



Additional information

DNOs to provide further data and evidence for the costs and volume of work as part of their consultation responses

Ref: 3.181

1. We have an obligation under the latest PCB regulations to identify and remove or remediate non-compliant equipment by 31 December 2025. The primary driver for investment is legal compliance triggered by environmental factors. Secondary drivers include replacement based on condition as well as uplift in the rating of replacement assets driven by future load forecasts and to reduce losses.
2. The main assets that fall within the scope of the regulations are pole mounted transformers (PMT) and ground mounted transformers (GMT) that have been manufactured prior to 1987.

GM Transformers

3. Oil testing and GMT decontamination or replacement volumes are reasonably certain and therefore are proposed to be excluded from the volume driver and funded through baseline allowances. We will therefore only discuss PMT's in the remainder of this document.

PM Transformers

4. We have a total of 16,446 HV PM transformer assets in both license areas combined that were manufactured prior to 1987. PM transformers are not designed to be internally inspected and do not have any oil filler/drain valves, from which an oil sample could be obtained. Actual PCB content is currently only measured when a transformer is decommissioned, as part of the oil disposal process. ENA members are collaborating to try to identify methods to sample the oil safely and economically in PM transformers, but in the meantime the only certain way of knowing whether PCBs are present is by removing the transformer from service and then sampling the oil.
 5. The EA has issued a Regulatory Position Statement (RPS) that permits the use of statistical modelling to demonstrate that HV PM transformers are compliant under the latest PCB regulations.
 6. Working with the EA and the Department for Environment Food and Rural Affairs (Defra) we have developed and agreed a statistical approach that complies with the requirements of the RPS. This
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facilitates identification of cohorts of transformers by manufacturer and age. It then classifies them as low or high risk based on oil samples taken from decommissioned assets within the same cohort. Assets within low-risk cohorts can be left in service for the remainder of their useful life, subject to normal external visual inspections and subsequent proper disposal of any PCBs upon decommissioning. All assets within high-risk cohorts are deemed to be non-compliant, regardless of their actual PCB content, under the latest PCBs regulations and must be replaced by the 2025 deadline.

7. The manufacturer and age of our existing pre-1987 HV PM transformer population, in conjunction with DNO-wide PCB test results, have been used as inputs for the statistical analysis. Test results are obtained and added to the analysis whenever a PM transformer is decommissioned, which includes testing the oil for PCB content.
8. A cohort can only be categorically classed as low risk when a statistically significant number of clean samples have been obtained (typically a minimum of 13 clean samples). A single 'dirty' sample will normally render the whole cohort as high risk.
9. The results so far have identified 1,858 assets to be in the high risk, red cohort category (i.e. high certainty of these PCBs being over the threshold) which must be replaced by the 2025 deadline. There are 5,955 assets that have been classified as low risk, green cohort.
10. That leaves a total of 8,633 assets which are still unclassified and require additional information to facilitate classification. The statistical analysis continues to improve as we decommission more transformers, but the most recent analysis¹ indicates that of the 8,633 unclassified assets there are a total of 1,829 assets that we must replace and identify as being in the green or red cohort to obtain a statistically significant sample or because the cohort (sample size) is too small for statistical sampling.
11. The combined total number of assets that we must replace is the 1,858 assets identified as high risk, plus the 1,829 assets that are currently unclassified. A full breakdown is shown in table 1.

¹ Completed on 26 June 2022.

COHORT	VOLUME	COMMENTS
Green	5,955	
• amber (small cohorts)	872	Must do due to cohort being too small for statistical sampling
• amber sampling	957	Must do to obtain a statistically significant sample in each cohort
• Red	1,858	Must do due to failures during sampling
Total must do	3,687	This is the definite minimum that we must do if all future samples come back clean
• Remaining ambers	3,199	These will get categorised as red or green when the amber sampling is completed
• Unknowns	3,605	These will get categorised when their age/manufacturer has been verified. Otherwise, they will need to be replaced
Total unknown/ remaining amber	6,804	
Combined Total	16,446	

Table 1 – NPg PMT's categorised based on statistical sampling

12. However, once we have classified the required 1,829 assets, we will be able to verify further asset data and classify the remaining 6,804 unknowns. To account for these assets in our planning assumptions we take an industry mean of the red:green ratios and forecast the additional high risk red assets that are likely to require replacement. From this we estimate that we will need to replace a total of 5,310 PMTs of the unknown/remaining amber category.
13. As per the EJP, our pole mounted transformers pricing is based on our ED1 actual performance, with an uplift for tier 2, upsizing and amorphous core. We then consider the cost for replacement of units based on different interventions as follows:
- Replace unit with same size and type
 - Upsize unit
 - Replace with a CRGO Tier 2 type unit
 - Replace with an Amorphous Tier 2 type unit
 - Combination of upsize and CRGO Tier 2/Amorphous Tier 2 units
14. Costs to replace units can vary from ca. £3k (25kV 11kV 1ph Tier 1 CRGO) to ca. £20k (315kVA 20kV 3ph morphous type). We have made a planning assumption in applying each type of

intervention with guidance from our PMT losses CBA to give us an average unit cost of £5k for both license areas in the submission. We welcome the opportunity to work with Ofgem on a tier unit cost driver and can supply detailed cost data on the individual types as part of that work.
