</sup>

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National Grid

**Summary**

Power Park Module developers have been installing Hybrid STATCOM / SVC's, which provide a portion (typically 50% to 75%) of their reactive capability from switched reactors and capacitors. Some of these devices have restrictions preventing repeated switching in a short period which can be seen as inconsistent with the concept of "continuously-acting" control which is required by the Grid Code. Interested parties believe clarification is required of the Grid Code requirements on these devices and that it would be beneficial to form a Workgroup to develop proposals for clearer and more appropriate requirements on Hybrid STATCOM / SVC performance.

**Users Impacted**

**High**

None

**Medium**

Owners and developers of Power Park Modules – reduced risk of non-compliance and more appropriate performance requirements.

**Low**

None

**Description & Background**

During compliance testing of new Power Park Modules it emerged that some manufacturers had interpreted the various references in the Grid Code to continuous voltage control, as a single linear increase or decrease in reactive power. National Grid's interpretation of the Code was that voltage control should be continuously available and that the equipment in question had unacceptable delays before the performance could be repeated. Manufacturers have indicated that the current performance regarding delays in operation, are driven by the switch gear, capacitor discharge and associated controls.

In addition, some manufacturers switch out the capacitors during a fault which could also be interpreted as a non-compliance. With regard to switching out capacitors several manufacturers have indicated that this is due to customer requests to do so, or to prevent over-voltage issues occurring.

Manufactures have identified a benefit in reduced costs of Hybrid designs compared to supplying a fully rated STATCOM / SVC. National Grid is keen to ensure that any potential shortfall in voltage control does not adversely impact on system security, or necessitate additional investment in alternatives, by achieving adequate discrimination between voltage control actions and network actions such as Delayed Auto Reclose.

<sup>1</sup> The Code Administrator will provide the paper reference following submission to National Grid.

National Grid convened a workshop on the 20<sup>th</sup> September 2013 to seek an up to date view from interested parties which was attended by representatives of equipment suppliers and generation developers. Developers provided feedback to indicate that inconsistency in interpretation of the current requirements continued to present a material risk to their projects. Manufacturers highlighted that different interpretations by different manufacturers meant that some parties could be disadvantaged.

### Proposed Solution

As an alternative to developers purchasing a fully rated STATCOM or thyristor switched shunt elements, National Grid has asked whether manufactures can improve the switchgear, capacitor discharge and control performance, possibly removing the need for fast discharge of the capacitors, and ensure it is not necessary to disconnect the capacitors at higher short circuit voltages.

Developers and manufacturers have asked that National Grid review the benefits that faster and repeatable actions from static components provide to the system, and to clarify the requirement to generate maximum reactive current during a fault.

Workshop attendees expressed a strong desire for these questions to be addressed and proposals for changes to the Grid Code to be progressed by an appropriate workgroup.

### Assessment against Grid Code Objectives

The improvement in performance proposed, aims to allow manufacturers, developers and generators to benefit from the cost reduction offered by Hybrid STATCOM / SVC's whilst restoring some of the capability lost, thereby improving system security and operability.

Clarification of the Grid Code will minimise the financial risk, posed by non-compliance to developers and manufacturers. It will also minimise the risk of Transmission Licencees having to make up a shortfall in reactive capability with alternative sources.

We believe the proposed changes to the Grid Code better facilitate the Grid Code Objectives:

**(i) to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;**

The main cost saving offered by Hybrid STATCOM / SVC's would be available provided their performance meets the minimum needs of the System.

**(ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);**

Transparency of requirement and clarification of the code creates a market in which all manufacturers, developers and generators are able to compete fairly without the burden of unnecessary risk.

**(iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national**

***electricity transmission system operator area taken as a whole;***

Clarity of the requirement and subsequent improvement in performance, such that most of the originally intended capability is restored, whilst allowing the use of Hybrid solutions provides, in our view, the best compromise between ensuring system security and efficiency of delivery.

***(iv) to efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.***

Future system security will be maintained assuming adequate improvement in performance can be achieved in a timely manner.

**Impact & Assessment**

***Impact on the National Electricity Transmission System (NETS)***

Hybrid STATCOM/SVC performance as proposed would ensure security of supply is maintained and will provide greater resilience with respect to voltage collapse.

***Impact on Greenhouse Gas Emissions***

None

***Impact on core industry documents***

The Grid Code will be modified to clarify the requirements on Hybrid STATCOM / SVC's.

***Impact on other industry documents***

There may be a need to review similar provisions in STC Section K.

**Supporting Documentation**

GC0075 Hybrid Statcom Draft WG ToRs.doc

Hybrid\_STATCOM\_SVC\_Workshop\_20\_09\_2013.pdf

**Recommendation**

The Grid Code Review Panel is invited to:

Progress this issue to a Workgroup with the aim of clarifying the Grid Code so that the performance requirements of Hybrid STATCOM / SVC's are defined appropriately.

**Document Guidance**

This proforma is used to raise an issue at the Grid Code Review Panel, as well as providing an initial assessment. An issue can be anything that a party would like to raise and does not have to result in a modification to the Grid Code or creation of a Working Group.

Guidance has been provided in square brackets within the document but please contact National Grid, The Code Administrator, with any questions or queries about the proforma at [grid.code@nationalgrid.com](mailto:grid.code@nationalgrid.com).

## GC0075 Hybrid Static Compensator DRAFT TERMS OF REFERENCE

### Governance

1. The Hybrid Static Compensator Workgroup was established by Grid Code Review Panel (GCRP) at the [November 2013] GCRP meeting.
2. The Workgroup shall formally report to the GCRP.

### Membership

3. The Workgroup shall comprise a suitable and appropriate cross-section of experience and expertise from across the industry, which shall include:

| Name | Role                         | Representing                             |
|------|------------------------------|--|
|      | Chair                        |  |
|      | Technical Secretary          |  |
|      | National Grid Representative | National Grid                            |
|      | Industry Representative      | [PPM Developers]                         |
|      | Industry Representative      | [Hybrid Statcom Equipment Manufacturers] |
|      | Industry Representative      | [Transmission Owners]                    |
|      | Authority Representative     | Ofgem                                    |
|      | Observer                     |  |

### Meeting Administration

4. The frequency of Workgroup meetings shall be defined as necessary by the Workgroup chair to meet the scope and objectives of the work being undertaken at that time.
5. National Grid will provide technical secretary resource to the Workgroup and handle administrative arrangements such as venue, agenda and minutes.
6. The Workgroup will have a dedicated section on the National Grid website to enable information such as minutes, papers and presentations to be available to a wider audience.

### Scope

7. The Workgroup shall consider and report on the following:

- The performance of Hybrid Static Compensators and comparable equipment with respect to repeatability and the supply of reactive current during a fault
- The performance required from voltage control equipment within Power Park Modules to control voltage on the networks in the steady state, during and after secured events, and in the event of a wider system disturbance.

## Deliverables

8. The Workgroup will provide updates and a Workgroup Report to the Grid Code Review Panel which will:
  - Detail the findings of the Workgroup;
  - Draft, prioritise and recommend changes to the Grid Code and associated documents in order to implement the findings of the Workgroup; and
  - Highlight any consequential changes which are or may be required,

## Timescales

9. It is anticipated that this Workgroup will provide an update to each GCRP meeting and present a Workgroup Report to the [Timetable to be discussed] GCRP meeting.
10. If for any reason the Workgroup is in existence for more than one year, there is a responsibility for the Workgroup to produce a yearly update report, including but not limited to; current progress, reasons for any delays, next steps and likely conclusion dates.