The Voice of the Networks

DNO Common Network Asset Indices Methodology

SLC 51 Part I Consultation – supplementary information

27 March 2017

Common Network Asset Indices Methodology Proposed Modifications – Standard Licence Condition 51 Part I Consultation – supplementary information

1 Purpose and Objective

The purpose of this letter is to address the issues raised in response to the consultation on the proposed changes to the Common Network Asset Indices Methodology from Version 1.0 (as directed for implementation by Ofgem in October 2016) and the DNO community Version 1.1 as currently proposed.

1.1 Executive Summary

On 3 February, the DNOs collectively published a consultation on proposed changes to the Common Network Asset Indices Methodology (CNAIM), as required under Part I of Standard Licence Condition (SLC) 51 of the Electricity Distribution licence. These changes were proposed in response to the learning from the process of the DNOs re-submitting their Network Asset Workbooks (NAWs) to Ofgem on 30 December 2016.

The Network Asset Workbooks were originally published as part of the RIIO-ED1 Final Determination, and were required to be re-stated following the directed implementation of version 1.0 of the CNAIM in line with the requirements of licence condition CRC5D.

The Network Asset Workbooks identify the starting level of asset risk in RIIO-ED1 for those asset types within the scope of CNAIM, and the forecast 2023 positions with and without the impact of DNO allowed replacement and refurbishment investments. The difference between the 2023 positions forms a delta which constitutes the DNO's Network Asset Secondary Deliverables (NASD) output target for RIIO-ED1 in this area.

Following Ofgem review, it was identified that version 1.0 of CNAIM had produced anomalous results for a small number of asset types which had a disproportionate impact on the overall risk targets being proposed in the NAWs, for example OHL Towers were in some cases contributing 20% of the overall risk delta for around 1% of the Secondary Deliverables investment. As a consequence, DNOs worked together to review relevant CNAIM parameters, proposed amendments to CNAIM and re-submitted their rebased NAWs on 9 February 2017.

Ofgem issued a consultation on the re-submissions on 3 March 2017. This consultation is live and remains open for responses until 31 March 2017. It can be found here;

https://www.ofgem.gov.uk/publications-and-updates/network-asset-secondary-deliverables-rebasing-consultation

In section 2.9 onwards of the consultation, Ofgem note the incorporation of proposed changes for EHV and 132kV OHL Towers and UG Cables (Oil) in response to the issues found in the original submissions.

It was Ofgem's view that these changes constituted a further modification to the Directed Methodology and hence needed to go through the change control process set out in part I of SLC51. This requires a consultation on the proposed changes followed by a report to Ofgem. Following submission of the report, Ofgem have 28 days to issue a direction not to implement the changes, otherwise they are deemed agreed.

This consultation was published on 3 February 2017 and hosted on the Energy Networks Association (ENA's) website for 28 calendar days. It published the proposed modified v1.1 of the CNAIM document, together with an explanatory document of the changes.

It elicited a single response which identified that, although the changes appeared sensible in principle, insufficient information had been provided within the consultation for consultees to form a fully informed view on the proposals.

As a consequence, the DNOs have agreed to publish this supplementary letter including additional explanation and information on the proposed changes and their justification.

We welcome any additional feedback on this letter by 7 April to the e-mail address noted in section 4. If you consider that further time is required to review these proposals, please respond to the same address.

We have not responded to the comments made by the respondent concerning the use of the revised or original secondary deliverables as establishing and implementing a Common Network Asset Indices Methodology was a requirement of all the RIIO-ED1 licensees.

It remains our recommendation that the proposed v1.1 of the Methodology is duly approved with these amendments incorporated.

This letter is issued on behalf of the following companies that between them hold the fourteen GB Electricity Distribution licences:

Electricity North West
Northern Powergrid
Scottish and Southern Distribution
Scottish Power Energy Networks
UK Power Networks and
Western Power Distribution

2 Background

2.1 Structure of this document

This chapter sets out the background to the currently directed version of CNAIM, and the detailed changes currently proposed for Direction.

Chapter 3 sets out the issues raised in response to the previous consultation and provides additional explanation and detail on each point raised.

It should be read alongside the updated version of the Common Network Asset Indices Methodology published in conjunction with this consultation, together with Ofgem's current Network Asset Secondary Deliverables Rebasing Consultation, referenced in Chapter 1.

2.2 Methodology consultations

February 2016 Direction
Following an initial submission in July 2015 and subsequent review, Ofgem deemed that the revised version of the CNAIM submitted by the DNOs in December 2015 (v0.4) met the requirements of SLC51 and Directed its implementation on 1 February 2016;

https://www.ofgem.gov.uk/publications-and-updates/decision-dno-common-network-asset-indices-methodology

October 2016 Revision
The DNOs commenced implementation of the revised methodology and during this period identified a series of other minor changes which also required amendments to the methodology. Ofgem identified that these changes constituted a change under SLC51 Part I and as a result the DNOs ran a further public consultation in August and September 2016.

No responses were received to this consultation and in October 2016 Ofgem directed that the Methodology dated 1 August 2016 (Version 1.0) be adopted.

https://www.ofgem.gov.uk/publications-and-updates/decision-distribution-network-operators-common-network-asset-indices-methodology

2.3 Changes proposed (as presented in the February 2017 consultation)

There are three changes from the version of the Methodology directed by Ofgem in October 2016 proposed in Version 1.1 and they are listed in the table below. These changes apply to the EHV OHL Towers, 132kV OHL Towers, EHV UG Cable (Oil) and 132kV UG Cable (Oil) asset types only.

All three changes are designed to better quantify the level of risk as a result of an asset failure and hence the relative risk exposure when compared to other asset classes within the methodology.

Changes 1 and 2 propose a revision of the value of k (in this proposal a reduction) which results in the value of the calculated Probability of Failure for an asset being reduced, whilst keeping the fundamental shape of the deterioration curve across all asset types, a fundamental design criteria of the methodology. Equation 1 of the CNAIM document (Page 30) illustrates this principle.

In Change 3, the average consequence of failure associated with the Network Performance of the asset is reduced for EHV OHL Towers and 132kV OHL Towers and hence the total consequence score is reduced.

All three changes are designed to reduce the risk associated with an asset related failure by reducing the values of Probability and Consequence and thus Risk (Probability x Consequence). In the opinion of the DNOs, these revised values better reflect the proportion of asset risk they have and are required to manage for these asset types when compared to the basket of assets modelled within the wider methodology.

Revisions to Version 1 proposed in Version 1.1

Change	Document Ref	Changes Description	Change Logic
1	Table 21 Page 106	The value of k for Pressurised Cable (EHV UG Cable (Oil) and 132kV UG Cable (Oil)) has been revised to 2.0944% from 3.7754%	In creating the value of k for this asset category it was observed on review that the range of interventions being used to create the calculation varied significantly between companies. This resulted in an overstatement of the risk and hence the value has been recalculated using the median. This has the effect of excluding data outliers.
2	Table 21 Page 106	The value of k for Towers has been revised to 0.0545% from 0.0879%	Failures of these asset types are rare and the data used to calculate the value of the k factor suffered from the same observed problem as Change 1. This resulted in an overstatement of the risk and hence the value has been recalculated excluding data outliers.
3	Table 227 Page 179	The Value of Coincident fault per hour for 33, 66 and 132kV Towers has been reduced to 0.05% from 1%. This has a consequential impact on the Reference Cost of Failure.	Examination of fault records indicates that the initial value of 1% overstated the “as found” situation. A change to the value of 0.05% better reflects DNO experience that very few of the functional failures in the data set would lead to a double circuit outage (than previously assumed).

3 Issues Raised

3.1 Chapter Summary

This chapter identifies the specific issues raised in response to the consultation and provides additional information and context on the changes proposed.

3.2 Issues

Issue 1: It is unclear why it is believed that the current version of the CNAIM overstates the perceived risk associated with the relevant asset classes and hence has a disproportionate impact on the RIIO-ED1 risk reduction targets.

Response:

During the bilateral meetings between Ofgem and the DNOs following submission of the revised NAWs, the majority of the DNOs raised concerns about EHV and 132kV OHL Towers and the disproportionate level of risk that CNAIM was calculating for these asset categories. Some DNOs also raised similar concerns for the EHV and 132kV UG Cable (Oil) categories. Following further discussions between Ofgem and the DNOs, it was agreed that the risk contribution from both asset categories was, in particular for OHL Towers, out of proportion with the level of investment planned. In some cases, OHL Towers were contributing approximately 20% of the overall risk target for around 1% of the associated Secondary Deliverables investment (with the highest being 45%). The issue was less pronounced for UG Cable (Oil) but it was agreed that the issue was worth investigating further.

The cause of this issue was driven by the types of failure experienced for these particular asset categories. For all other asset categories, the Probability of Failure (PoF) is driven by electrical faults which are all recorded on the National Fault and Interruption Reporting Scheme (NaFIRS) and this data is then used to derive the PoF curve.

For both OHL Towers and UG Cable (Oil) the failure modes are not just limited to electrical failures but also include physical failures. For OHL Towers these are interventions to repair steelwork and for UG Cable (Oil) they are oil leakage rates.

The physical failure mode required the DNOs to use historical intervention data in addition to the NaFIRS data to reflect the volumes of physical failures experienced for these asset categories when calibrating the k factor used in the Probability of Failure calculation. While the DNOs have this data, they each define these interventions independently which results in differences between the DNOs. This data is also subject to variances due to timing and/or work content of interventions undertaken, which may be driven by differences in asset management approaches between companies.

Previously, an average of the data was used to determine the PoF. Upon reviewing the physical failure data, the DNOs found that there were some outliers which gave rise to high PoF values. The DNOs agreed that the median would be used to determine the PoF for UG Cable (Oil) categories and that data more than one standard deviation away from the average would be excluded and the average then be determined for OHL Towers.

Additionally for OHL Towers, the DNOs identified that the Consequence of Failure associated with these asset categories had a very high Network Performance contribution. It was identified that within the Network Performance costs of Failure (Table 227 of CNAIM v1.0) the Probability of a coincident fault per hour was 20 times larger than for the other asset categories. It was agreed that, whilst most towers are double circuit, the majority

of forecast failures are incipient (i.e. they do not result in the loss of supplies) and therefore the probability of a coincident fault (causing loss of supplies) is not actually significantly higher than for other asset categories.

The DNOs were in agreement that the Probability of a coincident fault per hr should be reduced to match all other asset categories.

Issue 2: The consultation does not include any review of the extent to which the underlying issue causing this particular anomalous output may also be affecting other outputs of the CNAIM.

Response:

The issues identified related only to those asset types where functional and structural failures had been combined into a single Probability of Failure function within the CNAIM approach. As discussed earlier, although functional (fault) failures are reported via a standardised approach, the definition of structural failures has historically varied and hence the historical failure rate data for these asset types is variable between DNOs. The application of simple averages to this historic data revealed a significant over-statement in the resulting level of risk to that experienced by the DNOs and reflected in their RIIO-ED1 investment submissions.

The asset types on which the changes are proposed are the only ones exhibiting this feature; hence there is no corresponding impact on the other asset categories within the scope of the CNAIM methodology.

Issue 3: The approach to identifying outliers needs to be explained in order for the suitability of the proposed values of k to be assessed.

Response:

EHV and 132 kV Towers

The method for determining the value of k for all assets in the current version was carried out in an identical manner regardless of the purpose of the asset by using the average functional failure rate across all DNOs to calibrate k. For Towers, this has the consequence that a steel structure was treated in the same manner as an electrical transformer, thus resulting in a value of k being determined which doesn't reflect the actual observed failures.

Data for the original calculation was provided for 10 of the 14 licence areas. The annual functional failure rate per licence area for the previous five years varied from zero to 11.4% with the vast majority of the rates (seven of the 10 considered) being below the average failure rate. Use of the statistical mean resulted in a high value of k and hence Probability of failure and risk for the asset class.

When restating the NAW it became evident that the level of risk assigned to these asset classes was significantly disproportionate to the expenditure being undertaken. Further analysis of this discovered that the outliers in the k value calculation were disproportionately raising the level of the PoF value.

From the review, the value of k was recalculated including 12 of the 14 licence area data sets and removing the outlier values. This resulted in the value of k reducing from 0.0879% to 0.0545%

The adjustment to the k value has resulted in the risk values associated with these assets being reduced to a more proportionate level (excluding Oil cables – see below). It must

be noted that the reduction of the coincident fault value (see issue 4) has a further impact on these calculations.

EHV and 132kV Oil cables

The methodology is designed to take into account both primary circuit faults typified by the passage of high current at the time of an incident and other faults such as a unsustainable oil leak that requires the circuit to be either pumped back to operating pressure or the cable being removed from service to permit repairs. Incidence of the former fault mode are rare due to the generally good performance of this type of asset; however the latter is commonplace due to disturbance caused by vibration, land movement and third party activity.

As with the towers, data was collected from the DNOs (13 of the 14 licence areas) and a probability of failure and hence value of k was calculated based on the total failures in the five year period prior to publication of the methodology. This took no account of the split between the electrical failures and those associated with oil loss.

The resultant level of risk associated with these assets was identified as being disproportionate to the investment proposed by the DNOs. Examination of the data revealed that, as with towers, some company data created significant outliers when used to calculate the value of k. A review of the data identified that by treating the failures in a revised manner from the other asset groups, the PoF would be modified and a risk value more appropriate to the asset and the associated investment levels identified.

Two options were considered:

1. Remove the highest and lowest values and recalculate on that basis; or

2. Create a median value from the data to determine the median top up rate per kilometre of cable for GB.

The majority of DNOs agreed that option 2 more accurately reflected the PoF and hence would more accurately reflect the value of risk when operating these assets. Option 2 was subsequently unanimously agreed for inclusion in the proposed V1.1.

Issue 4: An explanation of the empirical derivation of the proposed Value of Coincident fault per hour is needed for stakeholders to assess whether it constitutes an appropriate change to the CNAIM.

Response:

The coincident faults per hour value used in the calculation of Consequence of Failure is set at 1% in V1.0 of CNAIM. This is the likelihood throughout GB of coincident faults occurring on the network and thus resulting in total loss of supply to a wide area. A value of 1% means that for every 100 incident hours where an asset failure is experienced, a further failure which can impact the asset condition of the failed asset is likely to occur. In very extreme cases this could result in the loss of a tower and hence supplies. This value is used in the calculation to determine the base criticality value for towers.

In order to confirm an appropriate value for this element of the calculation and based on GB wide data, a review of the number of coincident failures per hour was undertaken. This review concluded that the value of 1% or one coincident failure per 100 hours was a significant overstatement of the actual observed failure rate. The value proposed in the revised methodology of 0.05% more closely represents the 1 in 2000 hours as observed in the GB network.

The revised value was applied to the calculation of the average value of CoF and thus reduced the CoF value which when combined with the lower PoF value outlined earlier results in an overall risk reduction.

4 Responses

Responses should be submitted to the ENA secretariat by 7 April 2017 no later than 17.00hrs to regulation@energynetworks.org. Alternatively submissions by post as detailed below must be received by the same time at the address below.

Electricity North West Limited,
Head of Asset Management,
Hartington Road,
Preston,
PR1 8AF

This proposal is tabled on behalf of the licencees listed on page 3 but is hosted on the Electricity Networks Association's website.

Unless clearly marked **confidential**, all responses to the consultation (regardless of original media) will be published on the Electricity Networks Association website until 31 April 2017. After that date copies of the consultation responses can be obtain by writing to:

Electricity North West Limited,
Asset Management Modelling Manager,
Floor 3,
Hartington Road,
Preston,
PR1 8AF

and providing either a return postal or e mail address.

5 Next Steps

5.1 Chapter Summary

This chapter sets out the next steps in the process for enacting the proposed changes to the Common Network Asset Indices Methodology.

After the closing date has passed, the companies required to conduct this consultation will consider the responses received. A report summarising the responses, together with copies of all received documents will be sent to Ofgem who may either direct the revised Common Network Asset Indices Methodology be adopted or Direct that the existing Methodology continue to be implemented.

	Date
Supplementary consultation published on Electricity Networks Association website	27 March 2017
Supplementary consultation closes	4 April 2017
DNOs present report to Ofgem on proposals and responses to the consultation	7 April 2017