



Drakelow GSP

Network Development Report – East Midlands

May 2024

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Drakelow 132 kV

1. Network Overview

Drakelow Grid Supply Point (GSP) supplies three Bulk Supply Points (BSPs) in National Grid Electricity Distribution's (NGED's) East Midlands licence area in and around Burton-upon-Trent and Swadlincote. These three BSPs are: Burton, Burton South and Gresley (with Burton being separated into Burton 132/33 kV and Burton 132/11 kV).

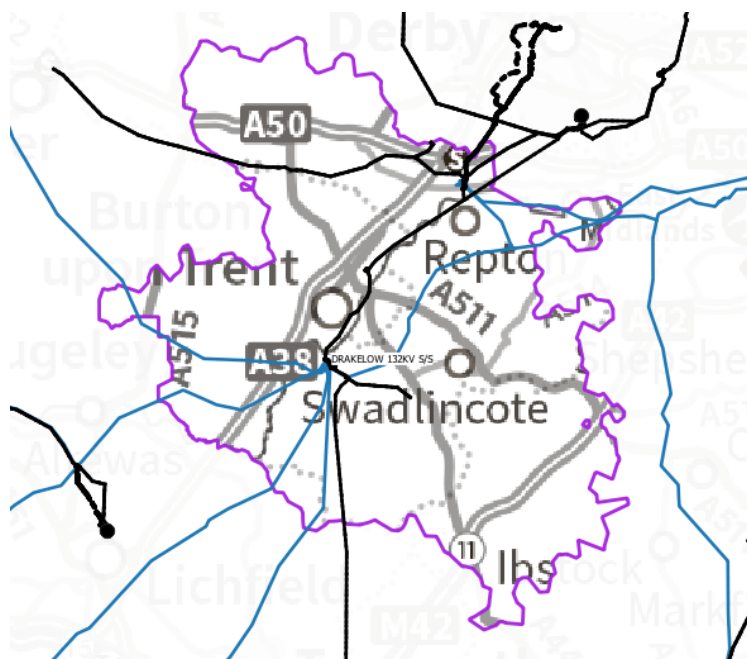


Figure 1.1 Drakelow GSP geographic network coverage

This report discusses all existing and future network constraints over a 0-10 year horizon identified on the 132 kV network fed from Drakelow GSP. This uses the methodology outlined in the Network Development Plan Methodology Report with Network Operability Modelling applied as outlined below.

For the purposes of this analysis, the NGED Best View Distribution Future Energy Scenario (DFES) has been used to study the years 2022 (baseline), 2028 and 2034, with consideration given to how proposals could change under the other scenarios. Five representative days have been studied across the four seasons: Winter Peak Demand, Intermediate Warm Peak Demand, Intermediate Cool Peak Demand, Summer Peak Demand and Summer Peak Generation.

1.1 Network Topology

Burton and Gresley BSPs are supplied directly from Drakelow via 132 kV dual circuits. Burton South is also supplied directly from Drakelow, being located directly adjacent to the GSP. Drakelow is interconnected with two other GSPs: with Lea Marston via a single 132 kV circuit teed off the circuit to Gresley GT1, and with Willington via a single 132 kV circuit from Burton BSP. Neither of these circuits are run closed under normal running arrangements, with 132 kV normal open points at Tamworth Grid and Burton BSP.

Gresley BSP has two 132/33 kV Grid Transformers (GTs) run in parallel feeding three sections of 33 kV busbar (both GTs are rated to 45/90/117 MVA). Burton South BSP has two 132/33 kV GTs run in parallel feeding two 33 kV busbars (both GTs are rated to 60/90/117 MVA). Burton BSP has four GTs (two 132/33 kV and two 132/11 kV). Its two 132/33 kV GTs are both rated to 60/90/117 MVA, and both 132/11 kV GTs are rated to 30/60/78 MVA. Burton BSP is run parallel at 11 kV and at 33 kV, but is run split at 132 kV.

Drakelow itself has two 400/132 kV Super Grid Transformers (SGTs) feeding onto four sections of 132 kV busbar. The site is run in parallel under normal running arrangements. A third SGT is being added to the GSP which will also be run in parallel (although this could potentially trigger fault level works).

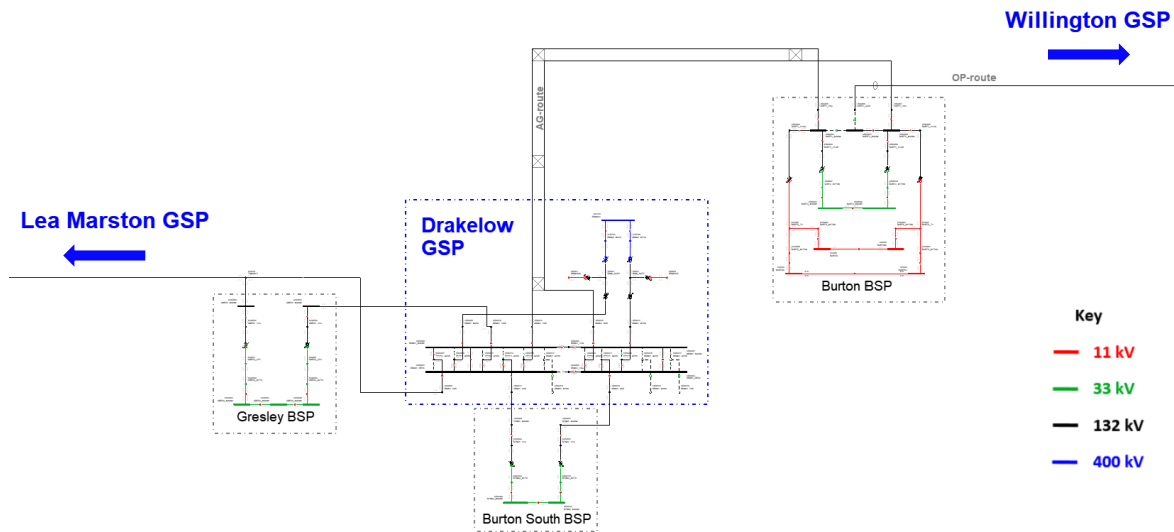


Figure 1.1.1 Drakelow 132 kV network single line diagram

1.2 Network Operability Modelling

The following network automation and manual switching schemes have been modelled in the analysis of this area, aligning to how the network is operated now and how it is planned to be operated in the future.

- Arranged outages on the 132 kV busbars at Drakelow GSP are modelled such that circuits are secured onto in service busbars.
- For arranged outages on CB130, CB230, the main 1 or main 2 (132 kV) busbars, or either isolator between the two main busbars, the reserve busbars are paralleled to maintain the 2 solid running arrangement of the GSP.
- For an outage on either 132 kV infeed to (or either GT at) Burton and Burton South BSPs, the loose couple between the two sites is broken by splitting Station Street primary at 11 kV.
- The 33 kV and 11 kV networks downstream of the BSPs fed from Drakelow GSP are split for arranged outages on the 33 kV bus section couplers (see relevant 33 kV network reports for more details).
- For the loss of an infeed to a transformer at any of the BSPs fed from Drakelow GSP under arranged outages, the lower voltage side circuit breaker is opened to prevent back-energisation.

2. Network Constraints and Solution Options

2.1 Summary of Network Constraints

The following constraints were identified for the Best View Scenario:

- For an arranged outage on an SGT at Drakelow followed by a fault on another SGT (with the third SGT installed) demand is expected to be slightly over the nameplate rating of the remaining SGT (for winter in 2028 and for multiple seasons in 2034). This could be managed through splitting the network, restricting outages to the access period and/or utilising short term ratings and post fault transfers.
- There is an N-2 restoration requirement for Drakelow GSP which is currently met using the 132 kV circuit from Burton BSP into the Willington group. Once the third SGT is installed, the N-2 restoration capacity of the group will be increased significantly.
- From 2028, there is forecast to be an N-2 restoration requirement for Burton BSP (as the group load exceeds 100 MW). As with Drakelow GSP, this will be easily met by utilising the third 132 kV circuit to Burton BSP from Willington GSP.
- Any constraints on the 33 kV networks downstream of any of the BSPs within Drakelow GSP are covered in the Burton, Burton South and Gresley 33 kV report.



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