Joint Grid Code / CUSC GIS Working Group

DNO position statement – August 09

1 Overview

1.1 Background

The issues debated in the WG were originally defined as being generator related, although some DNO concerns have been raised and the options to date have been reviewed with a bias towards the generator position.

This was recognised at the last WG meeting in June 2009 where it was accepted that the wider implications of these issues are now more clearly understood by all parties. It was agreed to review the range of ownership boundary options again in light of the present understanding from both a generator and DNO perspective. The attached table provides a summary of the positive and negative attributes of Options 1- 6 from a DNO perspective.

During the course of the WG discussions it has emerged that in addition to the construction and commercial issues associated with the 'start of life' construction and commercial issues associated with a GIS installation, there are 'enduring' operational issues. To illustrate this, during the WG discussions, Option 1 appeared to satisfy the requirements to simplify 'start of life' construction and commercial issues however there are 'enduring' operational issues associated with Option 1 that, from a DNO perspective, give rise for concern.

A note was circulated before the June 2009 WG meeting indicating some of the potential operational issues at the NGET/DNO interface associated with Option 1 and, including prospective Grid Code issues associated with changing the boundary between the transmission and distribution system.

At the June 2009 meeting the possibility that there may be different optimum solutions for Generators and DNO's was discussed. This was further explored during a subsequent conference call between the DNO participants, where it was concluded that DNO issues were different and potentially more complicated than those of the Generators. It was agreed during this call that there was a need for further discussion to consider the balance between the 'start of life' construction and commercial issues and the 'enduring' operational issues.

The key 'enduring' differences between the Generators and DNO's are:

- Where the GIS busbars are owned by NGET, Generators do not wish to operate the circuit breakers which connect their assets to the transmission system and form part of an NGET GIS switchboard. Their preference is for NGET to own and operate the whole switchboard.
- Where the GIS busbars are owned by NGET, DNO's do require operational control of the circuit breakers which connect their assets to the transmission system. Where the GIS busbars are owned by the DNO, DNO's prefer NGET to own and operate the circuit breakers connecting the transmission system to the GIS busbars,
- Generators are unlikely to undertake their own maintenance of these assets whilst DNO's are likely to undertake their own maintenance activities.
- The critical dependency on a single point circuit breaker connecting a Generator's assets to the transmission system and the ability to export means that Generators are very focussed on the availability of the circuit breaker. DNOs have multiple circuit breakers at the interface between DNO's assets to the transmission system and hence have more flexibility to accommodate planned and forced outages.

We acknowledge that there are common issues particularly in the commercial area, where a move to include the construction of the switchboard to become a licensed activity and therefore constructed by one party, may be a common solution, although at present there is not a DNO consensus view available.

1.2 Way forward

Following the June WG meeting it is becoming clear that whilst common principles are held by both Generators and DNO's, there is emerging divergence on matters such as operational and control which will require a wider dialogue with all DNO's, hence we believe that it will be unrealistic for the working group activity to be concluded at the August meeting. We believe that it would be beneficial to build on the understanding of the issues developed by and momentum of the WG and that there are at least two possibilities for continuing the work:

1. **Focus the work on Generator issues and leave the DNO' debate for later**.

   There would be a need to ensure that any proposed changes relating to Generators do not impact on the present DNO arrangements. Work to develop and progress the DNO issues would be progressed later and if considered appropriate, a further CUSC / Grid Code amendment proposal prepared. Whilst this addresses the immediate Generator issues potentially within the timescales agree with the relevant panel there is the possibility of further associated Grid Code / CUSC changes at a later date and the momentum of the WG could be lost.

2. **Continue to develop a solution that accommodated Generators and DNOs.**

   This option would see the WG continue to develop the preferred Generator solution but there would be a need to extend the timescales of the WG to permit wider discussion of the DNO issues with a wider (ie all DNO) audience. This would enable the DNO issues to be better understood and a solution designed to resolve the agreed commercial, operational and technical issues. The draft Grid Code / CUSC changes would be developed so that an agreed set of modifications addressing the Generator and DNO issues could be presented to the GCRP / CUSC panel.
   This option would require additional time, but develop a set of changes that address the issues of both parties.

2 GIS construction

A review of options 1 – 6 is described below, following further consideration of the operation and control issues specifically appropriate to the DNO population.

2.1 Switchgear

Two types of GIS construction (relevant to the Grid Code) have been illustrated in slides to the group:

Disconnector separate from busbars

In this construction there is a gas barrier between a busbar disconnector and its associated busbar. This has been referred to in the presentation material as Type A.

This form of construction was used in early types of GIS.

Disconnector compartments containing section of busbar

In this construction the gas compartment containing a busbar disconnector also contains the junction between the disconnector and the busbar, and a section of busbar. This has been referred to in the presentation material as Type A

This construction is used in all present designs of GIS at least up to 145 kV. This arrangement was developed in order to reduce the size of the equipment: given that size is one of the selling points of GIS it is very hard to envisage any manufacturer bringing out equipment in the future which does not use this type of construction.

There are issues of outage constraints which lead users to specify arrangements of switchgear which are larger than the manufacturer's default option; this usually requires that an extra section of busbar is fitted between each bay, which would not be required in the earlier form of construction. However since this degree of outage

flexibility is not commonly required in other markets it is unlikely that manufacturers would sacrifice the compactness of present designs.

2.2 Local control cubicle (LCC)

GIS is commonly supplied with a single LCC for each complete bay. This is logical because, operationally, a bay is a single entity, with inter-related operational controls. Operation of disconnectors requires that the CB is open, and the interlocking to achieve this is built into the LCC. Similarly working on the CB requires that the three-position disconnectors on both line and busbar sides of the earthing switches are set to the earth position, and there will be interlocking in the LCC to ensure that no disconnector can be selected to the earth position unless all other disconnectors on that bay are open.

2.3 Summary

- Operationally each bay is an entity of inter-dependent devices
- If the ownership and / or operational responsibility of a bay is split between two parties that will mean that the ownership / responsibility of the LCC must be shared between the parties

3 Assessment of Grid Code Working Group options from DNO perspective.

The analysis below sets out the relative merits of the 6 Options from a DNO perspective considering commercial, technical and operational considerations. In making this analysis, the following assumptions have been made:

1 The operational responsibility rest with the asset owner. Where this is considered to be undesirable / impractical an operational contract will be required so the plant can be operated by the 'natural' operator.

2 Only Type B switchgear is included on the basis that future plant is likely to be Type B and to simplify the analysis; for Options 1 and 6 there are potentially two Type A possibilities (DNO owns the busbars, NGET owns the busbars) and two Type B possibilities.

3 The following issues have been considered:

- Single / multiple party construct switchboard
- Single / multiple party ownership of busbars (potential SQSS advantages)
- Single / multiple party of circuit gas zone (Type B)
- Single / multiple party of LCC
- Need for operational contracts
- Impact on capex
- Impact on opex
- Impact on exit charges
- Uncertainty re change in boundary between Distribution and Transmission system (assuming the ownership & operation of CB is dominant)
- Consistency with AIS

Assessment of Grid Code Working Group options from DNO perspective

Option	Description	Advantages	Disadvantages	Comments	DNO evaluation
1a	Complete board owned and operated by single party **Switchboard owned by DNO** (Typical)	**Initial** One party constructs assets **Enduring** Busbar ownership is retained by a single party (potential SQSS advantages) LCC in single party ownership Gas zone is responsibility of one party Exit charges reduce	**Initial** Increased capex the incoming SGT CBs **Enduring** Increased opex re maintenance of incoming CBs Exit charges increase Creates inconsistency with AIS Contractual operational arrangements to permit NGET to operate the incoming SGT CBs DNO assets on DNOs behalf Uncertain implications associated with change in boundary between Distribution and Transmission system	Potentially addresses the commercial issues Since DNO's and NG each require operational control of their 'own' circuits this will require contractual and Grid Code arrangements to manage: • Operation by one party of the other party's equipment • Access for maintenance • Boundary between TNO and DNO assets for regulatory purposes	Potential option that addresses the commercial issues but creates the requirement for new operational framework to be established and has underlying uncertainties associated with the changing transmission & distribution system boundaries
1b	Complete board owned and operated by single party **Switchboard owned by NGET** (eg shared sites and legacy power station sites)	**Initial** One party constructs assets Reduced capex (outgoing feeders would be NGs) **Enduring** NGET maintain all assets Busbar ownership is retained by a single party (potential SQSS advantages) LCC in single party ownership Gas zone is responsibility of one party	**Initial** **Enduring** Increased Exit charges reflecting additional NGET capex and opex Creates inconsistency with AIS Contractual operational arrangements to permit DNO to operate the outgoing feeder CBs on NGETs behalf Uncertain implications associated with change in boundary between Distribution and Transmission system	Since DNO's and NG each require operational control of their 'own' circuits this will require contractual and Grid Code arrangements to manage: • Operation by one party of the other party's equipment • Access for maintenance • Boundary between TNO and DNO assets for regulatory purposes	As Above
2	Current CUSC Boundary at Gas barrier(s) on busbar side of disconnector	**Initial**	**Initial** Multiple party construct assets – commercial issues not addressed **Enduring**	• Operationally clear – maintains operational and ownership integrity of bay • Busbar shutdowns require cooperation of all parties	Preferred option operationally but commercial issues not addressed

		Enduring Each party owns and operates its 'natural' assets Opex and capex arrangements unchanged Gas zone is responsibility of one party LCC in single party ownership Exit charges unchanged	Inconsistency with AIS (Ok for Type A) Busbar ownership is in multiple party ownership (potential SQSS disadvantages)		
3	Ownership boundary at gas barrier between busbar disconnectors and CB	**Initial** **Enduring** Gas zone is responsibility of one party Existing boundary between Distribution and Transmission systems retained Opex and capex arrangements unchanged (assuming negligible procurement and maintenance of disconnectors) Gas zone is responsibility of one party LCC in single party ownership Exit charges unchanged	**Initial** Multiple party construct assets – commercial issues not addressed **Enduring** Contractual operational arrangements to permit one party to operate the other party's disconnector (depends on which party 'owns' the busbars. Busbar ownership is in multiple party ownership (potential SQSS disadvantages) Inconsistent with AIS boundary	• Splits operational control of bay ie circuit beakers and disconnectors • Splits ownership of Local Control Cubicle • Provides ownership of busbar by single party	More disadvantages than Option 2 - rejected
4	Ownership boundary at gas barrier nearest busbar	**Initial** **Enduring** Opex and capex arrangements unchanged Existing boundary between Distribution and Transmission systems retained Gas zone is responsibility of one party Exit charges unchanged	**Initial** Multiple party construct assets – commercial issues not addressed **Enduring** Contractual operational arrangements to permit one party to operate the other party's disconnector (depends on which party 'owns' the busbars. LCC in multiple party ownership Inconsistent with AIS boundary	• For current GIS types splits operational control of bay • For current GIS types splits ownership of LCC • Gives different operational boundaries for older and current GIS types • Provides ownership of busbar by single party	More disadvantages than Option 2 - rejected
5	Ownership boundary at busbar side terminal of busbar disconnectors – multiple parties build	**Initial**	**Initial** Multiple party construct assets – commercial issues not addressed **Enduring**	• Retains operational integrity of bay • Retains single ownership of LCC	Similar to Option 2 (in that the commercial issues aren't addressed), but gas zone is in multiple ownership

	& own switchboard	**Enduring** Each party owns and operates its 'natural' assets Opex and capex arrangements unchanged Exit charges unchanged Existing boundary between Distribution and Transmission systems retained LCC in single party ownership Consistent with AIS boundary	Busbar ownership is in multiple party ownership (potential SQSS disadvantages) Gas zone is responsibility of multiple parties		– rejected in favour of option 2
6	Ownership boundary at busbar side terminal of busbar disconnectors One party builds & owns switchboard Gas zones jointly owned Switchboard owned by DNO (Typical)	**Initial** One party construct assets – asset transfer agreement needed **Enduring** Each party owns and operates its 'natural' assets (following asset transfer) Opex and capex arrangements unchanged (assuming equitable asset transfer) LCC in single party ownership Exit charges unchanged Existing boundary between Distribution and Transmission systems retained Consistent with AIS boundary	**Initial** **Enduring** Busbar ownership is in multiple party ownership (potential SQSS disadvantages) Gas zone is responsibility of multiple parties	• Retains operational integrity of bay • Retains single ownership of LCC • Joint ownership of gas zone leads to confusion – will require detailed arrangements for: o Sharing capital cost (probably relatively small) o Specification of module (where 2 parties have different detailed requirements) o Responsibility for commissioning o Responsibility for maintenance (assumed that the gas zone itself requires limited mtce o Liability in case of failure	Potential option that addresses the commercial issues and results in 'natural' operational arrangements. Key disadvantage relates to the need to manage the joint responsibility for the gas zone (need further clarity re the materiality of this)

Summary

The current position of the DNO represented on the WG is that Options 1, 2 (the existing arrangement) and 6 are worthy of further consideration by the WG to understand the relative magnitudes of the merits of the advantages and disadvantages of the options.