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nationalgrid

# GUIDANCE NOTE

# ACTIVE NETWORK MANAGEMENT SCHEMES

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## INTRODUCTION

National Grid welcomes the introduction of Active Network Management (ANM) Schemes on User's systems especially where these do not impact on BMUs (generation or demand) participating in the Balancing Mechanism. This may be:-

to facilitate early connection of a generator ahead of the local reinforcement works required for its connection to be compliant with the Security and Quality of Supply Standard (SQSS) when the curtailment of that generator's output may be necessary to avoid unacceptable overloading of the transmission or distribution system. This would be a short term measure

or:

as a long term solution where reinforcement of the network would not be economic compared with the anticipated lifetime generation constraint costs.

## WHAT ARE THE CONSIDERATIONS?

There are, however, factors that would need to be taken into consideration in all cases where an ANM may be adopted:-

1) The likelihood of impact on the effectiveness of demand management locally.
2) The retention of the System Operator's requirement for balancing services provided by market participants within the remit of the ANM scheme, those affected by the ANM, or to take demand control action.
3) There would need to be control signals flowing between the System Operator's (SO's) Energy Balancing System and the ANM scheme. However, where an ANM scheme is intended as an interim measure and system operation will not be appreciably affected (eg where there is no impact on a BMU actively participating in the BM) the SO may agree to the use on an ANM scheme.
4) There would be a cost to provide the additional functionality of the EBS that would be required to interface with future ANM schemes. Manual control of generation is not considered to be economic or efficient.
5) The use of ANM should not obscure the need for network investment to facilitate the connection of further renewable generation.
6) The ANM scheme should be capable of reacting sufficiently quickly to prevent unacceptable post-fault overloads or tripping. It should be noted that ANM schemes do not necessarily react in customary protection timescales and that SCADA or similar systems may have a much slower cycle time. The post-event ratings employed by the ANM scheme would take account of the total ANM system cycle time and thus may include short-term ratings.[1]
7) The adoption of an ANM scheme will not preclude (and will remain subject to) the need for the formal connection application processes to be followed with the relevant parties to assess whether an ANM scheme will be possible in each specific instance.

We consider network complexity beyond type F below to be unsuitable for Transmission or Distribution level ANM.

[1] ANM schemes are not necessarily designed to customary protection standards and thus there is potentially additional risk to assets in the use of short term ratings should a mal-operation occur.

| **Comparison of some potential ANM Scenarios** – See later diagrams | | | |
|---|---|---|---|
| TYPE | Description | Advantages | Disadvantages |
| A | Embedded non-BMU* - ANM acts on D circuit. | No impact on SO. Can facilitate early connection of embedded generator | Demand control affected. |
| B | Embedded Non BMU impacting on embedded BMU* - ANM acts on D circuit. | Can facilitate early connection of embedded generator | SO requires comms with ANM for balancing services[2] or to prevent 'back-filling' of BOA for constraint management. Demand control affected. |
| C | Embedded non-BMU* - ANM acts on T circuit. | No BMUs affected. Can facilitate early connection of embedded generator | Demand control affected. NETSO needs to be aware of the scheme. (May need indications and metering) |
| D | Embedded Non BMU impacts on embedded BMU* - ANM acts on T circuit. | Can facilitate early connection of embedded generator | SO requires comms with ANM to procure balancing services or prevent 'back-filling' of BOA for constraint management. Demand control affected. |
| E | T connected BMU Impacts on other BMU(s)* - ANM acts on single radial T circuit. | Can facilitate early transmission connection of generator | SO requires comms with ANM to procure balancing services or prevent 'back-filling' of BOA for constraint management. Demand control affected. |
| F | T connected BMU Impacting on T connected BMU, D connected BMU and embedded non BMU* - ANM acts on 2 radial T circuits. | T circuit sharing factors can be predicted and complex power-flow estimation avoided | SO requires comms with ANM for balancing services or to prevent 'back-filling' of BOA for constraint management. Demand control affected. |
| G | T connected BMU Impacting on T connected BMU, D connected BMU and embedded non BMU* - ANM acts on >2 radial T circuits. | None – Not practicable | T circuit cannot be predicted except by power-flow estimation (Duplication of EBS, potential control hierarchy issues). SO requires comms with ANM for balancing services or to prevent 'back-filling' of BOA for constraint management. Demand control affected. |

*Under ANM Control, D relates to Distribution, T to Transmission and BOA to Bid-Offer Acceptance.

[2] Balancing services may be provided by a wide range of participants including demand customers.

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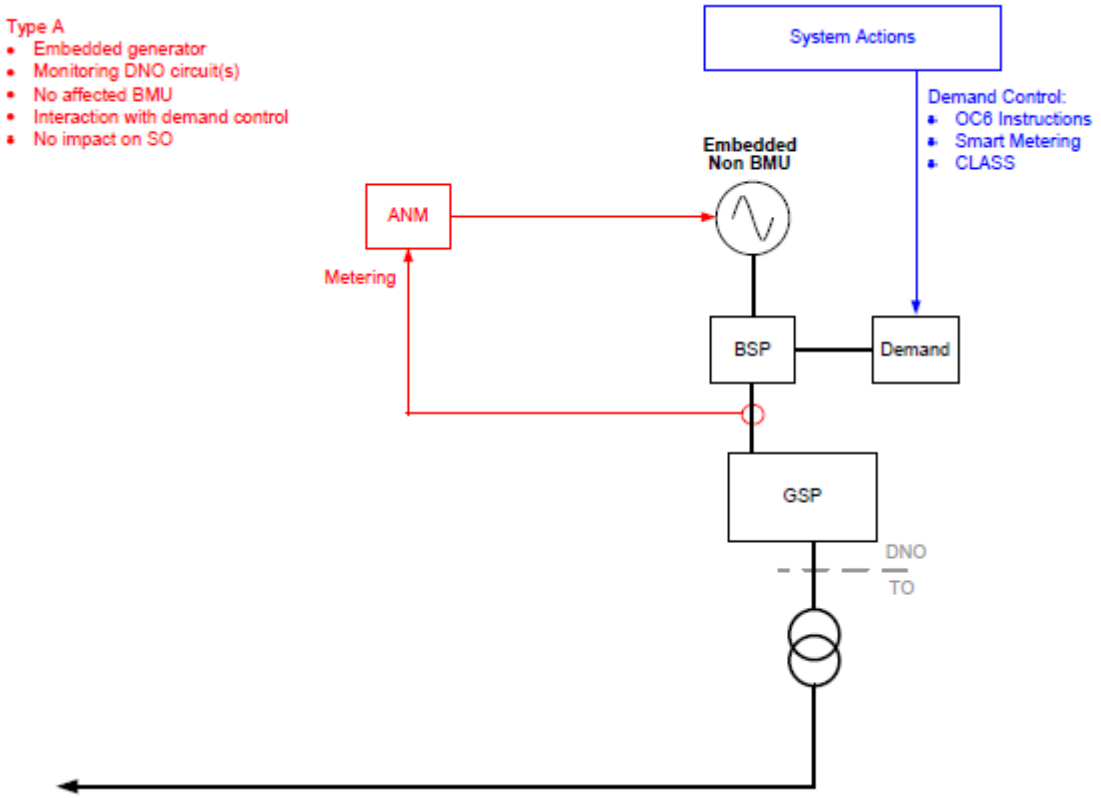
STCP26-1 Type 1

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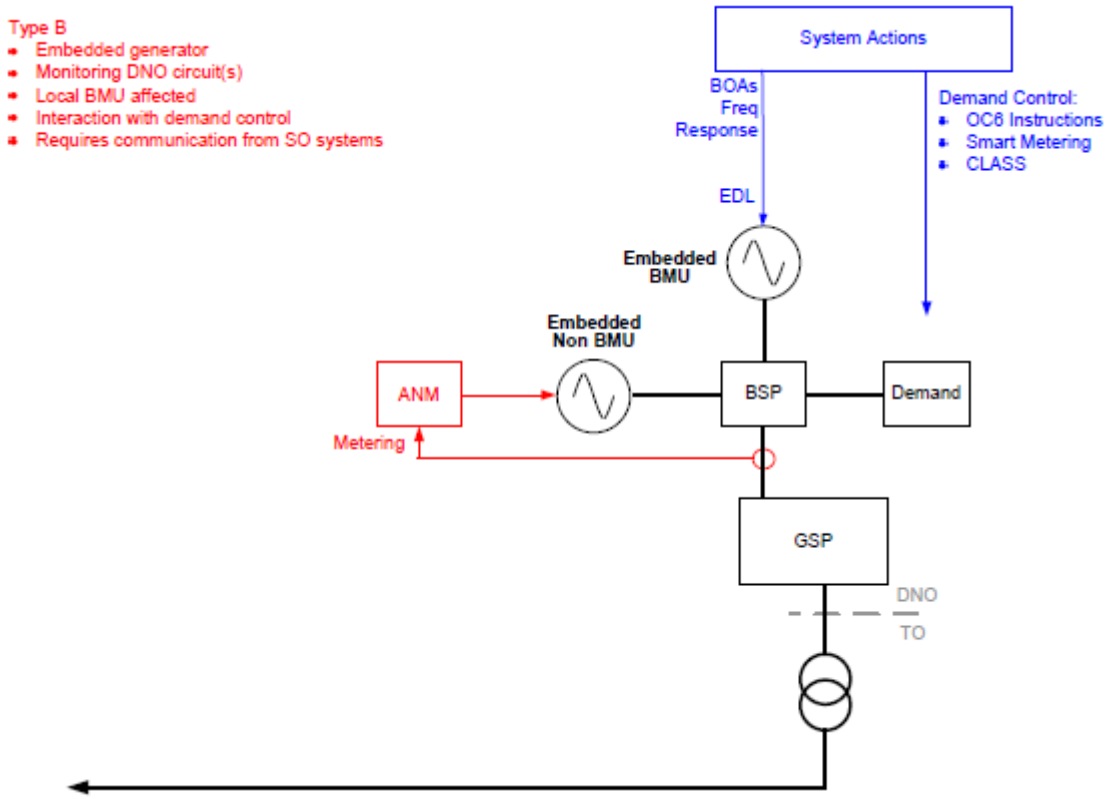

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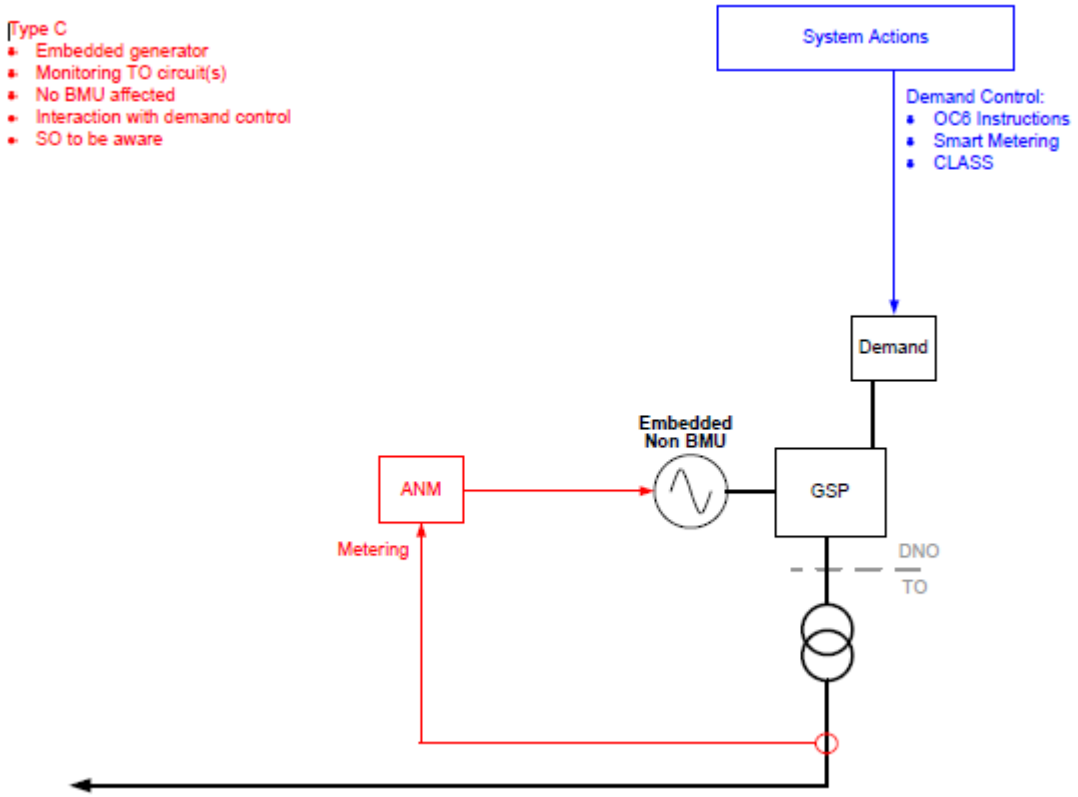
STCP26-1 Type 1

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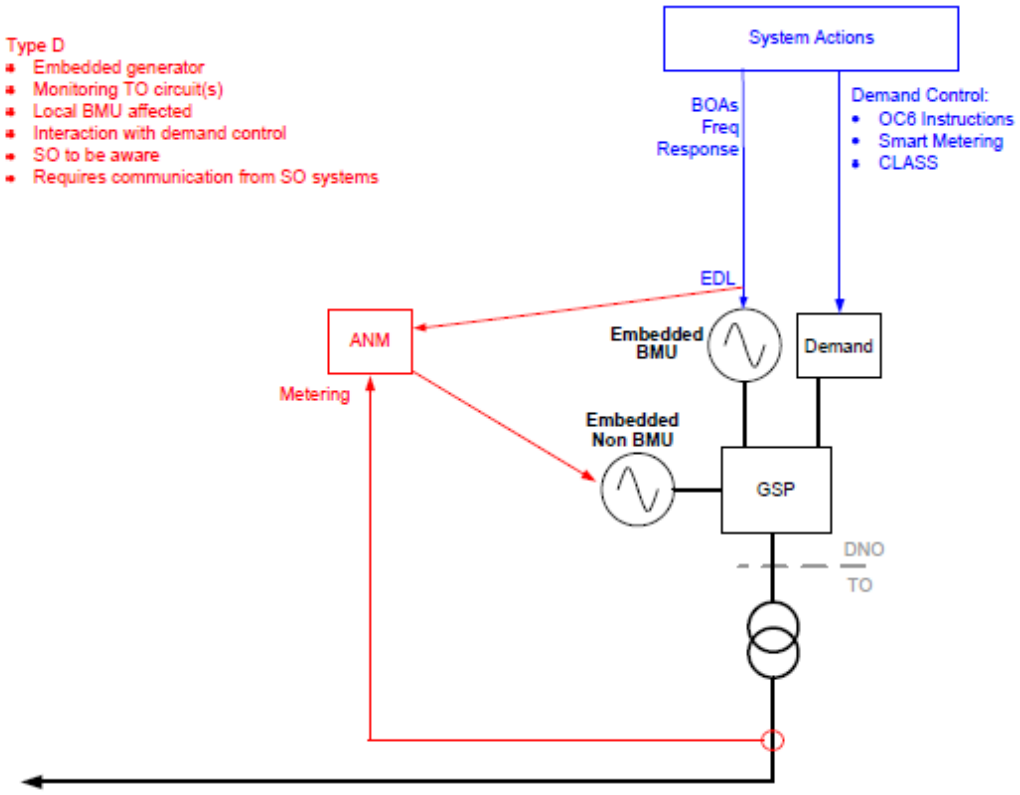

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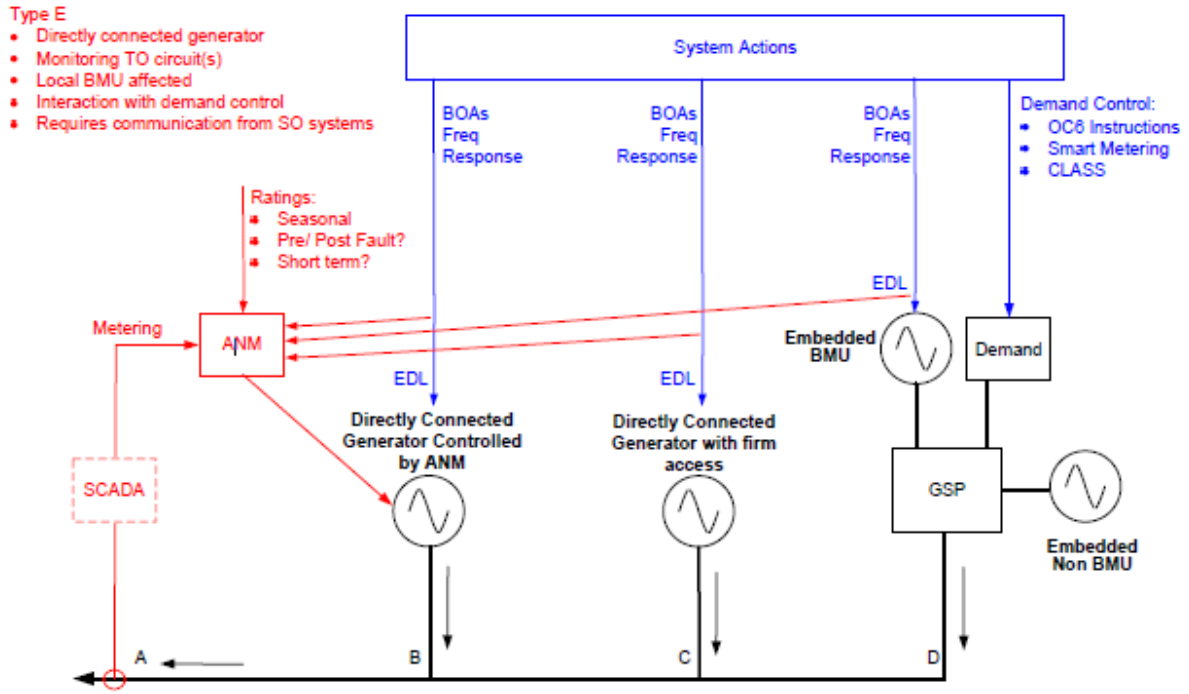
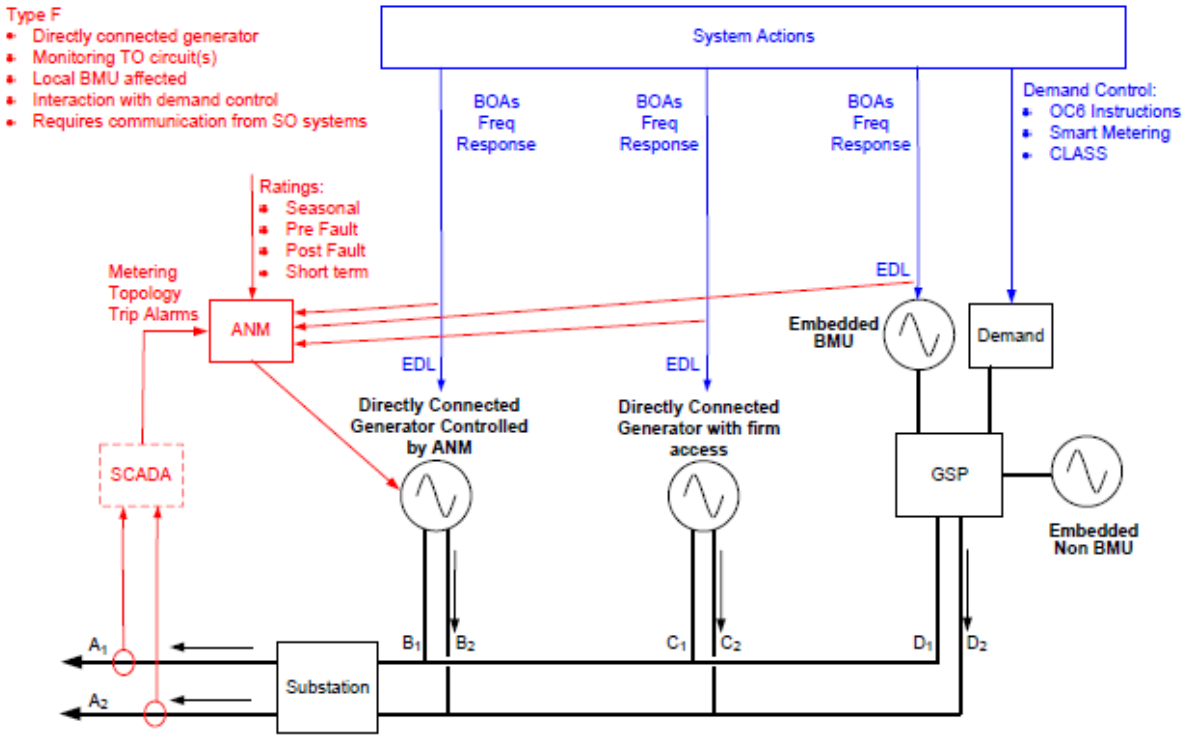
STCP26-1 Type 4




Output Limit B = Rating A – (Gen C + BOA C +Trade C) - (Flow D + BOA D + Trade D)
Available Headroom B = Rating A – (BOA C +Trade C + BOA D + Trade D) - Flow A

STCP26-1 Type 4




Available Headroom on $A_1$ = [Rating $A_1$ – α(BOA C +Trade C ) - β(BOA D + Trade D) - Flow $A_1$] Where α and β are sharing factors and are variable
Available Headroom on $A_2$ = [Rating $A_2$ – γ(BOA C +Trade C ) - δ(BOA D +Trade D) - Flow $A_2$] Where γ and δ are sharing factors and are variable
If Available Headroom on $A_1$ > 0 AND Available Headroom on $A_2$ >0 THEN [Available Headroom B = Available Headroom on $A_1$ + Available Headroom on $A_2$] ELSE [Available Headroom B = 0]

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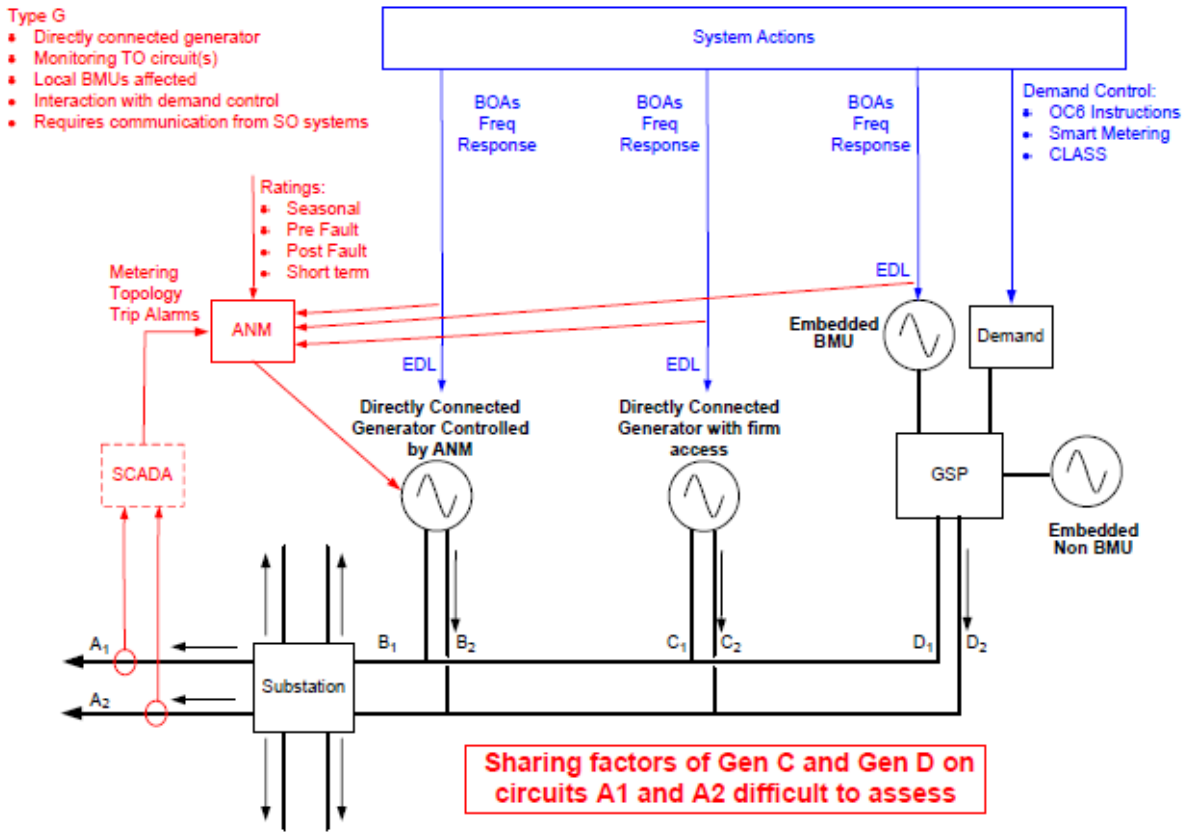
Not practicable for ANM control




Notes:

1. CLASS: Customer Load Active System Services – Commercial arrangement for DNO to reduce load.
2. OC6 instructions are used to effect demand control.