Code Administrator Meeting Summary

Meeting Name: GC0155 Workgroup 5

Date: 23 August 2022

Contact Details

Chair: Banke John-Okwesa, National Grid ESO Banke.John-Okwesa@nationalgrideso.com
Proposer: Terry Baldwin, National Grid ESO Terry.Baldwin@nationalgrideso.com

Key areas of discussion

Review of Actions log

The Workgroup talked through each action in the order it had been logged, Action **16** and **17** were deemed completed and closed.

Presentation on Design Limits for Temporary Overvoltage (TGN288)

- The NGET Workgroup member (FG) presented the slides on Design Limits for Temporary Overvoltage (TGN288) which will be shared with the Workgroup post meeting. FG clarified that the purpose of the presentation was to explain the background of TGN288 and, perhaps concepts and requirements considered may be adopted in developing the text for the Grid Code.
- A Workgroup member pointed out that the TGN288 is only applicable in England and Wales and not Scotland and does not make provision for lower voltage areas i.e., 132kv and less. It was suggested that consideration should be given to having a unified document across GB.
- It was suggested that a strawman based on existing converter specifications and other grid codes around the world should be created and reviewed within the Workgroup. In response to this, it was mentioned that a strawman had been presented by the SSE Rep in workgroup meeting 2. Also, it was highlighted that, although overview of TGN288 is useful knowledge, it is not fully applicable to this modification solution change.
- Some of the questions that were raised and discussed by Workgroup members include:
    - What the healthy phase voltage limit is required to be according to the Grid Code (1.4pu?) and whether the content of the NGET presentation suggested that it is a protective setting – it was clarified that it is not interpreted as a protection setting but rather an Absolute Insulation Level

- When is an equipment safely allowed to deload or trip, is it required to remain at 1.4pu in England and Wales and whether generators/wind turbines are supposed to remain connected and ride through the fault at 1.4 or above – it was clarified that it is expected to operate safely within the set window
- Regarding what point generators need to fault ride through – it was noted that if voltage increases generators have the discretion to decide their next steps. Also, supposing Temporary Over Voltages (TOV) lasts for 2m/s, if a converter cannot maintain full output, they may be allowed to drop it but the expectation is that the control system should ensure that output is sustained
- Fast fault current injection requirements post fault

Discussions on Temporary Over Voltage (TOV) / Reactive Power Requirements

- It was noted that where overvoltage requirements are set too low this can cause problems and additional costs to other parties. BA suggested that there should be reasonable means for managing TOVs without taking them off the network.
- A Workgroup member suggested that there needs to be a cost-effective way to look at reactive current in relation to the below diagram that was shared during the meeting. It was suggested that it is essential to study the behaviour of reactive currents during overvoltages as the Reactive Current injection requirements in the Grid Code may need refinement: Upon clearing the fault, Reactive Current Injection should be appropriate to how the voltage recovers: if it gets too high, reactive current should be imported and where it is too low then it should only be exported.

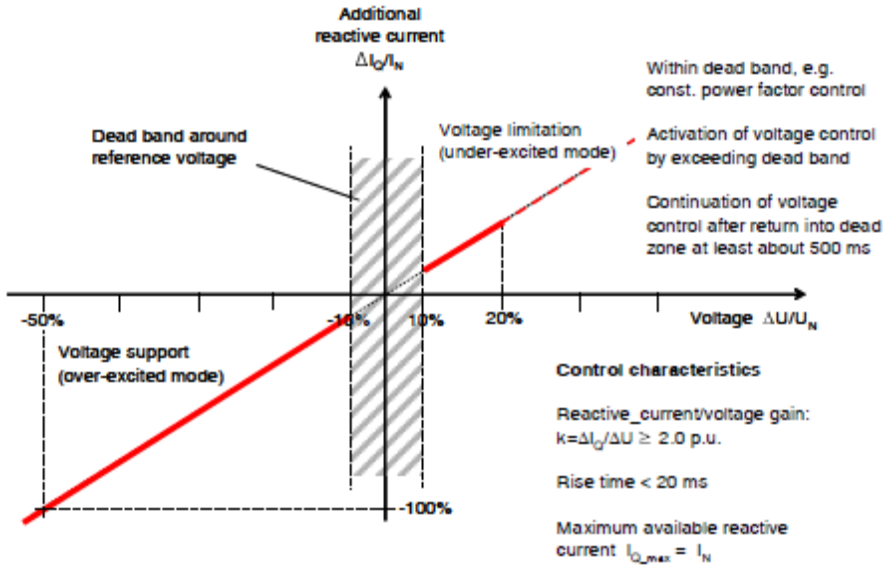

Fig. 2. Reactive power requirements of E.ON Netz [5] for HVRT.

Discussions on Research / Case studies, Phase Jumps and Vector Shifts

- The chair asked if the NGESO were looking at the international standards as this has been a common suggestion from Workgroup members. BA responded that the NGESO need to understand what is driving the problem first to determine what standards to investigate or consider. BA asked that, for the NGESO to be equipped to define overvoltage limits they need to establish and fully understand:

  - What is driving the problem, whether generators injecting power into the system, network parameters (mainly exists in cabled areas) etc
  - The equipment capability and mechanisms
  - Clear examples detailing the cause of high voltage issues; what drives the behaviour and reactions etc
- Most workgroup members emphasised the need for the NGESO Rep to speak with Original Equipment Manufacturers (OEM) to gather more information on equipment capability.
- BA talked through an example of voltage fluctuation associated with the deload of a windfarm which had been shared via email on 22 August 2022. A Workgroup member suggested that further investigation into the cause of the phase jumps in this example should be done before drawing conclusions. Without full investigation, it is difficult to determine how much phase jump is expected on the system and what could have caused it.
- BA clarified that the NGESO do not intend to address Vector Shift requirements within the modification as they do not feel it is directly related to the defect of the modification and will result in scope creep. Some workgroup members disagreed and AL took an action to produce a strawman for consideration by the Workgroup.

Timeline review

- The Chair talked through the Timeline to ensure that the Workgroup is on track and confirm objectives of subsequent meetings. Workgroup members were comfortable with the Timeline but felt that, for the Workgroup to keep on track the NGESO need to be more forthcoming with investigations and findings as the requirements from the Workgroup have been reiterated in this meeting and previous meeting and were quite clear.

Next steps

- The next workgroup meeting is scheduled for Wednesday 07 September 2022. At this meeting the Workgroup will review findings available from the NGESO; look into some technical questions that the SSE Rep will provide and review any other available evidence or strawman in relation to TOVs.

The following actions were noted:

Actions Log

Action Number	Workgroup raised	Owner	Action	Comment	Due by	Status
16	WG	All	Workgroup members to respond to NGESO Questionnaire to determine plan for additional requirements		5th August	Closed
17	WG4	BA/FW	Consolidate comments received, check those requirements that can/cannot be included and provide update.		15th August 2022	Closed
18	WG4	BA	Reach out to manufacturers to get their views	Remained open and an ask for WG members to reach out to		Open

			manufacturers also		
19	WG5	FG	To share updated slides with the workgroup from the presentation today		Complete
20	WG5	PM	To send the material to NGESO providing details on convertor manufacturer specifications	ASAP	Open
21	WG5	IG/BA	To meet offline to support with providing contacts of convertor manufacturers	ASAP	Open
22	WG5	All	To provide NGESO with clear articulation with examples of the TOV issues	ASAP	Open
23	WG5	All	For the workgroup to share with BJO to collate any evidence or examples they have on research work on TOVs to help support NGESO work and develop the modification solution	ASAP	Open
24	WG5	FN	To share some technical questions for the Workgroup to deliberate and discuss	7th Sept	Open
25	WG4	AL	Creation of Strawman on vector shift requirements for the workgroup to review		Open

Participants

Attendees	Initials	Company	Position
Banke John-Okwesa	BJO	Code Administrator National Grid ESO	Chair
Ruth Roberts	RR	Code Administrator National Grid ESO	Technical Secretary
Terry Baldwin	TB	National Grid ESO	Proposer & Workgroup Member
Alan Mason	AM	Oceanwinds	Workgroup Member
Alastair Frew	AF	Drax Power Station	Workgroup Member
Andrew Larkins	AL	Sygensys	Workgroup Member
Bieshoy Awad	BA	National Grid ESO	NGESO Rep and Workgroup Member
Fraser Norris	FN	SSE	Workgroup Member
Forooz Ghassemi	FG	NGET	Workgroup Member
Isaac Gutierrez	IG	Scottish Power	Workgroup Member
Priyanka Mohapatra	PM	Scottish Power	Workgroup Member
Martin Aten	MA	Uniper	Workgroup Member
Tim Ellingham	TE	RWE	Workgroup Member

Nicola Barberis Negra	NBN	Orsted	Workgroup Member
Shilen Shah	SS	Ofgem	Authority Rep
Tim Ellingham	TE	RWE	Workgroup Member
Fiona Williams	FW	NGESO	NGESO Rep & Observer
Julie Richmond	JR	Scottish Power	Observer
Owen Curran	OC	Siemens	Observer
Xiaoyao Zhou	XZ	National Grid ESO	Observer
Mike Kay	MK	Independent	Observer

For further information, please contact Banke John-Okwesa.