Annex 15:
NARMs

Scottish & Southern Electricity Networks
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Contents

Executive Summary

The purpose of the addendum for all NARM category assets is to provide a clear overview of SSEN's asset management strategy for RIIO-ED2 which uses Common Network Asset Indices Methodology (CNAIM) to drive a systematic process that delivers condition-based risk management to manage safety and resilience. Our approach is new and unique compared with all other DNOs, and it been independently reviewed and been recognised for its innovative risk management approach by EA Technology[1]. It was concluded that our approach delivers investment efficiencies, manages network risk effectively and benefits our consumers, customers, and stakeholders. Ofgem noted in their Post Draft Determinations letter, dated 05 August 2022, that they "note the revised approach to the SSEN NAIM has resulted in what appears to be more holistic assessment of short and long-term risk".

This addendum covers the following Engineering Justification Papers:

No: 305_SSEPD_NLR_11kV_SWGR
No: 306_SSEPD_NLR_33kV_SWGR
No: 307_SSEPD_NLR_132kV_SWGR
No: 308_SSEPD_NLR_HV_TRANSF
No: 309_SSEPD_NLR_EHV_TRANSF
No: 310_SSEPD_NLR_132kV_TRANSF
No: 314_SSEPD_NLR_LV_SWGR
No. 315_SSEPD_NLR_LINKBOXES
No: 316_SSEPD_NLR_LV_POLES
No: 317_SSEPD_NLR_HV_POLES
No: 318_SSEPD_NLR_EHV_POLES

From our understanding of the Draft Determination consultation, supplementary questions and the EJP response from Ofgem, there are areas where further clarity is required to ensure that Ofgem fully understand our proposed approach to asset replacement. This addendum targets our key messaging that has been presented within our Final Submission so that it is clear that our proposed asset management strategy is new, innovative, stakeholder supported and delivers efficiencies with associated benefits to our customers through improved risk management.

[1] SSEN NAIM Intervention Evaluation

Investment Decisions RIIO-ED1 & RIIO-ED2

In RIIO-ED1 SSEN agreed the proposed volumes, associated costs and monetised risk targets based on the 2012/13 final submission ahead of the commencement of the start of the price control in 2015/16. Ahead of RIIO-ED1, there was no industry standard for asset risk management nor any specific approved system to collate data inputs to drive investment decisions like CNAIM provides today. In addition, our ability to record, store, manage and use data over the last 10 years has significantly improved and as a result our delivery strategy and how we inform it has also been enhanced.

Comparisons between RIIO-ED1 and RIIO-ED2 can be made when assessing how we respond to assets that are in an 'end of life' condition and the intervention options that we choose to address each assets condition (replacement, refurbishment, maintenance). However, it is not appropriate to use our RIIO-ED1 NARM volumes as an indication of the NARM volumes that will be required during RIIO-ED2. Historically, our distribution network was built in large peaks and troughs. This is reflected directly within the age profiles we have provided within each Engineering Justification Paper (EJP). As such, the subsequent asset replacement that is required when these assets collectively reach an 'end-of-life' condition can result in a temporary increase or decrease in volumes when compared to the previous price control periods. Our RIIO-ED2 NARMs volumes (CV7a and CV9) reflect this fundamental fact given that some asset categories have seen an increase in volumes, whereas others have seen a decrease when compared to RIIO-ED1. Importantly, our RIIO-ED2 volumes have been identified using a detailed 'bottoms-up' methodology utilising the outputs from our CBRM intervention models (NAIM) and the condition data that has been collected for each individual asset.

Furthermore, within each asset category there is a unique mix of asset models/types that can drive increases or decreases in volumes between price controls. For example, our switchgear assets have different types of insulation mediums (Air, Oil, SF6), each of which have a different life cycle. For this reason, it is important that our RIIO-ED2 volumes and the justification of their intervention are assessed using the latest condition data that is available together with our NAIM, rather than comparing directly to RIIO-ED1 volumes as an indication of the needs case.

We are meeting, and will continue to meet, our required outputs for RIIO-ED1 based on the agreed plan with the associated volumes, allowance, and monetised risk reduction; however, the information that determined those investments is no longer applicable. As covered herein, our RIIO-ED2 asset management principles are driving a methodically robust and industry leading standard that is evidenced based.

Innovative Risk Management Approach

We believe that Ofgem understand the inputs to and principles of our Condition Based Risk Management (CBRM) system, so we do not propose to cover it in this addendum. Further details can be found in section 5.1 of our A7.1 Safe & Resilient Annex issued as part of our final submission in December 2021.

This addendum focuses on our new approach to asset risk management that ensures that we only invest in network assets that are truly "end of life", where any deferment in replacement or refurbishment would result in a higher risk of failure for customers which is not acceptable. As such, where the only driver for intervention is condition, we will invest in assets based on their Health Score and Criticality during RIIO-ED2 as per our Network Asset Intervention Methodology (NAIM) and the Health Score Intervention Criteria (HSIC) that is assigned to each individual asset category.

Figure 1 illustrates how the Probability of Failure (PoF) increases exponentially as assets reach the HI5 banding.

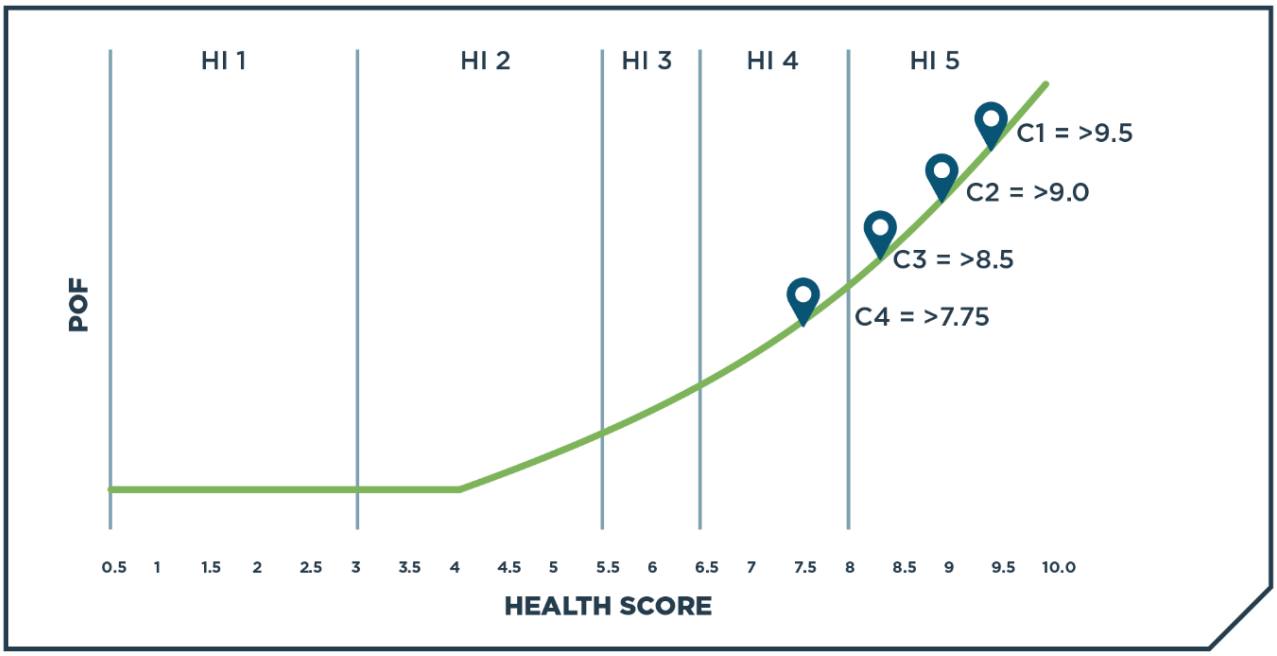

Figure 1 - CNAIM Health Score by PoF

However, we recognise that within the HI5 Banding there is a need to be cognisant of the criticality of each asset under consideration to ensure the total risk of failure remains acceptable for our customers. A HI5 asset does not necessarily need to be intervened upon the moment it reaches the HI5 banding (score >=8.0). These assets still have useful life that should be maximised until the health and criticality gives a total risk of failure that can no longer be accepted.

As such, it is not appropriate to shortlist all assets that are expected to become HI5 in RIIO-ED2 for intervention without consideration of both the health score and criticality.

A health score investment criteria has been developed which defines the minimum Health Score required to justify the need to invest in an asset by the Criticality Index (C1-C4) of each asset. Table 1 below lists all assets that have been subject to this approach and sets out the health score investment which triggers the need to invest in each asset category.

Table 1- Intervention criteria by asset class

Intervention Criteria				
Asset Category	**C1**	**C2**	**C3**	**C4**
6.6/11kV Transformer (GM)	>=10.0	>=9.0	>=8.5	>=7.75
33kV Transformer	>=9.5	>=9.0	>=8.5	>=7.75
66kV Transformer	>=9.5	>=9.0	>=8.5	>=7.75
132kV Transformer	>=9.5	>=9.0	>=8.5	>=7.75
6.6/11kV CB (GM) Primary	>=9.5	>=9.0	>=8.5	>=7.75
33kV CB (Air Insulated Busbars) (ID) (GM)	>=9.5	>=9.0	>=8.5	>=7.75
33kV CB (Air Insulated Busbars) (OD) (GM)	>=9.5	>=9.0	>=8.5	>=7.75
33kV CB (Gas Insulated Busbars) (ID)(GM)	>=9.5	>=9.0	>=8.5	>=7.75
33kV CB (Gas Insulated Busbars) (OD)(GM)	>=9.5	>=9.0	>=8.5	>=7.75
132kV CB (Air Insulated Busbars) (OD) (GM)	>=9.5	>=9.0	>=8.5	>=7.75
132kV CB (Gas Insulated Busbars) (ID)(GM)	>=9.5	>=9.0	>=8.5	>=7.75
132kV CB (Gas Insulated Busbars) (OD)(GM)	>=9.5	>=9.0	>=8.5	>=7.75
33kV Switch (GM)	>=9.5	>=9.0	>=8.5	>=7.75
33kV RMU	>=9.5	>=9.0	>=8.5	>=7.75
LV Circuit Breaker	>=9.5	>=9.0	>=8.5	>=7.75
LV Pillar (ID)	>=9.5	>=9.0	>=8.5	>=7.75
LV Pillar (OD at Substation)	>=9.5	>=9.0	>=8.5	>=7.75
LV Pillar (OD not at a Substation)	>=9.5	>=9.0	>=8.5	>=7.75
LV Board (WM)	>=9.5	>=9.0	>=8.5	>=7.75
LV UGB	>=9.5	>=9.0	>=8.5	>=7.75
6.6/11kV CB (GM) Secondary	>=9.5	>=9.0	>=8.5	>=7.75
6.6/11kV Switch (GM)	>=9.5	>=9.0	>=8.5	>=7.75
6.6/11kV RMU	>=9.5	>=9.0	>=8.5	>=7.75
6.6/11kV X-type RMU	>=9.5	>=9.0	>=8.5	>=7.75
LV Poles	>=8.0	>=8.0	>=8.0	>=8.0
6.6/11kV Poles	>=9.5	>=9.0	>=8.5	>=7.75
33kV Pole	>=9.5	>=9.0	>=8.5	>=7.75
66kV Pole	>=9.5	>=9.0	>=8.5	>=7.75
132kV Pole	>=9.5	>=9.0	>=8.5	>=7.75
33kV Fittings	>=7.25	>=7.25	>=7.25	>=7.25
66kV Fittings	>=7.25	>=7.25	>=7.25	>=7.25
132kV Fittings	>=7.25	>=7.25	>=7.25	>=7.25
Tower Line Conductor (33kV and 132kV)	>=9.5	>=9.0	>=8.5	>=7.75

During the Ofgem's "ED2 Engineering Hub Analysis Working Group" teach-in session held on 19 July 2022, Ofgem explained that where they deemed EJPs to be unjustified the default was to select the lowest volume generated from one of five models Ofgem have used. This is clearly not in the interests of current and future consumers, and fails to consider wider impacts, in particular, in terms of security of supply and cost increases in future price controls. Our fundamental concerns with this approach, which was implemented for eleven of our asset categories, are as per the following:

1. It completely ignores the results of our asset risk management process that uses CRBM and the CNAIM which is an industry standard and approved asset condition assessment, risk management and reporting tool.

2. We strongly disagree with the use of crude and outdated Survivor modelling when calculating condition related intervention volumes, particularly where measured and/or observed condition data is available (NARMs assets).

3. We have asset specific condition data based on inspection information that has informed our bottom-up asset intervention criteria.

4. Where Ofgem have accepted our proposed volume justification but have then rejected it on the grounds of deliverability to force a reducing in volumes it does not remove the need for the intervention of these assets. In effect, Ofgem have forced our proactive asset risk management proposal to become a reactive and cost inefficient model.

5. Ofgem have failed to recognise that our networks have not been built at a constant rate. As such, asset replacement cycles are different between asset categories and are influenced by environment, age, manufacturer, operational use, etc. and the needs will vary between regulatory reporting periods. To disregard an evidenced based asset management tool and suggest that we should not deliver the volumes proposed, which increases our network risk, just because the need wasn't there in the past is not a legitimate argument to not have a valid requirement for future volumes. Based on this logic, some assets may never have an agreed allowance to invest in future because historically intervention wasn't required.

6. In addition to point 5, when taken in the overall view of asset replacement, Ofgem have not acknowledged that in some cases we are proposing to replace less volumes for some asset categories; therefore, the mix of intervention has changed and means that as a total programme of work it is still manageable within the period of RIIO-ED2.

Our lean NAIM proposal has gone a step further than the blanket approach that all Health Index (HI) 5 assets should be replaced; we are now taking a detailed view of network risk by combining HI with criticality and the individual asset's associated health score to drive investment decisions for NARMs assets. As a result, we believe that we have provided sufficient evidence to demonstrate that we have developed a robust asset risk management process that drives an efficient intervention model that balances network risk with overall investment for the benefit of our customers and consumers.

Poles (LV/HV/EHV)

As part of Ofgem's Draft Determination response, as part of the feedback received on these specific non-load related wood pole EJPs, they stated the following:

(the bold text highlights the key areas of concern as we understand it)

*"It was confirmed that only assets that have recent inspection data have been considered for intervention and that **assets without data are capped at HI3 and hence not considered**. Clarifications indicates that <20% of this asset base are inspected annually. **With less than 20% of this asset base inspected annually this introduces a risk related to the proposed volume**. It should also be noted that **if there is a change to the health and safety regulations for creosote, this could change the cost and life (hence volumes)** of future wooden poles replacements. We therefore consider the EJP to be partially justified."*

We strongly disagree with this conclusion for the following reasons:

- SSEN does not apply any cap to the Health Score of our poles. The industry standard CNAIM methodology applies caps in the calculation of the Health Score where there is no inspection data available. However, we do have inspection data available for all of our poles within our CBRM models. Therefore, there is little risk that our volumes underestimate the intervention volumes that will be required during RIIO-ED2 (See end of this section for further evidence and detail).

- Only assets that have been inspected and condition data collected will have Health Scores that fall into our HSIC. Therefore, additional inspection would only increase the number of poles shortlisted for intervention and should not be used as justification for applying cuts to these CBRM calculated volumes.

- Fundamentally, the Ofgem approved CNAIM does not specify any time periods applied to the data refresh rate requirement for any asset types, and on this basis we do not propose to have our poles inspected more than once every 8-years for the output of the models to be used as justification of our proposed volumes. This frequency is an SSEN Asset Management policy and reflects the practicalities associated with managing the 927,000 poles we have on our network. Any increased inspection frequency would not represent value for money for our network customers as it would significantly increase our CV30 inspection OPEX for little to no benefit.

- It is SSEN's responsibility to determine the appropriate inspection and maintenance frequency for our network assets. It is not Ofgem's place to insist we inspect our assets more or less frequently, or then challenge the intervention volumes that are required as a result of the data collected from these inspections and fed through our CBRM models. As described above our 1-in-8-year cycle for poles is an established SSEN policy that we intend to continue to work to.

- We have also applied our conservative Health Score Intervention Criteria (HSIC) to poles meaning our volumes are already substantially lower than what they could have been. Any further cuts represent an unacceptable increase in risk for our customers.

- Any new safety regulations on the use of creosote would only impact the unit cost to install new poles (drive a higher unit cost). It would not impact RIIO-ED2 volumes given that the alternative non-creosote poles used during RIIO-ED2 would not be scheduled for replacement themselves for approximately another 50-60 years, so their own lifetime is irrelevant for RIIO-ED2. This environmental policy change would only impact RIIO-ED2 volumes if the alternative pole type used were to last for less than one price control period and this would only then represent an increase in our volumes, not a decrease.

The following EJPs provide detailed analysis that was used to determine the health score criteria for each pole:

316_SSEPD_NLR_LV_POLES
317_SSEPD_NLR_HV_POLES
318_SSEPD_NLR_EHV_POLES

Three sensitivities were undertaken as part of our analysis to ensure that the right level of risk and affordability was reflected in the replacement volumes we proposed within our final plan. The bounds of this sensitivity analysis is shown in the tables below and explained further in each EJP.

Table 2 – Sensitivity Criteria

Sensitivity 1	Shortlists assets for intervention which will fall within the Health Index 5 band only; HSIC ≥8.0
Sensitivity 2	Shortlist more critical assets for intervention at a lower HSCI, e.g. C4 ≥7.75, and modifying the lower criticality asset HSCI, e.g. C1 ≥ 9.5. Therefore, adjusting the HSCI to reflect different consequences of failure.
Sensitivity 3	As per Sensitivity 2 but further adjusting the HSCI criteria, e.g. C4 ≥7.50 and C1 ≥ 9.0. Therefore, adjusting the HSCI to reflect different consequences of failure.

The following criteria was concluded as part of our sensitivity analysis:

Table 3 – Pole Sensitivity Analysis Conclusion

LV Poles	Volumes driven using sensitivity 1 analysis on the grounds of safety as LV poles have a higher probability of being in close proximity to the public along footpaths and gardens. This also represented the right balance of risk and affordability.
HV Poles	Volumes driven using sensitivity 2 analysis as this balanced safety, risk and affordability.
EHV Poles	Volumes driven using sensitivity 2 analysis as this balanced safety, risk and affordability.

Our approach to deriving pole volumes is consistent with all other NARM asset categories and meets the conditions of our robust asset risk management process.

Part of the concern raised by Ofgem in assessing our intervention volumes for wood poles related to them not having been condition inspected and that a high volume had been excluded from our NARM assessment. The volumes of poles inspected by SSEN has been established and presented to Ofgem as part of our data quality assurance process. This was presented completely independently and prior to the RIIO-ED2 process being undertaken but the summary of this was also included in our RIIO-ED2 Business Plan submission. This can be seen in table 4 below which is an extract from our RIIO-ED2 Business Plan Submission (*Annex 7.1 Safe & Resilient - Appendix A: Asset data strategy*) where we have clearly stated that 99% have been conditioned assessed over the past 8 years so the '***capped at HI3***' statement is an incorrect assumption or misunderstanding held by Ofgem and no grounds to withhold our proposed intervention volumes.

Table 4 – Asset Data Quality Matrix

Asset Data Quality Matrix						
Company	**Sub-Asset Type Grading**			**Accuracy**	**Completeness**	**Timeliness**
SSEN	**Secondary Deliverable Ground Mounted Plant**	4	Score	81%	92%	77%
			Grading	4	3	4
	Wooden Poles	3	Score	91%	99%	91%
			Grading	3	1	3
SEPD	**Secondary Deliverable Ground Mounted Plant**	4	Score	84%	96%	80%
			Grading	4	2	4
	Wooden Poles	4	Score	86%	99%	94%
			Grading	4	1	3
SHEPD	**Secondary Deliverable Ground Mounted Plant**	5	Score	78%	87%	74%
			Grading	4	4	5
	Wooden Poles	4	Score	97%	99%	87%
			Grading	2	1	4

In tables 5 & 6 below we can demonstrate the volume of poles our NAIM and HSIC has shortlisted for intervention replacement during RIIO-ED2 alongside the number of HI5 poles that are expected to be on our network at the end of RIIO-ED2 with and without this proposed intervention.

The 6.6/11kV and 33kV Poles both have a volume of HI5 condition assets remaining on our networks at the end of RIIO-ED2 with the proposed intervention volumes. However, as per our NAIM, we are targeting all HI5 condition LV Poles during RIIO-ED2 given the additional safety concerns associated with HI5 poles which sit in much closer proximity to the public when compared to poles at higher voltage levels. This approach is also consistent with the learnings gathered from the recent Storm Arwen.

Table 5: RIIO-ED2 SEPD CV7a pole volume (LV-33kV)

	SEPD CV7a RIIO-ED2 Pole Replacement Volumes		
	No. of HI5 (End of ED2 without Investment)	ED2 Volumes (Disposals)	No. of HI5 (End of ED2 with Investment)
LV Poles	13,345	-13,345	0
6.6/11kV Poles	15,258	-12,503	2,857
33kV Poles	2,077	-1,669	443

Table 6: RIIO-ED2 SHEPD CV7a pole volume (LV-33kV)

	SHEPD CV7a RIIO-ED2 Pole Replacement Volumes		
	No. of HI5 (End of ED2 without Investment)	ED2 Volumes (Disposals)	No. of HI5 (End of ED2 with Investment)
LV Poles	1,929	-1,929	0
6.6/11kV Poles	6,519	-5,197	1,503
33kV Poles	1,978	-1,737	280

The full NARMs tables for our CV7a poles volumes are also provided within Appendix 1 of this document for additional information (see page 10) and is an extract from our supplied BPDTs. This shows the exact Health and Criticality Indices of the poles we have shortlisted for intervention during RIIO-ED2.

Switches & RMUs

Ofgem have stated *"Based on the data available to us, we have adjusted the licensee's submitted volumes in line with the cost model's relevant run rate outputs."*

We propose to confirm the strategy for 6.6/11kV switches and ring main units (RMU) within this section of the addendum.

As with all NARM assets, our proposed volumes for 6.6/11kV switches and 6.6/11kV RMUs have been calculated using the same asset risk management process used for all other asset categories; table 1 above provides the health score criteria used for this assessment. Although this is the case, we must make it clear that there are some specific differences and associated efficiencies that we've also proposed within the disposal and addition volumes of these specific asset categories. These are as follows:

1. Where a site requires more than one 6.6/11kV switch to be replaced we have proposed to replace this with a new RMU. The associated cost of two switches is more than a RMU and they also take up more space; so we believe that this is an efficient proposal for switch replacement. The following applies in our logic:

Table 7 – Switch to RMU Replacement

No. of Switches	RMUs Installed
≥2	1
≥4	2
≥6	3

2. substation sites. A CSU consists of an HV Transformer, LV Board and RMU that are all intrinsically connected. Where any specific part of a CSU requires replacement, all associated equipment will be replaced as this is the most cost-efficient solution. We have installed Combined Unit Substations (CSU) across large volumes of secondary.

So, based on the logic above that was driven by our asset risk management process the following volumes were proposed in our final business plan:

Table 8 – Volume Additions and Disposals

		SSEN Submission		Ofgem's DD
Licence Area	Asset Type	Additions	Disposal	Additions
SEPD	6.6/11kV Switches	129	1262	129
SEPD	6.6/11kV RMU	551	93	551
SHEPD	6.6/11kV Switches	16	195	168.9
SHEPD	6.6/11kV RMU	425	350	133.7

As can be seen in the tables above, SEPD volumes have been accepted as part of Ofgem's Draft Determination; however, the same cannot be said for SHEPD. In SHEPD, our proposed disposal volumes have been cut in the disaggregated modelling from 195 Switches to 168.9 Switches and from 350 RMUs to 133.7. These cuts represent significant risk to these asset categories given that we have already applied our industry leading asset risk management process. Any further cuts to our proposed volumes risk unnecessary, expensive, and potential unsafe asset failures.

Appendix 1 – LV to 33kV Pole NARM Tables

	LV Poles - End of ED2 (without intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	10,921	4,013	1,753	2,559	1,504	**20,750**
C2	58,061	20,390	8,053	12,488	3,319	**102,311**
C3	40,664	14,731	5,864	8,883	4,406	**74,548**
C4	33,932	13,263	4,731	7,147	4,116	**63,189**
Total	**143,578**	**52,397**	**20,401**	**31,077**	**13,345**	**260,798**

	LV Poles (SEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	-1,504	**-1,504**
C2	0	0	0	0	-3,319	**-3,319**
C3	0	0	0	0	-4,406	**-4,406**
C4	0	0	0	0	-4,116	**-4,116**
Total	-	-	-	-	**-13,345**	**-13,345**

	LV Poles (SEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	1,504	0	0	0	0	**1,504**
C2	3,319	0	0	0	0	**3,319**
C3	4,406	0	0	0	0	**4,406**
C4	4,116	0	0	0	0	**4,116**
Total	**13,345**	-	-	-	-	**13,345**

	LV Poles - End of ED2 (with intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	12,425	4,013	1,753	2,559	-	**20,750**
C2	61,380	20,390	8,053	12,488	-	**102,311**
C3	45,070	14,731	5,864	8,883	-	**74,548**
C4	38,048	13,263	4,731	7,147	-	**63,189**
Total	**156,923**	**52,397**	**20,401**	**31,077**	-	**260,798**

	6.6/11kV Poles - End of ED2 (without intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	6,106	2,370	1,451	1,580	407	**11,914**
C2	31,721	13,176	6,865	8,987	6,515	**67,264**
C3	26,050	11,536	5,586	7,821	5,688	**56,681**
C4	10,824	5,399	2,244	3,310	2,648	**24,425**
Total	**74,701**	**32,481**	**16,146**	**21,698**	**15,258**	**160,284**

	6.6/11kV Poles (SEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	-272	**-272**
C2	0	0	0	0	-4,386	**-4,386**
C3	0	0	0	0	-5,095	**-5,095**
C4	0	0	0	-102	-2,648	**-2,750**
Total	-	-	-	**-102**	**-12,401**	**-12,503**

	6.6/11kV Poles (SEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	272	0	0	0	0	**272**
C2	4,386	0	0	0	0	**4,386**
C3	5,095	0	0	0	0	**5,095**
C4	2,750	0	0	0	0	**2,750**
Total	**12,503**	-	-	-	-	**12,503**

	6.6/11kV Poles - End of ED2 (with intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	6,378	2,370	1,451	1,580	135	**11,914**
C2	36,107	13,176	6,865	8,987	2,129	**67,264**
C3	31,145	11,536	5,586	7,821	593	**56,681**
C4	13,574	5,399	2,244	3,208	-	**24,425**
Total	**87,204**	**32,481**	**16,146**	**21,596**	**2,857**	**160,284**

	33kV Poles - End of ED2 (without intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	7,666	6,510	1,589	3,230	992	**19,987**
C3	465	294	65	80	0	**904**
C4	4,210	4,513	1,058	2,316	1,085	**13,182**
Total	**12,341**	**11,317**	**2,712**	**5,626**	**2,077**	**34,073**

	33kV Poles (SEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	0	0	0	0	-549	**-549**
C3	0	0	0	0	0	-
C4	0	0	0	-35	-1,085	**-1,120**
Total	-	-	-	**-35**	**-1,634**	**-1,669**

	33kV Poles (SEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	549	0	0	0	0	**549**
C3	0	0	0	0	0	-
C4	1,120	0	0	0	0	**1,120**
Total	**1,669**	-	-	-	-	**1,669**

	33kV Poles - End of ED2 (with intervention) - SEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	-	-	-	-	-	-
C2	8,215	6,510	1,589	3,230	443	**19,987**
C3	465	294	65	80	-	**904**
C4	5,330	4,513	1,058	2,281	-	**13,182**
Total	**14,010**	**11,317**	**2,712**	**5,591**	**443**	**34,073**

	LV Poles - End of ED2 (without intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	4,239	1,512	4,009	6,571	445	**16,776**
C2	12,355	3,720	9,481	12,278	430	**38,264**
C3	6,547	2,045	5,727	6,130	639	**21,088**
C4	5,009	1,574	3,170	3,145	415	**13,313**
Total	**28,150**	**8,851**	**22,387**	**28,124**	**1,929**	**89,441**

	LV Poles (SHEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	-445	**-445**
C2	0	0	0	0	-430	**-430**
C3	0	0	0	0	-639	**-639**
C4	0	0	0	0	-415	**-415**
Total	-	-	-	-	**-1,929**	**-1,929**

	LV Poles (SHEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	445	0	0	0	0	**445**
C2	430	0	0	0	0	**430**
C3	639	0	0	0	0	**639**
C4	415	0	0	0	0	**415**
Total	**1,929**	-	-	-	-	**1,929**

	LV Poles - End of ED2 (with intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	4,684	1,512	4,009	6,571	-	**16,776**
C2	12,785	3,720	9,481	12,278	-	**38,264**
C3	7,186	2,045	5,727	6,130	-	**21,088**
C4	5,424	1,574	3,170	3,145	-	**13,313**
Total	**30,079**	**8,851**	**22,387**	**28,124**	-	**89,441**

	6.6/11kV Poles - End of ED2 (without intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	34,438	17,959	14,126	29,457	2,394	**98,374**
C2	48,799	19,127	16,575	25,695	2,113	**112,309**
C3	33,071	13,839	12,807	20,192	1,666	**81,575**
C4	7,761	2,964	2,320	3,912	346	**17,303**
Total	**124,069**	**53,889**	**45,828**	**79,256**	**6,519**	**309,561**

	6.6/11kV Poles (SHEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	-1,747	**-1,747**
C2	0	0	0	0	-1,598	**-1,598**
C3	0	0	0	0	-1,470	**-1,470**
C4	0	0	0	-36	-346	**-382**
Total	**0**	**0**	**0**	**-36**	**-5,161**	**-5,197**

	6.6/11kV Poles (SHEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	-1,747	0	0	0	0	**-1,747**
C2	-1,598	0	0	0	0	**-1,598**
C3	-1,470	0	0	0	0	**-1,470**
C4	-382	0	0	0	0	**-382**
Total	**-5,197**	-	-	-	-	**5,116**

	6.6/11kV Poles - End of ED2 (with intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	32,691	17,959	14,126	29,457	647	**98,374**
C2	47,201	19,127	16,575	25,695	515	**112,309**
C3	31,601	13,839	12,807	20,192	196	**81,575**
C4	7,379	2,964	2,320	3,876	0	**17,303**
Total	**129,170**	**53,832**	**45,803**	**79,253**	**1,503**	**309,561**

	33kV Poles - End of ED2 (without intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	21,652	9,997	7,116	9,003	1,193	**48,961**
C3	1,397	391	241	265	31	**2,325**
C4	8,945	4,042	3,094	3,958	754	**20,793**
Total	**31,994**	**14,430**	**10,451**	**13,226**	**1,978**	**72,079**

	33kV Poles (SHEPD) - ED2 Disposal Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	0	0	0	0	-926	**-926**
C3	0	0	0	0	-18	**-18**
C4	0	0	0	-39	-754	**-793**
Total	-	-	-	**-39**	**-1,698**	**-1,737**

	33kV Poles (SHEPD) - ED2 Addition Volumes					
	HI1	HI2	HI3	HI4	HI5	Total
C1	0	0	0	0	0	-
C2	1,371	0	0	0	0	**1,371**
C3	18	0	0	0	0	**18**
C4	793	0	0	0	0	**793**
Total	**2,182**	-	-	-	-	**2,182**

	33kV Poles - End of ED2 (with intervention) - SHEPD					
	HI1	HI2	HI3	HI4	HI5	Total
C1	-	-	-	-	-	-
C2	23,781	9,997	7,116	9,003	267	**50,164**
C3	1,415	391	241	265	13	**2,325**
C4	9,738	4,042	3,094	3,919	-	**20,793**
Total	**34,934**	**14,430**	**10,451**	**13,187**	**280**	**73,282**