

Safety, Resilience, and Reliability Working Group

Meeting 4 – NARM / CNAIM



RIIO Electricity Distribution
16/01/2019

Safety, Resilience, and Reliability Working Group

- Welcome and introductions from Ofgem
- ENA presentation on proposed methodology for reporting Future (Whole Life) Risk
- ENA presentation on commonality of assets across NARMs / extension to further assets
- Update on timelines and priorities, experience and views from ED1 and other sectors
- ENA presentation on CNAIM v2 timeline
- ENA presentation on Good Practice Guidance
- Actions, Next Steps, AOB



- We propose to hold a WG session approximately every other week with feedback sessions to make sure all ground is covered and prioritised appropriately..
- We plan to run sessions in the Glasgow and London Ofgem offices.
- Depending on room availability, we may need to restrict the number of representatives that each member organisation sends to meetings of the Group

Date	Location	Summary	Items to cover
27 November 19	London	First session	ToR, Priorities
05-Dec-19	London	NARM/CNAIM	
09-Jan-19	London	Quality of Supply	
16-Jan-20	Glasgow	NARM/CNAIM	
30-Jan-20	London	Resilience	
12-Feb-20	London	NARM/CNAIM	
18-Feb-20	London	Quality of Supply	
03-Mar-20	Glasgow	Resilience	
18-Mar-20	London	NARM/CNAIM	
31-Mar-20	Glasgow	Quality of Supply	
07-Apr-20	London	Resilience	

ENA presentation on Future (Whole) Life Risk

The Voice of the Networks

Energy Networks Association



NETWORK ASSET INDICES:

**Consideration Of The Proposed Methodology For
Reporting Future (Whole Life) Risk Improvement (3)**

16th January 2020

Phil Mann

Proposed ED2 Reporting Framework (Recap)

- The present value of 'future risk', from CNAIM, can be determined from:-

$$[PV \text{ of Future Risk}]_{0-n} = [(PoF_0 \times DF_0) + (PoF_1 \times DF_1) + (PoF_2 \times DF_2) + \dots + (PoF_n \times DF_n)] \times CoF$$

where:

PoF_0 = the expected number of functional failures in the current year;

PoF_1 = the expected number of functional failures in year 1; etc.

CoF = the Consequences of Failure (£);

DF_0 = the discount factor applicable to year 0, the current year;

DF_1 = the discount factor applicable to year 1, i.e. one year into the future; etc.

{note: the discount factor applicable for year $n = (1+r)^{-n}$, where r is the discount rate}

- Our proposal was tabled at the RSEWG/ SRRWG meetings on 4th November and 5th December 2019 that 'future risk' can be considered using the existing 5x4 (Health v Criticality) reporting matrix by:-
 - retaining the existing approach to assigning a Health Index and Criticality Index to each asset;
 - retaining the existing methodology for assigning a typical value of CoF to each Criticality Band; and
 - applying new weightings to each Health Index Band that reflect the 'cumulative discounted future PoF' for a typical asset within each Health Index Band.

Proposed ED2 Reporting Framework (Recap)

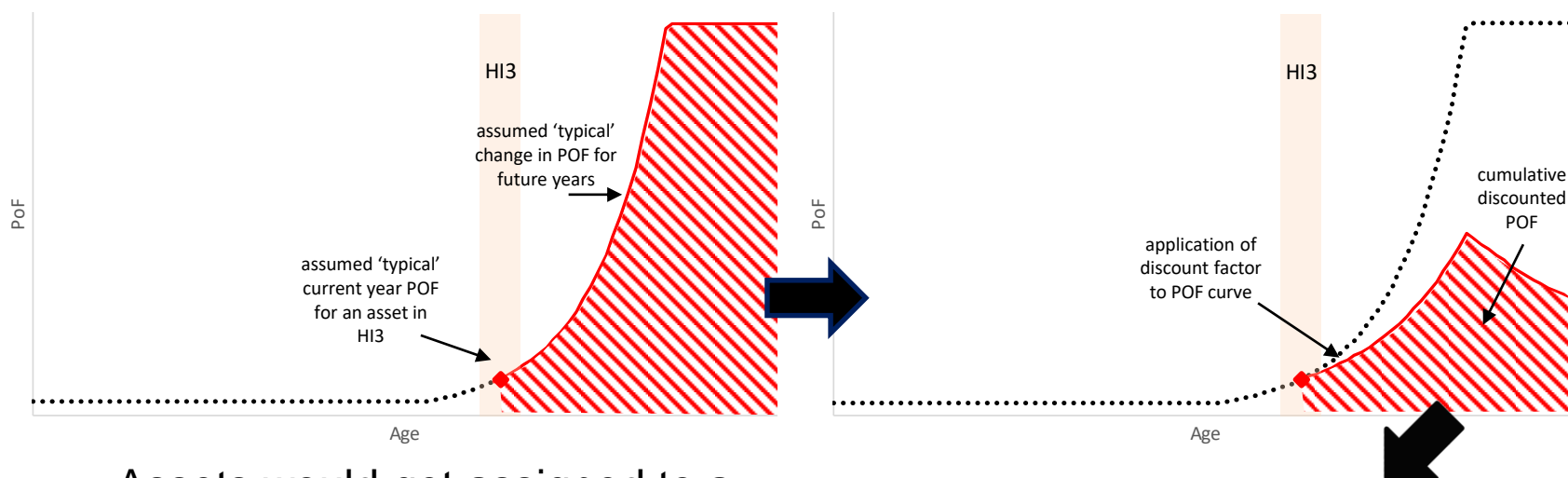
- **Core assumptions**

In order to assign a typical 'cumulative discounted future PoF' weighting to each Health Index Band, it is necessary to assume that:-

1. all assets (within a given asset category) within the same Health Index Band can be regarded as having the same typical value of Health Score (and PoF) in the current year. This is an assumption already used in the current ED1 reporting framework
2. all assets (within a given asset category) with the same Current Health Score, will follow a standard deterioration curve and therefore have the same value of Health Score (and PoF) in each future year. Typical 'time based' Health Score curves can be generated based on the principles used for the underlying age based curves within CNAIM. These can then be used to create typical time based PoF curves using the relationship defined in CNAIM.
3. CoF can be considered to be a constant.

Proposed ED2 Reporting Framework (Recap)

- For each Health Index Band, the 'cumulative discounted future PoF' can be evaluated from the typical PoF curve.



- Assets would get assigned to a Health Index Band based on Current Health Score, in exactly the same way as ED1 reporting – however the weighting used reflects the cumulative discounted PoF

		HI1	HI2	HI3	HI4	HI5
Weighting		325.4%	386.5%	498.5%	595.5%	766.8%
C1	320,238	1,041,940	1,237,732	1,596,377	1,906,901	2,455,500
C2	457,482	1,488,486	1,768,189	2,280,539	2,724,144	3,507,858
C3	686,224	2,232,729	2,652,283	3,420,808	4,086,216	5,261,787
C4	1,143,706	3,721,215	4,420,472	5,701,347	6,810,360	8,769,644

- CNAIM was developed to meet the Network Asset Indices Methodology objectives defined under SLC51 for ED1:-

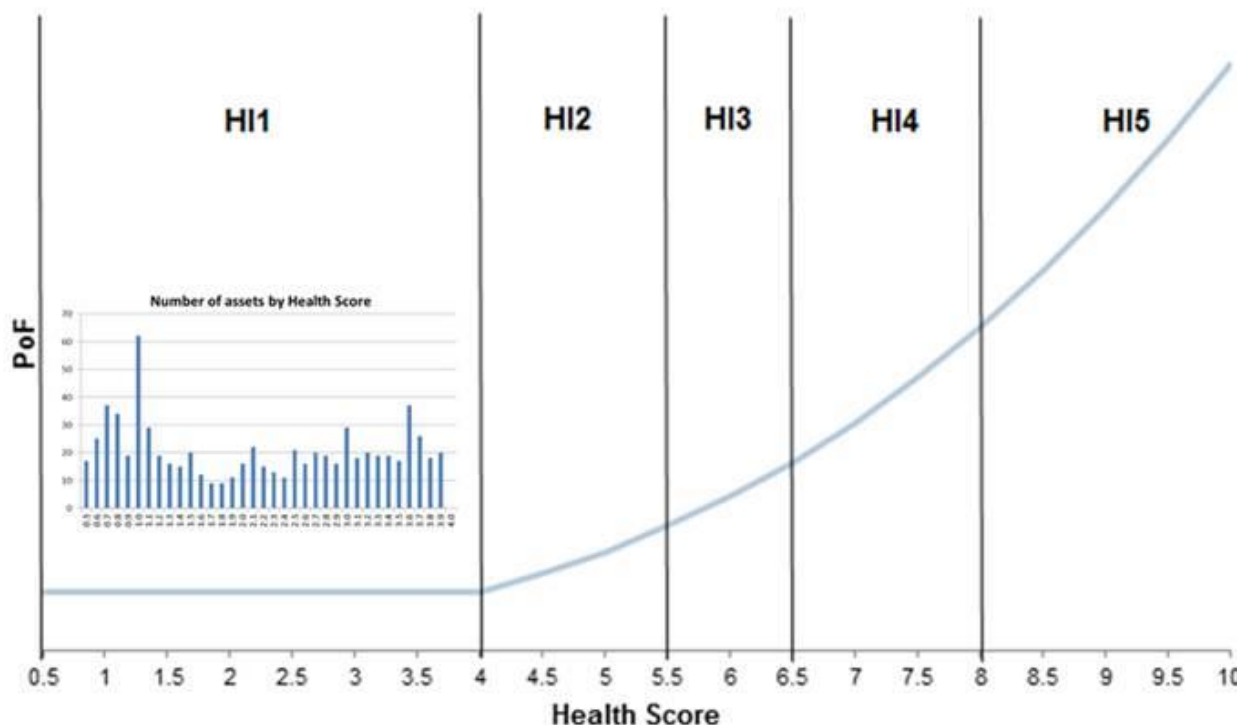
51.11 The Network Asset Indices Methodology Objectives are that compliance with the Common Network Asset Indices Methodology enables:

- (a) the comparative analysis of network asset performance between Distribution Services Providers over time; *{i.e. comparative benchmarking}*
 - (b) the assessment of the licensee's performance against the Network Asset Secondary Deliverables; and
 - (c) the communication of information affecting the Network Asset Secondary Deliverables between the licensee, the Authority and, as appropriate, other interested parties in a transparent manner.
- In considering fitness for purpose it is assumed that the ED2 NARMs objectives shall be broadly consistent with the existing SLC51 objectives, whilst reflecting that risk measures represent future (whole life) risk. This is consistent with discussions at the previous SRRWG meeting.
- The Health Index/ Criticality matrix and monetisation of risk by application of weightings to the Health Index and Criticality Bands provides an effective way of achieving the Network Asset Indices Methodology objectives.

- The simplicity of the matrix approach enables clear and transparent communication to all stakeholders (including Ofgem) about the health and criticality of high volume asset populations:-
 - the current matrix approach permits movements and changes (such as deterioration, material changes) to be as clearly represented and understood;
 - as certain portions of the matrix can be viewed as positions where intervention wouldn't be required, and others where intervention needs to be considered, the matrix position can illustrate when an asset is reaching a point where intervention may be appropriate;
 - facilitates assessment of business plans, target setting and assessment of performance.
- Retaining the matrix approach for ED2, with weighting factors that take account of future (whole life) risk:-
 - retains the existing benefits of the matrix approach;
 - can be accommodated within the existing reporting structures; and
 - enables performance assessment/ close out processes to be developed from those already established for ED1.

Considering Fitness For Purpose

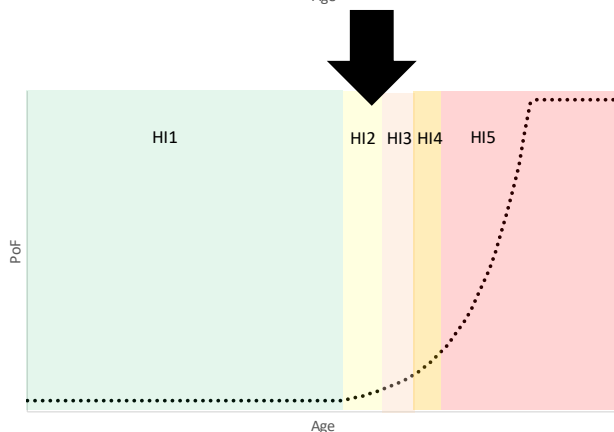
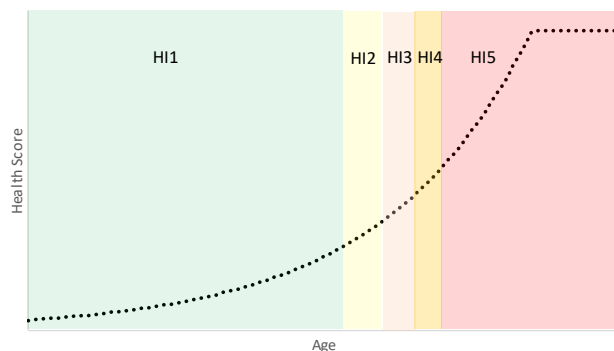
- Following the SRRWG meeting on 5th December 2019, the NOMs ED Working Group has given consideration to whether application of a single weighting factor to all assets (of the same asset type) within the same Health Index Band provides a suitable approximation to the actual cumulative discounted PoF associated with these assets.



- For sample asset populations, a comparison has been made between:-
 - the ‘actual’ total of the cumulative discounted PoF calculated for each of the individual assets within the sample population, when calculated by deriving the Future Health Score for each individual asset for each future year in accordance with CNAIM; and
 - the total cumulative discounted PoF that would be assigned if each of the assets were to be assigned the ‘typical’ value of cumulative discounted PoF

Considering Fitness For Purpose

Previously, it has been suggested that the cumulative discounted PoF weightings could be derived using typical PoF curves based around the 'time based' assumptions used to derive the Initial Health Score in CNAIM. This approach was initially used in undertaking the comparison between 'actual' cumulative PoF and application of 'typical' weightings.



$$\text{Health Score} = H_{\text{new}} \times e^{(B_1 \times \text{age})}$$

Where:-

Health Score is capped at 15;

$$B_1 = \ln(H_{\text{expected life}} / H_{\text{new}}) / \text{Normal Expected Life}$$

$$H_{\text{new}} = 0.5; H_{\text{expected life}} = 5.5$$

$$\text{PoF} = K \times [1 + (C \times H) + ((C \times H)^2 / 2!) + ((C \times H)^2 / 3!)]$$

Where:-

H = Health Score;

K and C are constants

Health Index Band	Health Score to be used to derive typical current year PoF
HI1	2.25
HI2	4.75
HI3	6
HI4	7.25
HI5	10

Considering Fitness For Purpose

- These initial comparisons showed some significant variations between:-
 - the actual cumulative discounted PoF that would be derived for the sample population if calculated individually for each asset, and
 - the value derived using the proposed Matrix Typical Weightings

Example: HV Switchgear – Primary (sample of all assets in one DNO)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	105	210	+100%
HI2	136	216	+59%
HI3	153	204	+33%
HI4	85	104	+23%
HI5	66	81	+22%
Total	545	815	+50%

- Consideration of these comparisons has identified that the use of Matrix Typical Weightings based on the originally proposed typical POF curve (based on the age based principles used to determine the Initial Health Score in CNAIM) fails to take into account the use of an ageing reduction factor when calculating the Future Health Score in accordance with CNAIM.
- The Ageing Reduction Factor (r) is described in section 6.1.9 of CNAIM v1.1 and is included in the calculation of the Future Health Score as shown below:-

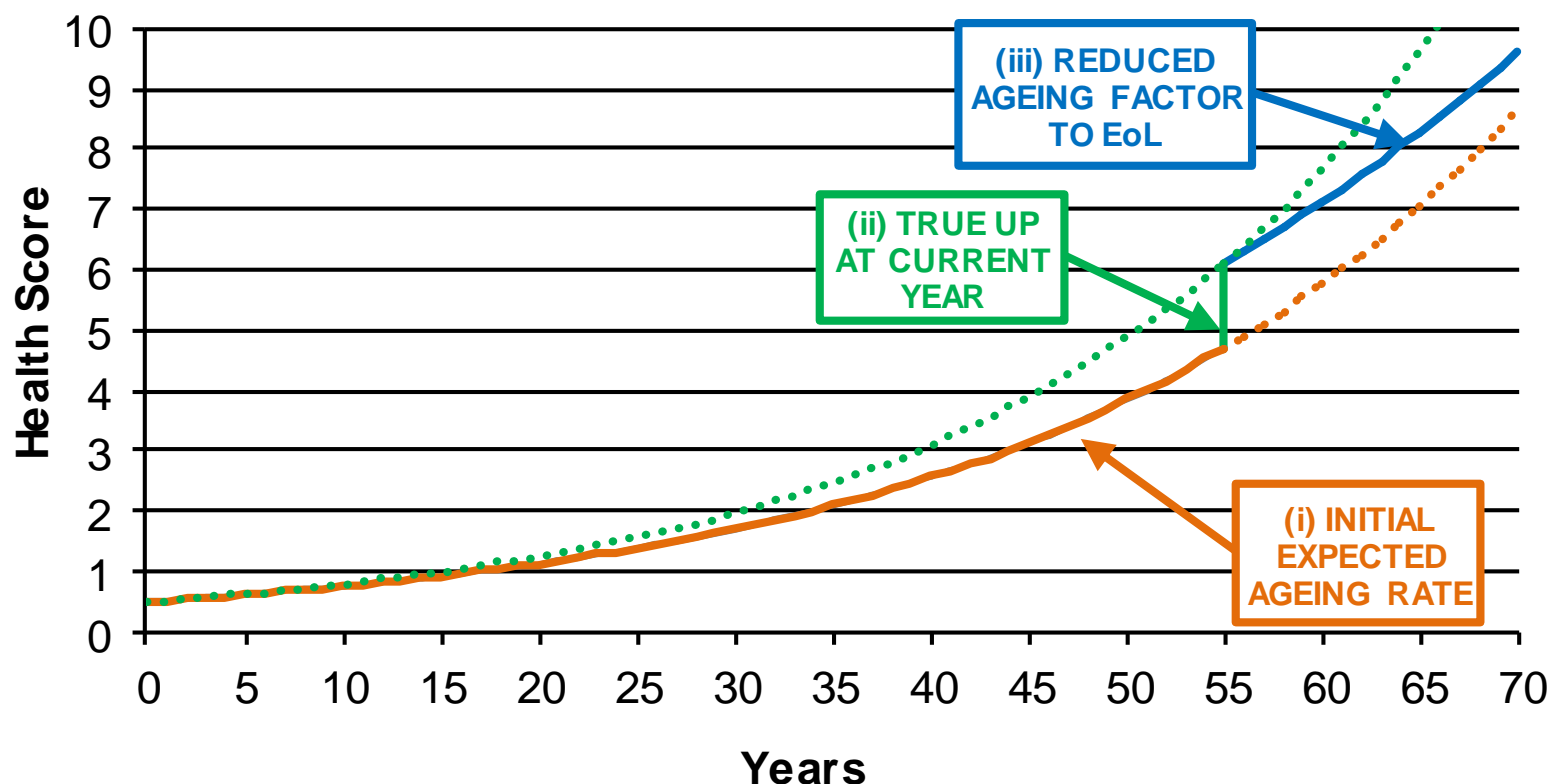
$$\text{Future Health Score} = \text{Current Health Score} \times e^{(B_2 / r) \times \text{age}}$$

- The Ageing Reduction Factor varies depending upon the Current Health Score (as shown in table 209 in CNAIM):-

Current Health Score	Ageing Reduction Factor
< 2	1
2 to 5.5	$((\text{Current Health Score} - 2) / 7) + 1$
> 5.5	1.5

Considering Fitness For Purpose

- The diagram below illustrates the effect of the ageing reduction factor upon the forecast deterioration calculated using CNAIM:-



Considering Fitness For Purpose

- Alternative typical POF curves* using the Ageing Reduction Factor have been considered for derivation of the Matrix Typical Weightings, using consistent principles to CNAIM.

$$\text{Health Score}_{(\text{Year } n)} = \text{Health Score}_{(\text{Year } 0)} \times e^{(B_1/r) \times n}$$

Where:-

Health Score is capped at 15;

$$B_1 = \ln(H_{\text{expected life}} / H_{\text{new}}) / \text{Normal Expected Life}$$

$$H_{\text{new}} = 0.5; H_{\text{expected life}} = 5.5$$

and Ageing Reduction Factor, r , is calculated from table 209 in CNAIM v1.1

$$\text{PoF} = K \times [1 + (C \times H) + ((C \times H)^2/2!) + ((C \times H)^3/3!)]$$

Where:-

H = Health Score;

K and C are constants

Health Index Band	Health Score to be used to derive typical current year (i.e. Year 0) PoF
HI1	2.25
HI2	4.75
HI3	6
HI4	7.25
HI5	10

* - due to the ageing reduction factor varying based on the Current Health Score, different curves will be derived for each Health Index Band

Considering Fitness For Purpose

- Better comparisons are produced by use of alternative typical PoF curves which incorporate the use of the ageing reduction factor

Example: HV Switchgear – Primary (sample of all assets in one DNO)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	105	180	+72%
HI2	136	138	+1%
HI3	153	146	-5%
HI4	85	82	-4%
HI5	66	74	+12%
Total	545	619	+14%

Considering Fitness For Purpose

- The NOMS ED Working Group have performed these comparisons across a variety of Health Index Asset Categories and considered sample populations from nine different DNOs. These comparisons produce similar conclusions.

132kV CBs (DNO 1)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	66	190	+187%
HI2	50	63	+25%
HI3	3	3	+36%
HI4	49	51	+3%
HI5	60	67	+12%
Total	228	374	+64%

132kV CBs (DNO 3)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	216	246	+14%
HI2	32	28	-
HI3	13	14	+6%
HI4	0	0	-
HI5	26	27	+3%
Total	288	314	+9%

- The matrix weightings provide a reasonable approximation to the actual cumulative discounted PoF for the sample populations, though it is noted that higher variances tend to be observed in the HI1 band.

Considering Fitness For Purpose

HV Transformer (DNO 2)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	2354	2917	+24%
HI2	917	997	+9%
HI3	1055	1003	-5%
HI4	215	215	0%
HI5	1408	1657	+18%
Total	5949	6789	+14%

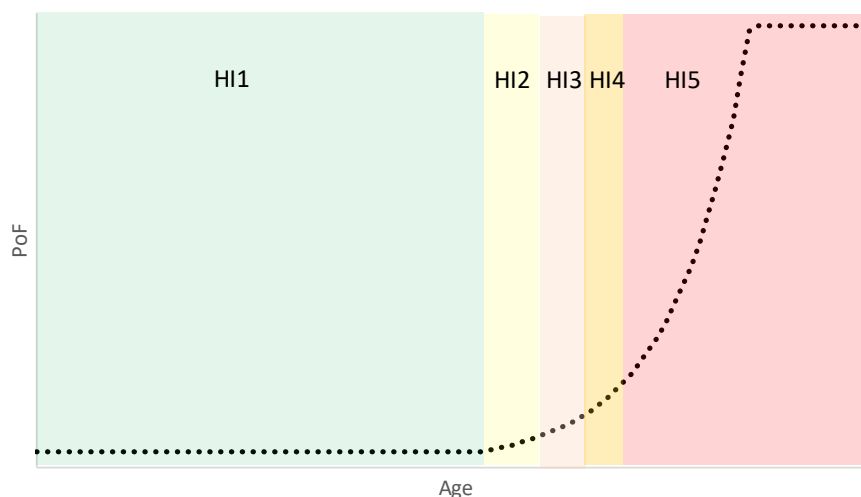
HV Transformer (DNO 5)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	1427	2169	+52%
HI2	166	207	+25%
HI3	63	66	+5%
HI4	20	20	+2%
HI5	524	608	+16%
Total	2200	3070	+40%

HV Transformer (DNO 8)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	1205	1229	+2%
HI2	1137	1083	-5%
HI3	1151	1088	-5%
HI4	410	409	0%
HI5	111	135	+22%
Total	4013	3946	-2%

- The selection of the typical value for current year Health Score assumed in the derivation of the Matrix Typical Weighting for the HI1 band needs to be carefully considered because there is scope for significant variance in the calculated cumulative discounted PoF depending upon which Health Score within the band is selected as the typical current year value. This arises because:-
 - based on the typical PoF curve a typical asset would be expected to lie within the HI1 band for a significant period of its life (approx. 85% of 'Expected Life'); and
 - the value of PoF is constant across the HI1 band.



Considering Fitness For Purpose

- The 'typical values' for the HI1 band, used in the examples in the previous slides, have been calculated from an assumed current. Health Score of 2.25, which is midway between the lower (0.5) and upper (4) limits of the band.
- Due to the exponential nature of the Initial Health Score curve in CNAIM, an asset would be expected to typically reach a Health Score of 2.25 when it has been in the HI1 band for approx. 70% of the overall time that it would be expected to be in the band. Consideration could be given to selecting a different value for the typical current year value of Health Score for the HI1 band, for example a Health Score of 1.41 would correspond to the point that an asset would be expected to typically reach when it has been in the HI1 band for 50% of the overall time that it would be expected to be in the band.

Example: HV Switchgear – Primary (sample of all assets in one DNO)

Current Health Score assumed for HI1 Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
2.25	105	180	+72%
1.41	105	89	-15%

Considering Fitness For Purpose

- As identified in the presentation to SRRWG in December, the Matrix Weighting approach can produce levels of risk that seem appropriate, when considering the cost-benefit of asset replacement activity – though it was identified that some model review would be required to ensure that this was appropriately reflected.

1) Typical Future Risk

	HI1	HI2	HI3	HI4	HI5
C1	1,041,940	1,237,732	1,596,377	1,906,901	2,455,500
C2	1,488,486	1,768,189	2,280,539	2,724,144	3,507,858
C3	2,232,729	2,652,283	3,420,808	4,086,216	5,261,787
C4	3,721,215	4,420,472	5,701,347	6,810,360	8,769,644

3) Typical Cost of Replacement = £995,144

2) Future Risk Benefit of Like for Like Replacement

	HI1	HI2	HI3	HI4	HI5
C1	0	195,792	554,437	864,961	1,413,560
C2	0	279,703	792,053	1,235,658	2,019,372
C3	0	419,554	1,188,079	1,853,487	3,029,058
C4	0	699,257	1,980,132	3,089,145	5,048,429

4) Cost-Benefit

	HI1	HI2	HI3	HI4	HI5
C1	-995,144	-799,352	-440,707	-130,183	418,416
C2	-995,144	-715,441	-203,091	240,514	1,024,228
C3	-995,144	-575,590	192,935	858,343	2,033,914
C4	-995,144	-295,887	984,988	2,094,001	4,053,285

- The selection of an appropriate value for the typical value of current Health Score to be used in the derivation of the Matrix Typical Weighting for the HI1 band, should be considered as part of this activity.

Considering Fitness For Purpose

- Some higher variances were observed e.g. in the HI3 band for the example shown on the right.
- Most assets within this band moved into the band as the result of application of collars applied due to the leak history. However, as these assets were still comparatively young compared to the Normal Expected Life, an accelerated future ageing rate was applied resulting in higher future PoF values being attained.
- Such issues have less impact on the HI4 and HI5 assets, where interventions are generally targeted, due to their position on the PoF curve.

132kV Oil Cable (DNO 2)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	3575	1957	-45%
HI2	1343	1103	-18%
HI3	5736	3474	-39%
HI4	407	344	-15%
HI5	13175	14495	+10%
Total	24236	21373	-12%

132kV Oil Cable (DNO 7)

Health Index Band	Actual Cumulative Discounted PoF for sample population	Cumulative Discounted PoF derived from application of Matrix Typical Weightings	Variance
HI1	3476	2249	-35%
HI2	121	99	-19%
HI3	1745	1334	-24%
HI4	9	10	-
HI5	7100	7866	+11%
Total	12451	11558	-7%

- Overall the proposed methodology for incorporating future risk into the ED2 NARMs reporting framework produces levels of risk that seem broadly appropriate approximations to the actual future risk observed in sample populations.
- This presentation, along with the presentations at RSEWG and SRRWG in November and December 2019, show that the proposed use of suitable Matrix Weighting Factors can be developed to provide a reasonable reflection of future risk, suitable for a regulatory measure, whilst retaining the principles of the ED1 Network Asset Indices reporting and processes.
- DNOs will need to undertake some further works to determine the final appropriate values for the Matrix Weighting Factors (including as identified in the previous presentation, some asset type model reviews)
- Given the timeframes associated with ED2 submissions, and the requirement to undertake further works to ensure suitable weightings are determined, DNOs require a clear indication from Ofgem as to whether this provides a suitable means to reflect future risk in ED2 NARMs.

ENA presentation on commonality of assets across NARMs / extension to other assets

The Voice of the Networks

**Energy
Networks
Association**

**RIIO-ED2
CNAIM Assets**

16 January 2019



- Ofgem have indicated a desire to make number of modifications and improvements for CNAIM in RIIO-ED2 as part of the development of the Network Asset Risk Metric (NARM)
- Two key areas are:

Commonality of assets across NASD

- Fundamental to ensure consistency of NASD approach in ED2.
- Opportunity for all licensees to increase assets within their scope of CNAIM reported assets. All DNOs reporting on the same type of assets?
- The move to commonality should be based upon the existing scope of CNAIM, because models have already been developed.
- In terms of commonality, when we have models already in use, how do we treat DNOs who do not have data to operate those specific models?

Extension to further assets

- Focus should be on expansion within CNAIM framework, ahead of expanding to other asset types.
- Extension may not be possible using the CNAIM approach because this requires specific age and condition data about assets.
- This needs to be considered together with non-NARM assets.

Commonality of assets – RIIO-ED1

- CNAIM v1.1 has models for **25 different Health Index Asset Categories**
- These 25 Health Index Asset Categories are an amalgamation of **61 assets register categories**, e.g:

Health Index Asset Category	Asset Register Category	
LV Switchgear and Other	LV Board (WM)	LV Pillar (ID)
	LV Board (X-type Network) (WM)	LV Pillar (OD at Substation)
	LV Circuit Breaker	LV Pillar (OD not at Substation)

- In RIIO-ED1 companies specified which assets would form part of their monetised risk targets in their NASD and Monetised Risk workbooks
- These assets were declared at the Health Index Asset Category level
- **RIIO-ED1 company summary below:**

	ENWL	NPG	WPD	UKPN	SPEN	SSEN
No. of Health Index Asset Categories	21	22	22	22	14*	17*

* Scottish networks less due to no 132kV network

Commonality of assets – RIIO-ED2

- DNOs have undertaken a CNAIM assets review - suggesting the following principles for RIIO-ED2:

Proposals:


- The concept of a Health Index Asset Category is retired for ED1 – instead companies will report against the 61 Asset Register Category models only. This will ensure alignment between CNAIM assets and assets reported elsewhere in regulatory submissions.
- All asset register categories within the current CNAIM v1.1 must be declared against a company's NARM monetised risk target, with a NIL return provided for assets a licensee does not own.
- Exception to the above can be sought when a company is not in the position to provide data it feels is suitable to generate suitable outputs from an asset's model.

- Using the above principles the following position against the 61 different asset register categories for RIIO-ED2 has emerged:

	ENWL	NPG	WPD	UKPN	SPEN	SSEN
No. of Asset Register Categories for RIIO-ED2	61	61	61*	58	61	58

- UKPN and SSEN are TBC on reporting against 33kV, 66kV and 132kV Non-Pressurised cables to understand further whether the data it can provide would produce appropriate outputs from the models

* WPD has reservations about the reliance on lagging indicators in the models for 33kV, 66kV and 132kV Non-Pressurised cables

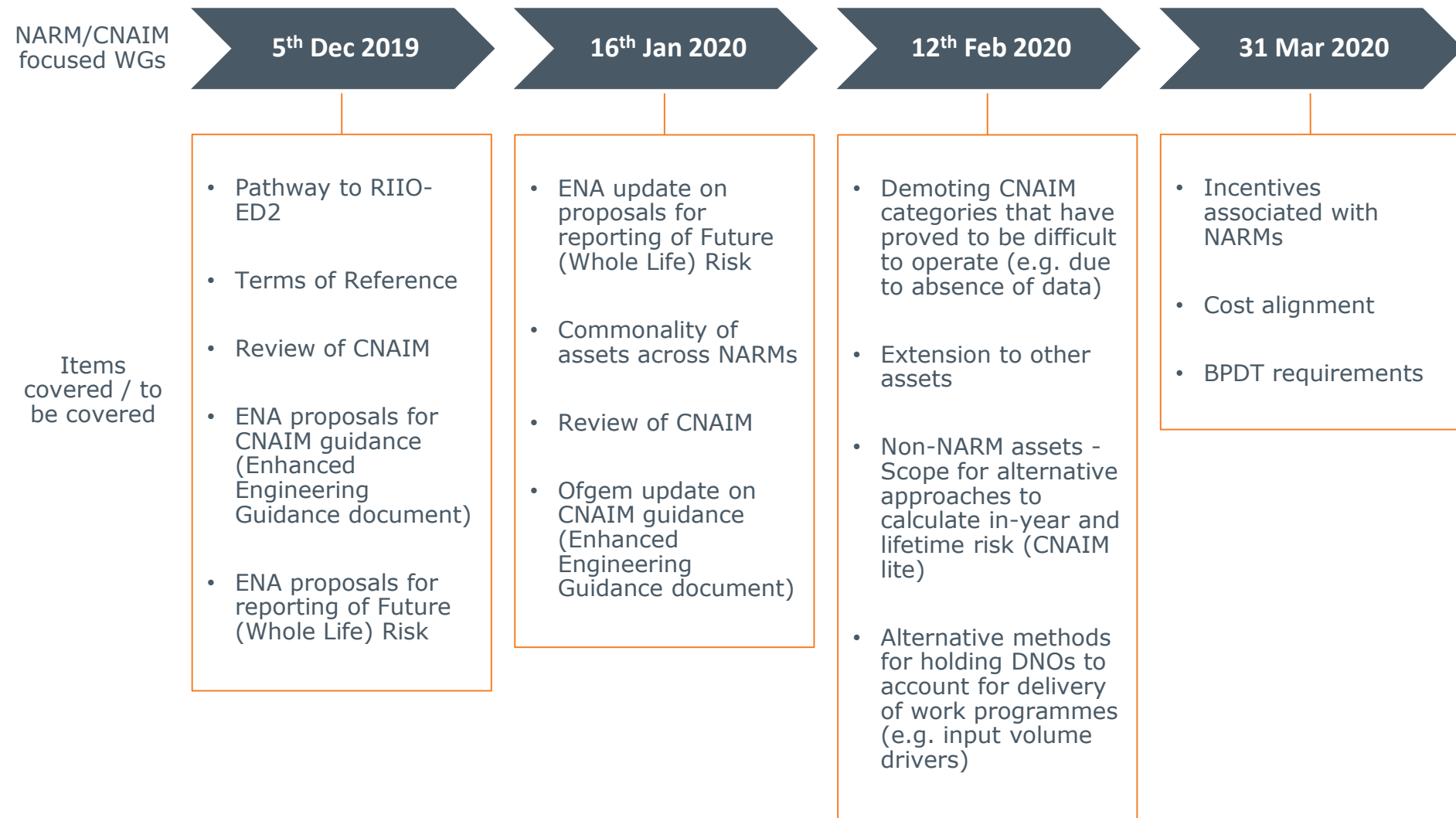
- As stated earlier, there are a number of work streams being undertaken for the development of CNAIM for RIIO-ED2 including:
 - Whole Life risk metric development
 - Commonality of assets
 - Development of CNAIM Best Practice Guide
 - Update to CNAIM 1.1
 - Extension of Assets
 - Given the considerable resource required to address the higher priorities – it is deemed there is not enough time to develop new CNAIM asset models, test, refine and update IT systems to accommodate before business plan submissions
- 
- Ofgem
Priority**

Proposal

- We propose that there is no expansion of assets within CNAIM for RIIO-ED2
- Instead, throughout RIIO-ED2, companies work to expand asset categories within CNAIM for RIIO-ED3

Update on Timelines and priorities

Theme	Topic	Detail
Reliability - NARM	Methodology - General	<ul style="list-style-type: none"> • Derivation of whole life risk • Reporting requirements for 'in-year' risk and whole life risk • Metrics to be used for target setting • Incentives associated with NARMs • BPDT requirements • Links to input volume delivery • Revisions to CNAIM • CNAIM guidance
	Commonality of assets/extension to further assets	<ul style="list-style-type: none"> • Commonality where CNAIM calculations exist and are useful • Demoting CNAIM categories that have proved to be difficult to operate (e.g. due to absence of data) • Opportunities to extend CNAIM to other asset categories
	Non-NARM assets	<ul style="list-style-type: none"> • Scope for alternative approaches to calculate in-year and lifetime risk • Alternative methods for holding DNOs to account for delivery of work programmes (e.g. input volume drivers)
	Cost alignment	<ul style="list-style-type: none"> • Clarity on what cost forecasts are associated with NARMs • Clear identification of costs to be used for PCDs/ODIs



Indicative timelines (original)

TASK	KEY ACTIVITIES	2019			2020				2021				2022				2023			
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Regulatory Submissions	Annual Submissions																			
	(Re)approval of CNAIM																			
	RIIO-2 BPDT (final)																			
Development of CNAIM	Scope (asset categories (CNAIM light vs CNAIM pro), investment activities)																			
	Condition Modifiers (e.g. type of inspection data)																			
	CoF Factors (e.g. CoF driven interventions)																			
	Health Assessment Methodology (age and/or condition based)																			
	Forecasting method (duration, exponential versus Weibul)																			
	Calibration (e.g. PoF, Health Score Modifiers, CoF reference values (inc. VOLL))																			
	Implementation guide (new part 2 of CNAIM)																			
	IT Systems																			
RIGs	Annex A - Glossary																			
	Annex D - Secondary Deliverables																			
Templates	BPDT / NAW (target setting)																			
	CBAs (target setting)																			
	Annex D (reporting actuals)																			

Priorities agreed at previous SRR WG

These are the collective development initiatives agreed above

Substations within 6 months, other assets within 12 months

Given the identified developments, probably OK for this to be extended

Scope of changes to CNAIM for ED2 must be defined by end Q4 2019

Indicative timelines (updated)

TASK	KEY ACTIVITES		2019			2020				2021				2022				2023								
			Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Regulatory Submissions	Annual Submissions																									
	(Re)approval of CNAIM																									
	RIIO-2 BPDT (final)																									
Development of CNAIM	Development Initiatives	Agree Scope & Priorities																								
		1. Commonality																								
		2. Whole Life Risk																								
		3. CNAIM modifications	Methodology																							
			Editorial																							
		4. Good Practice Guide	v1.1		substations				ccts																	
			v2.0																							
		5. Expansion																								
	Approval of CNAIM v2.0																									
	IT Systems																									
RIGs	Annex A - Glossary																									
	Annex D - Secondary Deliverables																									
Templates	BPDT / NAW (target setting)																									
	CBAs (target setting)																									
	Annex D (reporting actuals)																									

We may need to consider a staged approach to the approval of individual elements (e.g. whole life risk and commonality)

Update on Engineering Good Practice Guide

Following the SRRWG on the 5th of December, where representatives from the ENA presented on proposals for the development of an **Engineering Guidance document on data input to CNAIM**, representatives from Ofgem were invited to attend part of the ENAs NOMs Electricity Distribution Working Group (NEDWG) to further discuss the development of the Engineering Guidance document. Key points of discussion included:

Governance

- The ENA proposed that the Engineering Guidance document should be considered like an ENA Engineering Recommendation (ER) or Engineering Technical Report (ETR), that is referenced by the CNAIM document but does not sit with or as an appendix to the CNAIM document. The ENA should be directed by Ofgem to produce this Engineering Guidance document, and that this document is used to populate data as per CNAIM.
- Ofgem to issue a formal request for this work, providing detail on the governance structure.

Scope of Engineering Guidance document

- The plan for the development of the document should be considered in three stages:
 1. External condition and leaks guidance for specific asset classes – within next 6 months.
 2. All condition points for specific asset classes – before the start of RIIO-ED2.
 3. All condition points for all asset classes – before the start of RIIO-ED3.
- Some key principles were discussed:
 - Defects vs. Condition;
 - Condition vs. Intervention; and
 - Use of measurements over visual assessments where possible.

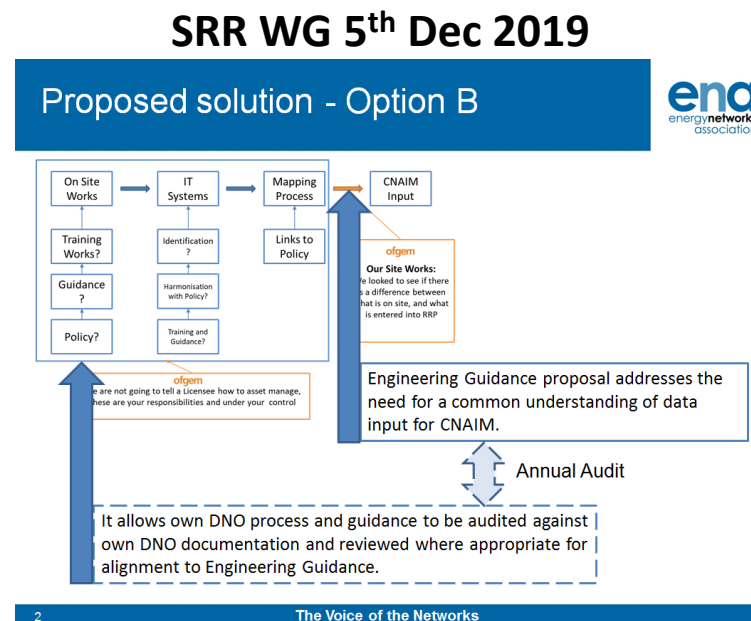
Other ongoing ENA activities related to the Engineering Guidance document

- The ENA have identified several issues of inconsistency with CNAIM and have, through the ENA NEDWG, been working on a guidance document to accompany CNAIM that aims to address some of these issues.
- One example that was given was the calculation of customer numbers for the failure of specific asset types e.g. 11kV CBs.

Update on Engineering Good Practice Guide

- The NOMs ED WG presented a recommendation to the SRR WG on 5th Dec to develop Engineering Guidance on the data inputs to the CNAIM v1.1:
 - This will allow all DNOs to review and establish internal review of NAIMs and supporting internal documentation in preparation for data quality auditing
 - It will be further updated to reflect changes for RIIO-ED2 once agreed
 - Publication of Engineering Guidance with main consultation on CNAIM v2.0 once finalised

- Further discussions were subsequently held with the Engineering Hub team on 17th Dec to refine the approach.



Update on Engineering Good Practice Guide

- We believe DNOs and Ofgem are in agreement with our approach which is to expand condition modifier tables with descriptors and photographs, split by functional asset groups.
- This provides a scalable approach allowing the guidance to be modularly expanded to other CNAIM components (e.g. Measured Condition Factors, CoF Factors) and to other asset categories:
 - Short term focus (6 months) on ground mounted plant
 - Then expand to linear asset groups (12 months)
 - Longer aspiration to cover all other inputs e.g. CoF inputs
- We understand Ofgem's intention is for the Engineering Hub team to approve this guide with a preference that it sits within the license as part of CNAIM.

Update on Engineering Good Practice Guide

Example 1: Switchgear External Condition


- Switchgear External Condition is defined in CNAIM v1.1 by tables 50/55/60/66.
- We propose that the descriptors for each Condition Criteria would be expanded:


Condition Criteria	Enhanced Description
As New	No deterioration: This Condition Criteria represents a positive indication of asset condition. There are no obvious signs of any deterioration such as corrosion, stains or markings.
Normal Wear	Superficial/minor deterioration: There are no obvious signs of deterioration that would have any material impact of the probability of failure for the asset. The asset (or a sub component) may exhibit signs of ageing, minor stains or marks (e.g. weeping from a sight glass, surface level scratches, moss or lichen that can be brushed off). Repairs / intervention to the asset (or a sub component) is not expected to be required between now and the next planned maintenance.
Some Deterioration	Some Deterioration: The asset shows a level of deterioration such as surface corrosion spots or minor oil leaks. The level of degradation may affect the operation of the asset if left untended (e.g. large patches of rust on the metalwork, door-hinges heavily rusted, insulant leaks). Minor maintenance or refurbishment activities (as a minimum) are required to address the identified issue(s).
Substantial Deterioration	Substantial Deterioration: The switchgear is corroded to the point that it can no longer hold its oil / SF ₆ insulation, one or more metalwork supports are rusted through, or the switchgear housing is damaged beyond economical repair. Intervention (usually replacement) is required in the short term.


- Worked examples covering a range of assets and Criteria would be included.


Update on Engineering Good Practice Guide

Switchgear External Condition

Condition Criteria:	Some Deterioration
Asset Register Category:	6.6/11kV CB (GM) Secondary
Photograph(s):	
Comments:	The asset shows a level of deterioration such as surface corrosion spots or minor changes to the tolerance of the components. Minor maintenance activities are required to correct these in line with routine maintenance intervals. The paintwork on this equipment is in relatively poor condition and flaking and the steelwork is rusting but it is still structurally sound i.e. no holes or severe damage

Condition Criteria	As New
Asset Register Category:	6.6/11kV CB (GM) Primary
Photograph(s):	
Comments	There are no obvious signs of corrosion or other forms of deterioration.

Condition Criteria:	Substantial Deterioration
Asset Register Category:	6.6/11kV CB (GM) Secondary
Photograph(s):	
Comments:	Metalwork foundations rusted and falling apart.

Condition Criteria:	Normal Wear
Asset Register Category:	6.6/11kV CB (GM) Secondary
Photograph(s):	
Comments:	Multiple patches of surface rust – no evidence of deeper corrosion / rusting.

Update on Engineering Good Practice Guide

- We are currently developing the detailed descriptors for each Condition Criteria for ground mounted assets.
- We are also compiling a representative sample of examples for each Condition Criteria and plan to take a workshop type approach to calibrate / normalise the assessment at future session of the NOMs ED WG.
- We encourage the active participation of Ofgem in these workshops to ensure the direction of travel of the guide remains consistent with Ofgem's objectives.

Actions, Next Steps, AOB

- The next meeting will take place on 30th January, covering Resilience. It will be in Glasgow.
- We will circulate notes and an actions log from this meeting.
- Based on the prioritisation exercise, we will set out the anticipated topics to be covered at the upcoming meetings.

Our core purpose is to ensure that all consumers can get good value and service from the energy market. In support of this we favour market solutions where practical, incentive regulation for monopolies and an approach that seeks to enable innovation and beneficial change whilst protecting consumers.

We will ensure that Ofgem will operate as an efficient organisation, driven by skilled and empowered staff, that will act quickly, predictably and effectively in the consumer interest, based on independent and transparent insight into consumers' experiences and the operation of energy systems and markets.