



RP7 - NIE Networks Price Control 2025-2031

Draft Determination Annex P
Assessment of Network Investment Direct
Allowances
November 2023



About the Utility Regulator

The Utility Regulator is the economic regulator for electricity, gas and water in Northern Ireland. We are the only multi-sectoral economic regulator in the UK covering both energy and water.

We are an independent non-ministerial government department and our main duty is to promote and protect the short- and long-term interests of consumers.

Our role is to make sure that the energy and water utility industries in Northern Ireland are regulated, and developed within ministerial policy, as set out in our statutory duties.

We are governed by a Board of Directors and are accountable to the Northern Ireland Assembly.

We are based at Queens House in Belfast. The Chief Executive and two Executive Directors lead teams in each of the main functional areas in the organisation: CEO Office; Price Controls, Networks and Energy Futures; and Markets and Consumer Protection.



Our mission

To protect the short- and long-term interests of consumers of electricity, gas and water.



Our vision

To ensure value and sustainability in energy and water.



Our values

- Be a best practice regulator: transparent, consistent, proportionate, accountable and targeted.
- Be professional – listening, explaining and acting with integrity.
- Be a collaborative, co-operative and learning team.
- Be motivated and empowered to make a difference.



Abstract

This annex sets out the Utility Regulator's assessment of NIE Networks' proposals for direct network investment, which forms part of the overall capital investment proposed by the company for the RP7 price control period.

Audience

Will be of interest to regulated companies, consumers, other regulatory bodies, government and other statutory bodies.

Consumer impact

The overall consumer impact of RP7 is set out in the main draft determination report. The estimates of direct network investment direct expenditure in this annex contribute to the determination of tariffs for RP7.



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1. Introduction

Overview

- 1.1 This Annex sets out our assessment of NIE Networks' proposals for direct network investment which forms part of the overall capital investment proposed by the company for RP7.
- 1.2 Direct investments are those activities which involve physical contact with network system assets such as refurbishment or reinforcement of existing assets and the creation of new assets. Other strands of investment not covered in this section include indirect expenditure and metering.
- 1.3 Direct network investment is treated in a number of ways in this Price Control:
 - a) investment for which an ex-ante allowance is included in this determination with defined outputs;
 - b) investment for which a unit cost is determined but the outputs are uncertain (volume driven allowance)
 - c) investment carried out under an uncertainty mechanism' where an estimate included for costs which will be determined at a later date when the need for the project has been confirmed and the scope, cost and programme developed.
- 1.4 NIE Networks proposed direct investment in the distribution and transmission networks in RP7 of £1,388.2m in 2021/22 prices prior to the application of real price effects and on-going efficiencies. This included an estimate of major transmission maintenance projects (£493.4m) which will be assessed under the D5 mechanism (see Annex S). Taking account of this, we have identified £894.8m of planned direct network investment in the company's submission for which we have determined an ex-ante allowance of £814m (before the application of frontier shift). These figures include NIE Networks' innovation proposals which are discussed in detail in Annex N. This movement from the NIE Networks business plan submission to the draft determination is shown in Table 1.1 below.

	Distribution (£k)	Transmission (£k)	Total (£k)
NIE Networks Business Plan Submission	800,952	587,225	1,388,177
Less D5 estimates included in the business plan	0	-493,400	-463,400
Business plan core investment net of estimates	800,952	93,825	894,777
UR adjustments to core investment plan	-72,560	-8,174	-80,735
Draft determination of core investment plan	728,392	85,651	814,042
Add back D5 estimates	0	493,400	493,400
Draft determination including D5 estimates	728,392	579,051	1,307,442

Table 1.1: Change in direct network investment from the business plan submission to the draft determination

- 1.5 For the above core investment, we have carried out a detailed assessment and challenge of the company's proposals, considering both the need for the work proposed, the scope of work proposed and estimated cost of the work. We have been assisted in this assessment by our technical consultants Gutteridge Haskins & Davey whose experience covers the assessment and delivery of similar works in Northern Ireland, in GB and internationally.
- 1.6 We have concluded that an efficient cost of investment to maintain and develop the network as proposed by NIE Networks in its Business Plan is £818.4m before the application of real price effects and on-going efficiencies.
- 1.7 In this annex, all costs are reported in 2021/22 prices and before the application of real price effects and the application of on-going efficiencies
- 1.8 In addition to the work necessary to maintain and enhance the distribution and transmission networks, further work is expected to be identified in the future to improve the capacity or capability of the transmission network. This could be a material strand of investment but the scope, timing and costs of the work are highly uncertain. In RP6, efficient allowances for this type of work have been determined on a case by case basis as the work is confirmed. We intend to continue this approach in RP7.

Identification of Allowances

- 1.9 The various distribution and transmission programs and allowances have been identified by a numbering system and are shown in Tables 1.2 and 1.3 below.

Program	Description
D06	Distribution Tower Lines
D07	33kV Overhead Lines
D08	11kV Overhead Lines
D09	LV Overhead Lines
D10	Undereaves
D11	Cutouts
D13	Primary Plant
D14	Primary Transformers
D15	Secondary Substations
D16	Distribution Cables
D39	SCADA
D41	Operational Telecoms Network
D43	Distribution ESQCR
D50	Substation Flooding
D57	Distribution Network Reinforcement
D101	Network Alterations
D603	Distribution Protection
D604	Connection Driven System Work
D605	Network Access & Commissioning
D606	Innovation (see Annex N)
D701	Distribution Earthing
D702	Network Performance Strategy

Table 1.2: Distribution Programs

Program	Description
T10	110kV Switchgear Replacement
T11	275kV Plant Ancillaries
T12	110kV Plant Ancillaries
T13	275/110kV Transformer Replacement
T14	110/33kV Transformer Replacement
T15	22kV Reactor Replacement
T16	Transmission Transformer Refurbishment
T17	275kV Overhead Line Asset Replacement
T19	110kV Overhead Line Asset Replacement
T20	Transmission Cables
T602	Transmission Protection
T603	Network Access & Commissioning
T701	Strategic Spares
T702	Transmission Earthing

Table 1.3: Transmission Programs

2. Facilitating net zero through a flexible and integrated energy system

2.1 This section includes the following sub-programmes

Sub-programme	Submission Value (£k)	Our Assessment (£k)
D08f: 11kV Overhead Line Rebuild	208,939.805	191,914.443
D08g: Low Capacity Transformer Replacement	8,793.741	8,793.741
D57b: Primary Network Reinforcement. Forward Power Flow	29,978.021	26,980.219
D57c: Secondary Network Load Related Expenditure	101,422.090	101,399.614
D57l: Primary Network Reinforcement. Reverse Power Flow	19,958.405	17,962.564
D57n: EHV & HV Monitoring	1,260.984	1,260.984
Total	370,353.046	348,311.565

Table 2.1: Facilitating net zero sub-programmes

D08: HV Overhead Lines

Scope of Work

- 2.2 Historically, NIE Networks has carried two types of maintenance on the high voltage overhead line network these were
- a) Refurbishment: The replacement of defective components carried out over a 45 year cycle
 - b) Re-engineer: Rebuild sections of mainline (replacement of conductors and defective supports) and refurbishment of associated spur lines.
- 2.3 The above sub-programmes maintain the condition of the system but do not materially increase the capacity or resilience.
- 2.4 A large part of the high voltage network contains low capacity conductors (25sqmm Aluminium Conductor Steel Reinforced [ACSR]). This conductor was first introduced in the 1960's during the rural electrification program and is now outdated due its low current carrying capacity.
- 2.5 The electrification of transport and domestic heating will expose the existing high voltage network to much higher loads than it was originally designed to

withstand. In order to prevent the network from being a blocker to the uptake of low carbon technology, NIE Networks has introduced a new maintenance program for the high voltage system. The new program involves replacement all low capacity conductors with a minimum specification of 50sqmm All Aluminium Alloy Conductor (AAAC). This will increase the capacity of the network and also provide an improved element of resilience due to the larger conductor's increased mechanical strength.

- 2.6 The installation of larger conductors will require higher volumes of supports to be replaced to cope with the higher mechanical loads and ground clearance issues.
- 2.7 A distribution transformer with a capacity below 10kVA will be unable to supply the load of an Electric Vehicle (EV) fast charger and ordinary domestic load. For RP7, NIE Networks is proposing to continue its programme of proactive replacement of low capacity transformers in preparation for the expected uptake in EV sales. To this end, all transformers below 10kVA will be replaced with 25kVA units.

NIE Networks RP7 Proposal

- 2.8 In its submission, NIE Networks has proposed to complete the removal of low capacity conductor within two price controls (15 years). This ambitious strategy will involve the rebuilding of 8,731km of high voltage overhead line during RP7.
- 2.9 The proposed programme of works replaces the previous two sub-programmes of re-engineer and refurbish, therefore categories D08a and D08b are now obsolete.
- 2.10 In addition to increasing capacity and improving resilience to severe weather, the rebuild program will also address any vertical and horizontal clearance issues and ensure that the system is in compliance with Electricity Safety, Quality and Continuity Regulations (ESQCR)
- 2.11 The RP7 proposal calls for a step change in the rate of investment as shown in Table 2.2 below

Period	Expenditure pa (£k)
RP6 (Outturn)	8,116
RP7 (proposed)	34,823

Table 2.2: RP6 and Proposed RP7 HV OHL Investment

Draft Determination

D08f: 11kV Rebuild

- 2.12 The new specification for HV overhead lines was introduced in the RP6 extension year and is proposed to continue through the RP7 price control with no technical changes. Due to the continuation of works, our initial thought was to continue through RP7 with unit rate we had previously determined (£18,477/km).
- 2.13 NIE Networks stated in its submission that it had recalculated its costs for RP7 based on:
- a) Reallocation of ESQCR costs associated with HV overhead Lines (£333/km); and
 - b) Uplift due to renegotiation of contractor costs (£5,121)
- 2.14 We agree with the reallocation of ESQCR costs, however, we do not agree with NIE Networks assessment of contractor costs.
- 2.15 During the RP6 extension year negotiations we based our determination on 44% of the unit rate being contractor driven and a cost increase of 45%. Our approach for RP7 is to reduce the uplift to 39% to take account of the positive ~4% frontier shift. This makes our draft determination $18,477+333+3,171=£21,981$
- 2.16 The new programme of works began in January 2023, therefore our outturn data is limited to 3 months and is not deemed to be representative. We will review this sub-programme in the round prior to the final determination with the benefit of a full year of outturn data but will not place full reliance on the data

D08g: Low Capacity Transformer Replacement

- 2.17 NIE networks has proposed the same unit rate as we determined for the RP6 extension year for pole mounted distribution transformer replacement, therefore we are in agreement with the costs.
- 2.18 The proposed volumes are also in line with those agreed in the RP6 extension year (approximately 0.5 transformers/km).

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D08f - HV OHL Rebuild	NIE Networks' proposal	km	8,731	23.931	208,939,805
	Draft Determination	km	8,731	21.981	191,914.443
D08g: Low Capacity Transformer Replacement	NIE Networks' proposal	km	4,330	2.031	8,793.741
	Draft Determination	km	4,330	2.031	8,793.741
D08: 11kV Overhead Lines Total	NIE Networks' proposal				217,733.545
	Draft Determination				200,708.184

Table 2.3: D08 HV Overhead Lines Draft Determination

D57: Load Related Expenditure

Scope of Work

- 2.19 NIE Networks' primary distribution system operates at Extra High Voltage (EHV) of 33kV and is comprised mainly of overhead lines, some underground cables and 33/11kV substations.
- 2.20 The secondary network in Northern Ireland includes the High Voltage (HV) system predominantly running at 11kV¹ and the Low Voltage (LV) system running at 400/230V. It is the LV system where the final connection to domestic properties is made.
- 2.21 Historically the network, at all voltages, was designed and operated around a unidirectional flow of energy. However, with the influx of distributed generation, the network must be able to cope with bidirectional flow.
- 2.22 Due to the bidirectional flow of energy, the company can no longer rely on "dumb" equipment to protect the network and requires real time data to allow it to configure the system for most efficient operation.
- 2.23 Load related expenditure is not an easy allowance to calculate with any degree of certainty, especially with the introduction of Low Carbon Technology (LCTs). Therefore, lump sum allowances are suitable for items where the degree of expenditure is calculable but the location or nature of the expenditure is changeable. Additional protection in the form of specific uncertainty mechanisms is also discussed in Annex S of the draft determination.

¹ The network in some parts of Belfast and surrounding areas is operated at 6.6kV. The "HV" classification includes 11kV & 6.6kV

NIE Networks RP7 Proposal

2.24 NIE Networks' primary (33/11kV) substations are classified according to the established load indices banding applied across the UK as shown in Table 2.4 below:

Category	Definition	Loading
LI 1	Significant Spare Capacity	$\geq 0\%$ and $< 80\%$
LI 2	Adequate Spare Capacity	$\geq 80\%$ and $< 95\%$
LI 3	Highly Utilised	$\geq 95\%$ and $< 99\%$
LI 4	Fully Utilised, mitigation requires consideration	$\geq 99\%$ for < 9 hours pa
LI 5	Fully Utilised, mitigation required	$\geq 99\%$ ≥ 9 hours pa

Table 2.4: Load Indices

2.25 Our goal is to keep the number of substations classified as "LI 5" below 2% of the primary substation population. NIE Networks achieve this through a range of interventions which include

- a) Increasing transformer capacity
- b) Increasing capacity of incoming feeders
- c) Procuring flexibility services
- d) Reconfiguration of the network

2.26 NIE Networks employed a number of consultants to undertake LCT uptake forecasts which informed its decision on the level of investment necessary to keep ahead of network loading.

2.27 The key pieces of forecasting works undertaken were:

- a) Forecasting of Low Carbon Technology Deployment in NI by WSP; and
- b) EV UP modelling project by Field Dynamics
- c) Commentary on NIE Networks LCT forecasts by Ernst & Young

2.28 NIE Networks then calculated the load impact on its primary substation fleet. This involved using measured demand obtained through monitoring, load profiling and forecast demand from the works mentioned above.

2.29 In its submission (EJP 1.101), NIE Networks claims that it has adopted a prudent modelling approach to ensure "that there is low risk that our baseline

expenditure will not be fully required within the RP7 period". Below is a list of the conditions specifically included/excluded in NIE Networks' forecasting works

- a) Made ambitious assumptions around flexibility first.
- b) Excluded demand relating to rapid/ultra-rapid public charging hubs.
- c) Did not explicitly consider large volume housing e.g. Buncrana Road, Londonderry.
- d) Did not account for demand associated with HGV Electric Fleets.
- e) Did not account for the commercial electrification of heat.
- f) Did not account for the impact of Cold Load Pick Up (CLPU)².
- g) Robustly tested our joint NIE Networks / SONI forecasts with stakeholders. In light of the recent CCC report³ which implies that 350k EVs and electric vans are required by 2030 and 160k heat pumps by 2030, our 'best view' scenario forecasts (300k EVs and 120k heat pumps by 2030) would appear to be conservative.

2.30 The outcome of the above works is a list of primary substation sites shown in Table 2.5 below together with the identified interventions and associated costs

² A phenomenon following a planned or unplanned network outage where there is increased and sustained demand, particularly prevalent with heat pumps and electric vehicles.

³ [advice-report-the-path-to-a-net-zero-northern-ireland](#).

ID	Project	Intervention Summary	Conventional Cost (£k)	Flexibility Cost (£k)
1	Annsborough Central	Customer Flexibility		102.663
2	Ardboe Central	Customer Flexibility		13.294
3	Ballycastle Central	Rebuild network to 200sqmm	976.325	
4	Ballyfodrin Central	Upgrade Dual Transformers	854.254	
5	Ballykelly Central	Customer Flexibility		1.717
6	Ballymena North	Customer Flexibility		11.224
7	Brookhill Central	Upgrade Dual Transformers	854.320	
8	Buckna Central	Upgrade Transformer	107.389	
9	Carrickmore North	Upgrade Transformer	471.667	
10	Carrickfergus West	Customer Flexibility		50.821
11	Castleberg South	Upgrade Dual Transformers	854.320	
12	Creagh Central	Upgrade Dual Transformers	854.320	
13	Fivemiletown Central	Network Flexibility		34.070
14	Garvagh North	Upgrade Dual Transformers	854.294	
15	Keady Central	Customer Flexibility		2.748
16	Laragh Central	Upgrade Dual Transformers	854.294	
17	Lisnaskea Central	Rebuild network to 200sqmm	114.860	
18	Monbrief	Rebuild network to 200sqmm	201.006	
19	Mullaghglass	New 33kV circuit from Lisburn Main and install 2nd 5/6.25MVA Transformer	3,803.640	
20	Newcastle North	Upgrade Dual Transformers	858.370	
21	Newry East	Customer Flexibility		58.427
22	Omagh West	Customer Flexibility		33.703
23	Portstewart South	Construct New Primary substation at Portrush South supplied from Loguestown Main	5,262.987	
24	Richhill Central	Customer Flexibility		8,463

25	Tullyvannon	Install second 10/12.5MVA 33/11kV Tx. And reconfigure 33kV network	1,063.012	
26	Ardboe/Cookstown Mesh	2 new 33kV circuits out of Dungannon Main to split network and transfer load	3,591.309	
27	Ballinamallard/Ederny Mesh	Rebuild remaining 33kV network to 100mm	292,898	
28	Buckna/Carnlough Mesh	Rebuild network to 200sqmm	2,871,541	
29	Carrickmore/Pomeroy/Crouk	Connect Pomeroy into Tremoge Cluster Substation	2,470.561	
30	Cullybackey/Kilrea Mesh	2 New 33kV Circuits from Rasharkin Cluster Main and transfer load	757.506	
31	Cloughy Central /Kircubbin East	Rebuild existing 33kV network to 100mm	1,091.187	
32	Derryleckagh/Kilkeel Mesh	New 33kV Circuit from Newry Main to D'leckagh to split network and transfer load	393.263	
Total Conventional Cost			29,454.363	
Total Flexibility Cost				317.131
Total Deferred Cost				
Going Further Faster				207,527
Total proposed				29,978.021

Table 2.5: Primary Network Reinforcement: Forward Power Flow Proposal

- 2.31 As well as the reinforcement mentioned above for conventional forward power flow, a separate allowance is proposed for reinforcement associated with reverse power flow.
- 2.32 In RP6 we determined an amount of £10m for 33kV congestion. This allowance was for the purposes of rectifying legacy network design issues which were preventing distributed generation from connecting. These issues are now resolved.
- 2.33 NIE Networks has identified sections of the primary network where there is less than 250kW of generation capacity available. With RES-E targets for 2030 currently at 80%, and the promotion of PV in new housing, it would not be acceptable to have sections of the network unable to accommodate reverse power flow caused by distributed generation.

2.34 In EJP 1.102 the company identified 40 sites requiring one or more of the following interventions

Intervention	Volume	Cost (£m)
Tap Changer Replacement	42	3.36
Relay Replacement	34	0.58
Primary Transformer Replacement	4	1.71
33kV Circuit Breaker Replacement	1	0.16
33kV Network Restrung (km)	171	9.82
33kV Network New Build (km)	35	4.33
Total		19.96

Table 2.6: Primary Network Reinforcement: Reverse Power Flow Proposal

2.35 In addition to the primary network reinforcement, NIE Networks has proposed significant load related investment in the secondary network.

2.36 NIE Networks developed a range of forecast uptakes for Low Carbon Technology (LCT) and sought stakeholder input into its "Best View" choice of volumes shown in Table 2.7 below

EVs by 2030	HPs by 2030	Additional Generation	Increased Demand Consumption
300,000	120,000	2.23	29%

Table 2.7: Best View forecast of LCT Uptake Volumes by 2030

2.37 In RP6 we determined an ex-ante allowance for secondary network load related expenditure of £9.5m which was based on RP5 run rates and intended to allow the company to react to known operational constraints.

2.38 NIE Networks have made the case in EJP 1.105 that this allowance must allow proactive solutions to potentially quickly changing network conditions which will be identified through the recently funded network monitors.

2.39 For the RP6 LCT Mid-term review, we determined a unit rate per identified EV charger. This was designed to enable NIE Networks to catch up with customers who had not informed the company of the connection of a fast charger and could potentially use the remaining headroom on the network without the knowledge of the company.

2.40 The allowance was designed as a short-term fix and not intended for use beyond RP6.

- 2.41 NIE Networks consultant, WSP, developed the LCT Planner tool on behalf of the Energy Network Association and in conjunction with GB DNOs. This is a modelling tool that can be used to forecast load growth on electricity networks. WSP were commissioned by NIE Networks to make adjustments to the tool parameters in order to align with the network design in Northern Ireland.
- 2.42 In conjunction with the LCT Planner tool, NIE Networks utilised the "EV UP" modelling tool developed by Field Dynamics. This tool provides a locational element to the overall investment profile.
- 2.43 The above forecasting tools coupled with NIE Networks' Best View scenario for LCT uptake, produced gross investment forecast of £118.1m for secondary network reinforcement.
- 2.44 NIE Networks has stated that a number of savings can be applied to the gross cost and these are identified in table 2.7 below
- 2.45 Innovation savings represent non-conventional interventions such as the use of active network management which reconfigures the network automatically to redistribute load across a number of meshed substations
- 2.46 Time of use tariffs is the estimated savings forecast by NIE Networks when EV owners charge their vehicles at night (economy 7 tariff) moving load away from the traditional peak time
- 2.47 Optimisation of delivery represents the savings estimated through business as usual programmed works (e.g. 11kV OHL rebuild) which mitigates spend from the reinforcement budget

	Gross Costs (Modelled)	Innovation Savings	Optimisation of Delivery	Proposed Cost
HV Circuits	36.583	1.957	0.031	33.640
HV/LV Substations	45.493	0	3.168	41.399
LV Circuits	36.056	0	0.104	26.383
Time of Use Tariffs		11.449	0	0
Total	118.132	13.406	3.303	101.422

Table 2.8: Net Secondary Network Reinforcement Proposal

- 2.48 The final strand of proposed expenditure in the D57 category is the expansion of network monitoring.
- 2.49 During RP6 we determined 3 separate allowances associated with network monitoring:

- (i) D603c: Disturbance recorders (substation monitors)
- (ii) D603d: Reverse power flow recorders
- (iii) D58a: Data provision (network monitors)

2.50 The above classifications will cease at the end of RP6 and will be replaced with D57n as shown in Table 2.9 below

	Volume	Unit Cost (£)	Cost (£)
Bidirectional power flow monitors	670	1,345	901,400
HV/LV Substations	16	22,474	359,584
Total			1,260,984

Table 2.9: HV Monitoring Proposal

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D57b: Primary Network Reinforcement - Forward Power Flow

- 2.51 We are in broad agreement with the need for forward power flow reinforcement. This is a continuation of the RP6 programme and, whilst the volume of work is increasing, the conventional interventions proposed are considered to be business-as-usual solutions.
- 2.52 Whilst NIE Networks has identified a list of discrete sites, we do not propose to class these as nominated projects. This affords the company as much flexibility as possible if reprioritisation of the works is required during RP7.
- 2.53 The works carried out during RP6 in this cost category are currently outturning at 10% below the expected yearly expenditure, therefore we have applied this saving to the RP7 allowance

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D57b Primary Network Reinforcement (forward power flow)	NIE Networks' proposal	LS	N/A	N/A	29,978.021
	Draft Determination	LS	N/A	N/A	26,980.219
	Total Change +/-				-2,997.802
	Total Change %				-10%

Table 2.10: D57b Primary Network Reinforcement (Forward) Draft Determination

D57c: Secondary Network Reinforcement

- 2.54 We are in broad agreement with the need for secondary reinforcement, however we are uncomfortable allowing a lump sum allowance of this size due to the level of uncertainty driven by LCT uptake.
- 2.55 We considered the uncertainty mechanism proposed by NIE Networks and we cover this subject in Annex S of the draft determination. Instead of proceeding with a lump sum plus uncertainty mechanism, we intend to allow a volume driven allowance based on the interventions identified by NIE Networks. This will provide the company with the flexibility it needs to execute the required works and the opportunity to out-perform through the D3 mechanism. Furthermore, customers will receive a level of protection due to the company being remunerated only for the volumes delivered.
- 2.56 A small ex-ante lump sum is allowed to enable NIE Networks to avail of flexibility services should the opportunity to procure arise

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D57c: Secondary Network Reinforcement	NIE Networks' proposal	LS	N/A	N/A	101,422.090
	Draft Determination	LS	N/A	N/A	1.104
D57o: Pole Mounted Transformers	NIE Networks' proposal				
	Draft Determination	MVA	318*	85.7	27,252.600
D57p: Ground mounted transformers	NIE Networks' proposal				
	Draft Determination	MVA	179*	80.2	14,355.800
D57q: HV UG reinforcement	NIE Networks' proposal				
	Draft Determination	km	88*	95.9	8,439.200
D57r: HV OH reinforcement	NIE Networks' proposal				
	Draft Determination	km	437*	57	24,909.000

D57s: LV UG Reinforcement	NIE Networks' proposal				
	Draft Determination	km	260*	101.7	26,442.000
Total	NIE Networks' proposal				101,422.090
	Draft Determination				101,399.614
	Total Change +/-				-22.386
	Total Change %				-0%
* Estimated volumes					

Table 2.11: Secondary Network Reinforcement Draft Determination

D57I: Primary Network Reinforcement (Reverse Power Flow)

- 2.57 We are in broad agreement with the need for reverse power flow reinforcement.
- 2.58 As with forward power flow reinforcement, NIE Networks has identified a list of discrete sites requiring intervention, however, we do not propose to class these as nominated projects. This affords the company as much flexibility as possible if reprioritisation of the works is required during RP7.
- 2.59 Similar to forward power flow reinforcement we are applying a 10% saving to the RP7 proposed allowance.

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D57I Primary Network Reinforcement (reverse power flow)	NIE Networks' proposal	LS	N/A	N/A	19,958.405
	Draft Determination	LS	N/A	N/A	17,962.564
	Total Change +/-				-1,995.841
	Total Change %				-10%

Table 2.12: Primary Network Reinforcement (Reverse) Draft Determination

D57n: HV Monitoring

- 2.60 In the RP6 extension year determination, we determined a significant allowance for network monitors. The RP7 proposal is an extension to the original allowance and we are in agreement with the premise that further network monitoring will provide benefits in the form of more efficient network configuration, more efficient diagnoses and restoration of faults and better informed planning decisions

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D57n HV Monitoring	NIE Networks' proposal	LS	N/A	N/A	1,260.984
	Draft Determination	LS	N/A	N/A	1,260.984
	Total Change +/-				0
	Total Change %				0%

Table 2.13: D57n Draft Determination

3. Maintaining a Safe, Reliable & Resilient Network

3.1 This section includes the following programmes and values

Sub-programme	Submission Value (£k)	Our Assessment (£k)	Notes
D06: Distribution Tower Lines	2,390.476	2,165.828	
D07: 33kV Overhead Lines	21,005.219	19,052.318	
D08: 11kV Overhead Lines	12,958.143	9,951.978	
D09: LV Overhead Lines	5,627.881	5,445.382	
D10: LV Undereaves	10,653.959	14,486.347	
D11: Cutout Replacement	9,586.860	4,746.256	
D13: Primary Switchgear	29,903.293	27,210.863	See annex R
D14: 33/11kV Transformers	16,087.643	14,135.897	See annex R
D15: Secondary Switchgear	53,080.006	45,997.672	See annex R
D16: Distribution Cables	21,687.716	19,619.759	
D39: SCADA	4,802.870	4,376.918	See annex R
D41: Operational Telecoms	13,956.326	13,504.776	See annex R
D43: ESQCR	144,748.188	138,038.522	
D50: Climate Change Resilience	1,379.692	1,380.120	
D57m: High Impact Low Probability Events	4,086.925	2,783.323	
D101: Network Alterations	18,299.397	17,341.243	
D603: Distribution Protection	5,924.161	3,342.400	See annex R
D604: Connections Driven Systems Work	9,611.187	9,611.187	
D605: Network Access and Commissioning	9,514.002	9,514.002	
D701: Distribution Earthing	2,271.160	1,946.560	
D702: System Performance	13,719.000	10,719.000	
T10: 110kV Switchgear	1,564.534	798.407	See annex R
T11: 275kV Plant Ancillaries	3,815.514	3,499.268	See annex R
T12: 110kV Plant Ancillaries	11,322.372	10,307.908	See annex R
T13: 275/110kV Transformers	10,570.439	9,953.399	See annex R
T14: 110/33kV Transformers	9,072.831	8,640.336	See annex R
T15: 22kV Reactor Replacement	2,086.622	1,569.849	See annex R

T16: Transmission Transformer Refurbishment	1,416.264	1,246.099	See annex R
T17: 275kV Overhead Lines	18,696.388	18,008.989	See annex R
T19: 110kV Overhead Lines	18,204.154	15,790.930	See annex R
T20: Transmission Cables	4,701.795	3,713.637	See annex R
T602: Transmission Protection	5,697.481	5,433.116	See annex R
T603: Network Access & Commissioning T	2,274.471	2,274.471	
T701: Strategic Spares	4,414.075	4,414.075	See annex R
T702: Transmission Earthing	199.920	0.000	See annex R
Total	505,330.964	452,380.499	

Table 3.1: Maintaining a Safe, Reliable & Resilient Network Summary

D06: Distribution Tower Lines

Scope of Work

- 3.2 The majority of NIE Networks' overhead distribution system is supported by wood poles, however a proportion is supported by steel-lattice towers. NIE Networks operate 84km of distribution tower lines, consisting of twenty-five 33kV circuits, the majority of which are double circuit towers, and one circuit operating at 11kV.
- 3.3 The tower lines were built between the early 1930s and the early 1970s. Some of the circuits originally ran at a higher voltage but were downgraded to 33kV due to operational requirements, as an economical alternative to being replaced with wood pole lines. Some of the tower circuits were built to 110kV standards to allow for future upgrades, while the rest were built to the prevailing standard at the time, 69kV.
- 3.4 During RP6, investment in distribution tower lines was carried out under a lump sum general refurbishment programme, which consisted of minor works to address known defects where required and two bespoke programmes targeted to two specific circuits. The Eden Main - Carrickfergus West circuit was fully restrung and conductor fittings replaced. The Sprucefield - Lissue DC circuit was fully refurbished, which included replacement of severely corroded steel members, glass/porcelain insulators, corroded fittings and any other minor work as required.

NIE Networks' RP7 Proposal

- 3.5 NIE Networks proposed RP7 distribution tower lines investment has been assigned to 14 new programmes targeted at specific assets and components. This approach is a deviation from previous single refurbishment programme and circuit specific programmes, but aligns more with the

programmes carried out on the 110kV and 275kV transmission overhead line systems.

- 3.6 NIE Networks has set out its plans for investment in distribution tower lines in EJP 1.501 of its RP7 Network Investment Programme suite of documents. It submitted identical proposed unit costs for nine of the distribution tower lines programmes to that of its 110kV transmission overhead line programmes. These plans are summarised in the table below, along with identification of 110kV programmes with the same proposed unit rate.

Sub-programme	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)	110kV
D06d - Remedial Works	Lump Sum	N/A	N/A	100.000	
D06e - Replace Suspension Insulator Set	Tower Side	12	2.012	24.149	T19b
D06f - Replace Tension Insulator Set	Tower Side	18	10.657	191.823	T19c
D06g - Tower Painting	Tower	143	2.825	403.923	T19e
D06h - Replace colour and number plates	Tower	72	0.582	41.931	T19g
D06i - Tower Foundation Assessment	Tower	72	2.956	212.807	T19h
D06j - Tower Foundation Repair	Tower	4	132.940	531.760	T19z
D06k - Tower Condition Assessment	Tower	90	0.549	49.932	
D06l - Tower Muff Repair (see Note 2)	Each	72	1.065	76.650	T19n
D06m - Tower Muff Painting	Tower	143	0.787	112.522	T19t
D06q - Tower Reconductoring	Span	30	16.419	492.578	
D06r - Earth Conductor Replacement	Span	20	5.143	102.860	
D06t - Conductor Sampling	Each	27	1.463	39.491	T19ac
D06u - Replacement fittings	Tower	24	0.441	10.590	T19aj
D06: Distribution Tower Lines Total				2,391.016	

Note 1. Figures may not sum due to rounding.

Note 2. D06l tower muff repair revised from 172 volume/£183k total direct proposal in original submission

Table 3.2: NIE Networks D06: distribution tower lines proposal

Draft Determination

- 3.7 We agree with the rationale to align the distribution tower lines programme with the transmission overhead line programmes, given the similarity in assets and components. Creating component specific programmes will contribute towards more targeted assessment and replacement than current ad-hoc general refurbishment approach, and the measurable volumes will provide greater output transparency.

- 3.8 As all proposed expenditure for distribution tower lines has been assigned to new programmes, we have no direct outturn data to guide our assessment. The overall £2.39m proposed investment for RP7 is lower than the overall RP6 allowance of £2.84m. However, the RP7 total is higher than NIE Networks' actual and forecast expenditure for RP6 of £2.05m. NIE Networks' underspend is mainly outperformance in the two bespoke programmes targeted to specific circuits.
- 3.9 For the programmes where NIE Networks has proposed the same unit rate as 110kV programmes, we will use our draft determination 110kV unit rates. While the material and labour requirements for the 33kV assets may be lower, we will take this approach for the following reasons:
- Parts of the 33kV network are constructed to 110kV standard.
 - It is difficult to assess what effect on costs there is as a result of any reduced material and labour requirements, and a blanket percentage reduction may not be appropriate for all assets.
 - 33kV works volumes are much lower, which may result in less opportunity for efficiencies, and therefore any reduced requirements may not result in reduced costs.
 - Some 110kV related programmes have outturn lower unit costs than NIE Networks' RP7 proposal.
- 3.10 Our basis for determination of the 110kV programmes with the same proposed unit rate, is set out in the table below. Fuller details for these 110kV programmes can be found in Annex R.

33kV Programme	110kV Programme	110kV Determination Rationale/Comments
D06e - Replace Suspension Insulator Set	T19b	10% reduction applied due to assessment data accuracy concerns.
D06f - Replace Tension Insulator Set	T19c	22% reduction due to removal of increase due to renegotiated contractor rates.
D06g - Tower Painting	T19e	6% reduction to align with RP6 to March 2023 outturn.
D06h - Replace colour and number plates	T19g	16% reduction to align with RP6 to March 2023 outturn.
D06i - Tower Foundation Assessment	T19h	14% reduction to align with RP6 to March 2023 outturn.
D06j - Tower Foundation Repair	T19z	13% reduction to match lower 275kV request.
D06l - Tower Muff Repair	T19n	70% reduction to align with RP6 to March 2023 outturn.
D06m - Tower Muff Painting	T19t	Accepted.
D06t - Conductor Sampling	T19ac	Accepted.
D06u - Replacement fittings	T19aj	Accepted.

Table 3.3: Unit rate determination of 110kV programmes with same proposed rate to 33kV programmes.

3.11 We have assessed the four other programmes, where the proposed unit rate is not the same as a 110kV programme, as follows:

- D06d Remedial Works - We have accepted the relatively small proposed lump sum of £100k, which will allow NIE Networks flexibility to deal with ad hoc issues.
- D06k tower condition assessment - We have accepted proposed unit cost, which was 20% lower than request for similar 110kV programme (T19i), which we also accepted.
- D06q tower reconductoring - We have accepted proposed unit cost, which was based on outturn of the RP6 Eden Main - Carrickfergus West circuit reconductoring programme.
- D06r earth conductor replacement - We have accepted proposed unit cost, which we assessed against the RP6 110kV earthwire replacement programme, which is not continuing for RP7. NIE Networks' proposed unit cost is 12% lower.

3.12 We have accepted the proposed volumes for all 33kV programmes. We reduced the 110kV programmes volumes in some cases due to accuracy concerns following the identification of errors in the handling of data. Given

the much smaller volumes for the 33kV programme, 75% lower on average, we did not have the same concerns, and overall investment for RP7 is not a step change from RP6.

3.13 However, an error was identified in the tower muff repair (D06l) programme volume, which NIE Networks revised following our query⁴. The unit of measure for this programme was also inconsistent in the submission, with both per tower (4 x muffs) and per muff stated. NIE Networks clarified that it was per muff, but given that the proposed unit cost was more than three times that of the 110kV programme RP6 outturn, additional clarification may be required during the consultancy period.

3.14 Our draft determination for direct investment in distribution tower lines is set out in the Table 3.4 below.

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct (£k)
D06d - Remedial Works	NIE Networks' proposal	Lump Sum	N/A	N/A	100.000
	Draft Determination	Lump Sum	N/A	N/A	100.000
D06e - Replace Suspension Insulator Set	NIE Networks' proposal	Tower Side	12	2.012	24.149
	Draft Determination	Tower Side	12	1.811	21.374
D06f - Replace Tension Insulator Set	NIE Networks' proposal	Tower Side	18	10.657	191.823
	Draft Determination	Tower Side	18	8.340	150.122
D06g - Tower Painting	NIE Networks' proposal	Tower	143	2.825	403.923
	Draft Determination	Tower	143	2.664	380.876
D06h - Replace colour and number plates	NIE Networks' proposal	Tower	72	0.582	41.931
	Draft Determination	Tower	72	0.490	35.269
D06i - Tower Foundation Assessment	NIE Networks' proposal	Tower	72	2.956	212.807
	Draft Determination	Tower	72	2.555	183.982
D06j - Tower Foundation Repair	NIE Networks' proposal	Tower	4	132.940	531.760
	Draft Determination	Tower	4	115.840	463.360
D06k - Tower Condition Assessment	NIE Networks' proposal	Tower	90	0.549	49.932
	Draft Determination	Tower	90	0.549	49.392
D06l - Tower Muff Repair (see Note 2)	NIE Networks' proposal	Each	72	1.065	76.650
	Draft Determination	Each	72	0.320	23.052
D06m - Tower Muff Painting	NIE Networks' proposal	Tower	143	0.787	112.522
	Draft Determination	Tower	143	0.787	112.522

⁴ UR-0442

D06q - Tower Reconductoring	NIE Networks' proposal	Span	30	16.419	492.578
	Draft Determination	Span	30	16.419	492.578
D06r - Earth Conductor Replacement	NIE Networks' proposal	Span	20	5.143	102.860
	Draft Determination	Span	20	5.143	102.860
D06t - Conductor Sampling	NIE Networks' proposal	Each	27	1.463	39.491
	Draft Determination	Each	27	1.463	39.491
D06u - Replacement fittings	NIE Networks' proposal	Tower	24	0.441	10.590
	Draft Determination	Tower	24	0.441	10.590
D06: Distribution Tower Lines Total	NIE Networks' proposal				2,390.476
	Draft Determination				2,165.828
	Total Change +/-				-224.648
	Total Change %				-9.4%

Note 1. Figures may not sum due to rounding.

Note 2. D06l tower muff repair revised from 172 volume/£183k total direct proposal in original submission

Table 3.4: D06: Distribution tower lines draft determination

D07: 33kV Overhead Lines

Scope of Work

- 3.15 The D07 33kV overhead lines (OHL) programmes refer to the wood pole supported part of the 33kV OHL network. There is approximately 3,110km of this network that it is generally configured as radial or ring circuits with very few spur lines. The circuits supply relatively large 33/11kV substations however there are sections that continue to supply both small villages and individual customers via smaller 33kV/LV pole mounted transformers.
- 3.16 During RP6 NIE Networks executed the following activities on the 33kV wood pole OHL network:
- a) D07a 33kV re-engineering - replacement and more intensive refurbishment of network components, based on a 45-year cycle.
 - b) D07b 33kV refurbishment - lighter refurbishment of network components, based on a 15-year cycle.
 - c) D07d remedial works - replacement of defective components found whilst patrolling or during other works (outside of the normal refurbishment cycle).

NIE Networks' RP7 Proposal

- 3.17 NIE Networks' 33kV OHL wood pole network RP7 proposals include the continuation of the re-engineering and refurbishment programmes, but

discontinuing the remedial works programme. It has also proposed the addition of the following three new programmes:

- a) D07e undergrounding - replace parts of the 33kV OHL network that are difficult to access for maintenance with underground cable. Similar programmes exist for the LV and 11kV OHL networks.
- b) D07l air-break switch disconnecter (ABSD) replacement - replace all ABSDs with low load-breaking capability by the end of RP7, outside those that will be addressed by the RP7 re-engineering programme.
- c) D07m automated switch replacement - replace poor condition and design defective automated switches.

3.18 NIE Networks out its plans for investment in EJP 1.502 and EJP 1.504 of its RP7 network investment programme suite of documents. These plans are summarised in Table 3.5 below.

Sub-programme	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D07a - Re-Engineering (33kV)	km	420	35.346	14,845.180
D07b - Refurbishment (33kV)	km	840	2.595	2,179.439
D07e - Undergrounding	Lump Sum	N/A	N/A	3,701.513
D07l - ABSD Replacement	Each	60	3.243	194.958
D07m - Replace Automated Switches	Each	8	10.563	84.507
D07: 33kV Overhead Lines Total				21,005.219

Note 1. Figures may not sum due to rounding.

Table 3.5: NIE Networks' D07: 33kV wood pole overhead lines proposal

Draft Determination

- 3.19 We have accepted the proposed volume of activity for the re-engineering and refurbishment programmes. They are consistent with what would be expected to be addressed over the six-year RP7 period to meet the requirements of the respective 45-year and 15-year cycles.
- 3.20 We have not accepted the proposed unit costs for the re-engineering and refurbishment programmes, in particular the uplift as a result of the retendered overhead line contract in the second half of 2022.
- 3.21 To reflect the new contract, NIE Networks had added a 62% increase to the OHL contractor proportion of the RP6 outturn unit costs to date. It also submitted this proposed increase during the RP6 extension year process.

- 3.22 During RP6 extension process we assessed NIE Networks' proposed uplift and determined that 45% would apply for that process. For RP7 we will apply the same uplift overall, but have factored in the positive ~4% frontier shift that will be applied to all capex programmes following our RP7 assessment of industry input costs, inflation and productivity. We will therefore uplift the OHL contractor proportion of the RP6 outturn unit rates by 39% prior to the application of frontier shift.
- 3.23 In addition to the uplift due to the retendered OHL contract, NIE Networks proposed a small (£85/km) uplift on both the re-engineering and refurbishment programmes unit cost to address clearance issues. This activity was reported separately during RP6 under ESQCR compliance programme D43f, but no further funding has been requested for that programme. The proposed uplift was set at the RP6 outturn for the discontinued D43f programme. We have therefore accepted this additional amount on both the re-engineering and refurbishment programmes unit costs.
- 3.24 We have accepted the proposed new 33kV undergrounding programme. As with the existing similar programmes for the LV and 11kV OHL networks, undergrounding is often the most cost-effective solution to the complications in maintaining difficult to access OHL network.
- 3.25 In our assessment of proposed costs, we reviewed the identified seven undergrounding projects in NIE Networks' submission. Through the submission and subsequent queries⁵, we received data on the length of OHL to be recovered, the length of replacement underground cable to be installed and the rationale for undergrounding.
- 3.26 The laying of new underground cable attracts the greatest proportion of costs in an undergrounding project. We assessed the proposed projects' costs and underground cable lengths using the RP6 outturn costs from 33kV underground cable replacement programme D16m, which gave us a proxy unit cost for the recovery of OHL. We found projected costs to be reasonable and have therefore accepted NIE Networks' proposed expenditure.
- 3.27 We considered whether a unitised allowance could be set for the undergrounding investment, rather than a lump sum. We assessed basing a unitised allowance on the length of OHL line recovered, but there could be wide variation between those lengths and the subsequent length of underground cable installed. We have therefore agreed with NIE Networks' proposal to set a lump sum for this programme.

⁵ UR-0092, UR-0405

- 3.28 The new air-break switch disconnecter (ABSD) replacement programme is aimed at replacing all those with low load-breaking capability by the end of RP7. This programme will complement the replacements being carried out under the re-engineering programme.
- 3.29 There is increased utilisation of the 33kV network due to both increased load and bi-directional flows as result of connected generation. The ABSDs targeted for replacement were suitable at the time of installation, but their use could now be restricted during certain fault conditions that would detrimentally affect network operation and restoration of customers.
- 3.30 Therefore, we agree with NIE Networks' proposal to remove all ABSDs with low load-breaking by the end of RP7, and have accepted the proposed volumes.
- 3.31 As this is a new programme, we have no outturn costs to assess the proposed unit cost against. There is related data reported in the cost and volumes RIGs, and following assessment of this we found the average RP6 outturn unit cost to be £4,901, which is 51% higher than NIE Networks' proposal. We have therefore accepted the proposed unit cost.
- 3.32 We have accepted the new 33kV automated switch replacement programme. These devices allow automatic or remote reconfiguration of the network to restore supplies customers in the event of a fault and control the loading of circuits.
- 3.33 NIE Networks has experienced repeat failures in the operation of some of these devices due to design defects, that maintenance and refurbishment activities have been unable to resolve. It will target replacing these eight defective switches during RP7, and will continue to refurbish others via other 33kV programmes.
- 3.34 We have no outturn data on which to base our determination, but subtracting the determined cost of replacing the ABSD switch, from the proposed unit cost leaves £7,320 to cover the cost of power source, servos and antennae. The additional equipment will also attract additional installation costs, therefore, in our judgement, we conclude that the proposed cost is efficient.
- 3.35 Our draft determination for direct investment in 33kV wood pole OHL is set out in Table 3.6 below.

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D07a - Re-Engineering (33kV)	NIE Networks' proposal	km	420	35.346	14,845.180
	Draft Determination	km	420	30.866	12,963.877
D07b - Refurbishment (33kV)	NIE Networks' proposal	km	840	2.595	2,179.439
	Draft Determination	km	840	2.509	2,107.841
D07e - 33kV Undergrounding	NIE Networks' proposal	LS	N/A	N/A	3,701.513
	Draft Determination	LS	N/A	N/A	3,701.513
D07l - ABSD Replacement	NIE Networks' proposal	Each	60	3.243	194.580
	Draft Determination	Each	60	3.243	194.580
D07m - Replace Automated Switches	NIE Networks' proposal	Each	8	10.563	84.507
	Draft Determination	Each	8	10.563	84.507
D07: 33kV Overhead Lines Total	NIE Networks' proposal				21,005.219
	Draft Determination				19,052.318
	Total Change +/-				-1,952.901
	Total Change %				-9.3%

Note 1. Figures may not sum due to rounding.

Table 3.6: D07: 33kV wood pole overhead lines draft determination

3.36 Although we have agreed with NIE Networks' proposal to set a lump sum for the D07e undergrounding programme, we expect it to retain and be able to provide data on outturn lengths recovered and installed, as well as the split in costs.

D08: 11kV Overhead Lines

Scope of Work

3.37 The 11kV Overhead Lines work programme comprises works associated with high voltage overhead lines supported mainly on wood poles.

3.38 During RP6 NIE Networks carried out a number of sub-programmes which were:

- a) 11kV Re-engineer: Rebuilding the main lines with larger capacity conductor and refurbishing the associated spur lines
- b) 11kV Refurbishment: Condition based replacement of defective components

- c) Remedial Works: Replacement of defective components found whilst patrolling or during other works (outside of the normal refurbishment cycle)
- d) Undergrounding: Typically related to the undergrounding of existing overhead lines into substations where population growth has occurred

NIE Networks RP7 Proposal

- 3.39 NIE Networks has made some fundamental changes to its approach to 11kV Overhead Lines for RP7.
- 3.40 The main difference is the change in specification for 11kV overhead line maintenance. The categories of re-engineer and refurbishment have been amalgamated to allow the replacement of low capacity conductors and transformers across the entire network. This is due to forecast LCT uptake and is dealt with in section 2.
- 3.41 The requirements for undergrounding and remedial works have remained broadly unchanged from RP6.
- 3.42 A new category for dealing with bird fouling has been proposed for RP7. This funding is to deal with sections of overhead line oversailing residential housing and gardens which provides perches for roosting birds. This causes bird fouling on and around the property with the subsequent health hazards and inconvenience. The proposal centres on the fitting of a new bird anti-perch device which is lighter than the devices used in the past and this means that the whole span can be treated without exceeding wind span design criteria.
- 3.43 A further two new categories are proposed for RP7 and these deal with the replacement of Air Break Switch Disconnectors (ABSDs). Many ABSDs on the system are not capable of breaking fault load. As load increases on the system this may become a health and safety issue for engineers operating the switches in the field so it is proposed to replace these switches with uprated equipment.
- 3.44 The second category is for replacing a certain type of automated switch that contains known design defects.
- 3.45 NIE Networks set out its plans for 11kV Overhead Lines in EJPs 1.503, 1.504 & 1.506 per Table 3.7 below

Sub-programme	EJP	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D08d: Undergrounding	1.503	LS	N/A	N/A	1,322.147
D08e: Remedial Works	1.503	LS	N/A	N/A	3,062.558
D08i: Bird Fouling	1.506	LS	N/A	N/A	7,814.250
D08k: Switches	1.503	Ea	240	2.283	547.920
D08l: Automated Switches	1.504	Ea	20	10.563	211.267
D08 Total					12,958.143

Table 3.7: NIE Networks D08 proposal

Draft Determination

D08d: Undergrounding

- 3.46 For its RP7 undergrounding proposal, NIE Networks has identified 8 separate projects where sections of overhead line are required to be undergrounded mainly due to the difficulty of accessing poor condition assets. These landlocked assets are situated in residential gardens and replacement in situ would cause future access issues.
- 3.47 The costed proposals identify the length of underground cable to be installed and the length of overhead line to be dismantled.
- 3.48 In query UR-0053 we informed NIE Networks that its calculated costs contained spurious values for overhead line dismantlement when we substituted in the known outturn cost of installing 11kV. We further requested sketches of each proposed site to ensure we understood the nature of the works.
- 3.49 NIE Networks responded that using the historic outturn cost for cable installation would not be appropriate due to the complexity of each site.
- 3.50 Upon assessing the sketches provided by NIE Networks we disagree with its opinion that the projects are complex and out of the ordinary. The historic outturn rate for cable installation covers multiple projects and multiple levels of complexity and therefore is deemed to be appropriate as a proxy cost for cable installation on these projects. Our calculation of costs are shown in Table 3.8

Project	Total Cost	OH Recovery (M)	Cable Install (M)	Proxy Install Cost (£)	Recovery Cost (£)	Recovery Unit Cost (£)
Greenmount, Coleraine	130,068	500	1,255	91	15,863	32
Gulladuff	625,076	1,751	1,600	91	479,476	274
Linn Primary School, Larne	212,872	1,578	2,061	91	25,321	16
Ramona Rd 'B', Ballycastle	134,351	654	1,257	91	19,964	31
Bushmills Rd, Coleraine	97,580	820	947	91	11,403	14
Bells Lane, Lisburn	2,200	1,329	0	91	2,200	2
Scallions Rd, Mallusk	40,000	200	400	91	3,600	18
Trench Rd, Mallusk	80,000	730	780	91	9,020	12
	1,322,147	7,562	8,300			

Table 3.8: UR Calculation of costs

- 3.51 The median unit cost for recovery of overhead line is calculated from table 3.8 as £17/m⁶ which we consider to be a reasonable cost for the nature of the dismantlement.
- 3.52 The median unit cost multiplied by the total recovery length equates to £128,729
- 3.53 The proxy install cost multiplied by the total cable install length equates to £755,300. This leads us to the conclusion that the efficient allowance for the proposed works is £884,029.

D08e: Remedial Works

- 3.54 Our assessment of NIE Networks remedial works historic outturn costs revealed average expenditure per annum of £463,470. We found no evidence in NIE Networks business plan submission to persuade us that a higher amount per annum will be necessary in RP7, We, therefore base our decision on the historic outturn costs per annum multiplied by RP7 duration of 6 years.

D08i: Bird Fouling

- 3.55 Bird Fouling is a new sub-programme, therefore, we have no outturn costs with which to guide our determination. We do, however, agree that this issue needs to be addressed and cannot be dealt with without the socialisation of costs.

⁶ Equates to £1,360/span assuming 80m span length

3.56 In its submission, NIE Networks provided a list of 12 trial projects and the associated costs which it has carried out in RP6. The submission also contained sketches for 3 of the 12 projects. In query UR-0196 we requested sketches for all trial sites together with the total length of anti-perch devices fitted and the number of spans affected

3.57 We used the information provided to calculate the data shown in Table 3.9 below

Site Location	Number of customers involved	Cost (£)	Length of devices fitted (M)	Spans affected	Cost/Customer (£)	Customers /span
Islandmagee	12	6,000	1,098	6	500	2.0
Cogry, Doagh	9	3,047	540	3	339	3.0
Glebe Park, Sion Mills	6	1,272	432	2	212	3.0
Canvey Manor & Charnwood Court	11	9,595	678	4	872	2.8
4 Sandy Hill Gardens, Dunmurry	9	3,119	774	4	347	2.3
Caherty Hill, Broughshane	11	6,660	675	3	605	3.7
Bridge Park, Templepatrick	10	6,967	1,017	5	697	2.0
St Patricks Way	7	5,346	588	3	764	2.3
Marie Villas, Newry	22	10,859	1,611	11	494	2.0
Loughshore Manor, Enniskillen	6	4,640	205	2	773	3.0
Cherrylands, Newtownabbey	15	5,857	564	3	390	5.0
Ardmore, Holywood	8	5,734	1,017	6	717	1.3
	126	69,096	9,199	52		

Table 3.9: Trial Data

3.58 From the above data we calculated the average cost per customer is £548⁷ and the average number of customers per site is 10.5⁸.

3.59 NIE Networks stated in its submission⁹ that it expects 600+ complaints in RP7 so we used 700 for our estimation and, in addition, recognised the 281

⁷ £69,096 ÷ 126 customers = £548/customer

⁸ 126 customers ÷ 12 sites = 10.5customers/site

⁹ EJP 1.506, paragraph 4.1

sites already identified by the company. This gives an estimated total of 981 sites requiring remediation in RP7.

- 3.60 We concluded that 981 sites with, on average, 10.5 customers per site equates 10,300 customers @ £548ea gives an efficient allowance of £5,648,324 for RP7.

D08k: Replace Switches

- 3.61 Replacement of pole mounted Air Break Switch Disconnectors is a new sub-programme, however, the costs of replacement are recorded in the distribution cost and volume RIGs. We were not confident in the accuracy of RP5 data so we used only RP6 data to derive an average cost. The RIGs data returned an average cost for replacement of £2,547. This is very close to the requested unit cost of £2,283, therefore we concluded that the proposed unit cost is efficient.
- 3.62 We raised query UR-0028 to request data from NIE Networks regarding the volume of switches requiring replacement. NIE Networks stated in its response that most of the non-load breaking ABSDs will be replaced under the 11kV rebuild programme but it estimates that around 240 will require replacement under a stand-alone programme. We are content with the volumes proposed.

D08l: Replace Automated Switches

- 3.63 We have no outturn data on which to base our determination, however, if we subtract the cost of replacing the switch, determined above, from the proposed unit cost¹⁰ this leaves £8,280 to cover the cost of power source, servos and antennae. The additional equipment will also attract additional installation costs, therefore, in our judgement, we conclude that the proposed cost is efficient.

¹⁰ £10,563

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D08d: 11kV Undergrounding	LS	NIE Networks' proposal	N/A	N/A	1,322.147
	LS	Draft Determination	N/A	N/A	763.648
D08e: Remedial Works	LS	NIE Networks' proposal	N/A	N/A	3,062.558
	LS	Draft Determination	N/A	N/A	2,780.819
D08i: Bird Fouling	LS	NIE Networks' proposal	N/A	N/A	7,814.250
	LS	Draft Determination	10,300	0.548	5,648.324
D08k: Replace Switches	Ea	NIE Networks' proposal	240	2.283	547.920
	Ea	Draft Determination	240	2.283	547.920
D08l: Replace Automated Switches	Ea	NIE Networks' proposal	20	10.563	211.267
	Ea	Draft Determination	20	10.563	211.267
D08	NIE Networks' proposal				12,958.143
	Draft Determination				9,951.978
	Total Change +/-				-3,006.165
	Total Change %				-23%

Table 3.10: D08 Draft Determination

D09: Low Voltage Overhead Lines

Scope of Work

- 3.64 The low voltage (LV) overhead lines (OHL) network in Northern Ireland primarily comprises of lines supported on wood poles. There is approximately 7,050km of this network which includes both mains and service conductors, and it is mainly located in urban areas to deliver electricity to end users.
- 3.65 During RP6 NIE Networks executed the following activities on the LV OVL network:

- A combined LV clearances and OHL refurbishment programme (D43d), that was aimed addressing infringements to ensure ESQCR compliance, whilst at the same time addressing poor asset condition. This is main LV OHL investment area, but we assess this programme in the ESQCR section below.
- A Remedial programme (D09e) to address defects outside of the refurbishment programme, identified by routine inspections or customer notification.
- Undergrounding programmes, where NIE Networks' chosen solution is to replace parts of the overhead line network, that are difficult to access, with underground LV cable. During RP6 there were two programmes of this type, Direct Access (D09c) or Land-Locked (D09d).

NIE Networks RP7 Proposal

3.66 NIE Networks' RP7 proposals for the LV OHL D09 programmes include the continuation of both the remedial and undergrounding activities. However, its proposal for undergrounding activities is a change from the RP6 approach. It has proposed a single undergrounding programme with a lump sum allowance to replace the existing two programmes; direct access and land-locked, which had unitised allowances based on the length of OHL recovered.

3.67 NIE Networks set out its plans for investment in EJP 1.508 of its RP7 network investment programme suite of documents. These plans are summarised in Table 3.11 below.

Sub-programme	UoM	Total Direct Proposal (£k)
D09e – LV Remedial Works	Lump Sum	1,526
D09g – LV Undergrounding	Lump Sum	4,102
D09: LV Overhead Lines Total		5,628

Note 1. Figures may not sum due to rounding.

Table 3.11: NIE Networks' D09: LV overhead lines proposal

Draft Determination

3.68 NIE Networks' submission for the LV remedial works programme was based on the outturn annual average expenditure for RP6 through March 2022. It has been overspending the RP6 allowance by 82% on an annual basis, so it has proposed an increase in the RP7 allowance. This overspend was caused by increased levels of defects discovered as a result of increased network inspection.

- 3.69 Despite the increased LV OHL refurbishment through the D43d programme, NIE Networks anticipates the need to maintain its RP6 remedial works expenditure level. It anticipates that a reduction in defects, as result of activity through the refurbishment and remedial programmes, will not occur until RP8.
- 3.70 We are broadly in agreement with NIE Networks in setting the level of expenditure based on the RP6 outturn. However, we received data from the 2023 reporting year subsequent to the RP7 business plan submission, and found there was 67% reduction compared to the annual average from the prior RP6 years. This data contradicts some of the submission commentary on the need to maintain the higher level of expenditure, but there may be other factors we are unaware of. We have included this additional year in setting the allowance based on the RP6 annual average, which results in a 12% decrease from NIE Networks' proposal.
- 3.71 NIE Networks' submission for the new LV undergrounding programme was based on the total level of activity and expenditure it had experienced in RP6 across the two existing LV undergrounding programmes. It submitted a list of 28 projects it had identified, with the length of OHL to be recovered, 17km total, and estimated costs for each.
- 3.72 Following our query¹¹ on the rationale behind amalgamating the programmes, it detailed that there was often a mix of both land-locked and direct access sections under individual undergrounding projects. As result, allocating the project costs and outputs to a particular programme was not accurate.
- 3.73 We also queried¹¹ NIE Networks' proposal that the new undergrounding programme should be a lump sum allowance, which is a change from the existing programmes that are unitised on the length of OHL recovered. The response detailed that the length of underground cable installed in an undergrounding project was the most significant cost driver, and there could be significant variation of length of underground cable versus the length of OHL recovered.
- 3.74 In response to a further query¹², NIE Networks provided the estimated length of underground cable to be installed for each of the 28 projects it had identified. We found there could be significant variation between length recovered versus installed, with a ratio ranging from 0.9 to 3.5. We have therefore agreed with NIE Networks' proposal to set a lump sum for this

¹¹ UR-0387

¹² UR-0406

programme, and this aligns with the approach for the existing 11kV and new 33kV undergrounding programmes.

- 3.75 In our assessment of proposed costs, we reviewed the identified 28 undergrounding projects in NIE Networks' submission. The laying of new underground cable attracts the greatest proportion of costs in an undergrounding project. We assessed the proposed projects' costs and underground cable lengths using the RP6 outturn costs from LV underground cable replacement programme D16j, which gave us a proxy unit cost for the recovery of OHL. We found projected costs to be reasonable.
- 3.76 We also assessed the proposed costs against the outturn costs across the two RP6 undergrounding programmes. Only the length of OHL recovered was reported for these programmes, but when comparing the RP7 submission like for like, the proposed RP7 costs were 10% lower.
- 3.77 The proposed RP7 expenditure is a 2% reduction compared to the RP6 outturn, on an annual average basis. NIE Networks RP7 strategy is to underground worst condition OHL network only, rather than all OHL network that is difficult to access. We find this approach and total level of expenditure to be reasonable.
- 3.78 Our draft determination for direct investment in the D09 LV OHL programmes is set out in Table 3.12 below.

Sub-programme		UoM	Total Direct Proposal (£k)
D09e - LV Remedial Works	NIE Networks' proposal	Lump Sum	1,525.762
	Draft Determination	Lump Sum	1,343.263
D09g - LV Undergrounding	NIE Networks' proposal	Lump Sum	4,102.119
	Draft Determination	Lump Sum	4,102.119
D09: LV Overhead Lines Total	NIE Networks' proposal		5,627.881
	Draft Determination		5,445.382
	Total Change +/-		-182.499
	Total Change %		-3.2%

Note 1. Figures may not sum due to rounding.

Table 3.12: D09: LV overhead lines draft determination

Although we have agreed with NIE Networks' proposal to set a lump sum for the D09g undergrounding programme, we expect it to retain and be able to provide data on outturn lengths recovered and installed, as well as the split in costs.

D10: Undereaves

Scope of Work

- 3.79 Undereaves mains consist of a bundle of four insulated cables (3 phases and neutral) attached to the brickwork, fascia or soffit of the property being supplied. Single or three phase services are connected to the mains and are clipped directly to the walls of the property being supplied. This form of supply was installed between the 1950s and the 1970s and was considered to be a low cost alternative to underground cabling.
- 3.80 A number of insulation types have been utilised on undereaves mains and services. The oldest cables still in commission were insulated with PolyButylJute (PBJ), this type of insulation deteriorates over time. First the jute outer serving rots and falls away from the cable then the polybutyl rubber insulation becomes brittle and forms cracks which expose the live core of the cable. The undereaves wiring is readily accessible to members of the public cleaning windows or carrying out maintenance to eaves woodwork, hence exposed live conductors represent a danger.
- 3.81 NIE Networks discontinued the use of PBJ insulation in the early 1970s and, instead, utilised a cable with a single layer of PolyVinylChloride (PVC) insulation referred to as “single insulated”. PVC is much more stable than PBJ insulation but is still prone to cracking over time due to exposure to ultra-violet light.
- 3.82 Wiring regulations were updated in the late 1970s and the requirement to have mechanical protection over primary insulation came into being. NIE Networks began to use PVC insulated and PVC sheathed cables referred to as “double insulated”. These cables provide better mechanical protection and are less prone to exposure of live conductors.
- 3.83 NIE Networks currently replace poor condition LV undereaves assets using one of the following:
- Aerial Bundled Conductor (ABC), a preformed bundle of four single core cables insulated with PVC or Cross Linked PolyEthylene (XLPE). The thickness and grade of insulation provide insulation and protection in one layer and the material is pre-treated to prevent degradation through exposure to ultra-violet light.
 - PVC/PVC (double insulated) copper conductor.
 - Underground cable, where the option to replace the undereaves conductor in situ is not available.

3.84 During RP6 NIE Networks prioritised the replacement of PBJ-insulated conductors and have stated that all known conductors of this type will be replaced by the end of RP6. It also started to address single layer PVC insulated conductors as these are next highest priority.

NIE Networks' RP7 Proposal

3.85 NIE Networks has set out its plans for investment in Undereaves in EJP 1.507 of its RP7 Network Investment Programme suite of documents. These plans are summarised in the table below.

Sub-programme	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D10a – Replace 0.4kV mains and services (Undereaves)	Each	17,000	0.627	10,653.959

Table 3.13: NIE Networks' D10: Undereaves proposal

3.86 With all known PBJ-insulated conductors expected to be addressed in RP6, the proposed RP7 programme is aimed completing the replacement of all single layer PVC insulated conductors remaining on the network. NIE Networks is targeting all of this asset type, not just those in poor condition. This proposal is as a result of a risk assessment NIE Networks conducted to meet the requirements of ESQCR legislation, which indicates that aged single layer PVC is not effectively insulated and poses a risk of personal injury through inadvertent physical contact with exposed conductors.

3.87 NIE Networks is targeting the replacement of LV undereaves assets at 17,000 properties under the standalone undereaves programme (D10a), with a further 8,000 properties estimated to be addressed under the LV overhead line refurbishment programme (D43d) proposals. However, with the exact number to be addressed under the LV overhead line refurbishment programme being uncertain, it has requested that the RP6 volume driver mechanism be maintained for the RP7 undereaves programme (D10a).

3.88 NIE Networks' submitted unit cost for RP7 was based on RP6 outturn costs to March 2022, with the contractor proportion of the costs uplifted to reflect its overhead lines contract that was retendered in the second half of 2022.

Draft Determination

3.89 We have accepted the proposed total volume of 25,000 undereaves to be addressed in RP7. This will allow NIE Networks to remove all remaining single layer PVC insulated conductors by the end of RP7. However, we do not agree with the proposals to apportion undereaves works to the LV overhead line refurbishment programme (D43d). In order to monitor costs

and output effectively, all similar works should be reported under the same category. We have therefore disallowed the expenditure and outputs from the LV overhead line refurbishment programme (D43d) proposed to address 8,000 undereaves. The volume cap for the standalone undereaves programme will be set at 25,000 to compensate.

- 3.90 The volume to be addressed is no longer uncertain and a determined volume could be set. However, we will retain the volume driver for this programme, with volume capped at 25,000 properties. There would be no benefit to discontinuing the volume driver mechanism, and retaining the existing mechanism will minimise licence modifications.
- 3.91 We have not accepted NIE Networks' proposed unit cost, in particular the uplift as a result of the retendered overhead line contract in the second half of 2022.
- 3.92 To reflect the new contract, NIE Networks had added a 62% increase to the OHL contractor proportion of the RP6 outturn unit costs to date. It also submitted this proposed increase during the RP6 extension year process.
- 3.93 During RP6 extension process we assessed NIE Networks' proposed uplift and determined that 45% would apply for that process. For RP7 we will apply the same uplift overall, but have factored in the positive ~4% frontier shift that will be applied to all capex programmes following our RP7 assessment of industry input costs, inflation and productivity. We have set the draft determination unit rate at the RP6 outturn, with the OHL contractor proportion uplifted by 39%, prior to the application of frontier shift.
- 3.94 Our draft determination of direct investment in RP7 for undereaves is shown in the Table 3.14 below.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D10a – Replace 0.4kV mains and services (Undereaves)	Each	NIE Networks' proposal	17,000	0.627	10,653.959
		Draft Determination	25,000	0.579	14,486.347
	Total Change +/-				+3,832.388
	Total Change %				+36%

Table 3.14: D10: Undereaves draft determination

- 3.95 No ex-ante funding is provided for the undereaves programme, instead funding is provided based on our determined unit cost and the actual volume of units delivered in a reporting year, with tariffs then adjusted for the

following year. As this programme is volume driven, it is not eligible for the substitution mechanism.

D11: Service Cut-outs

Scope of Work

3.96 The majority of LV service cables to consumer premises are terminated in a service cut-out with a fuse which is located before the meter and the subsequent customer's consumer unit/fuse board. The cut-out fuse provides protection against overload of the service and provides back-up fault protection to the meter and customer's installation.

3.97 NIE Networks categorise cut-out replacements into the following types:

- Simple – Equipment can be replaced in-situ with no other modifications required;
- Complex – Replacement work often requires external excavation and reinstatement and internal modifications to property.

3.98 The RP6 mix of works, forecast by NIE Networks, was 90% simple and 10% complex.

NIE Networks' RP7 Proposal

3.99 NIE Networks has set out its plans for investment in cut-outs in EJP 1.505 of its RP7 Network Investment Programme suite of documents. These plans are summarised in the Table 3.15 below.

Sub-programme	UoM	Replacement Type	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D11a – Replace Service Cut-outs	Each	Condition based	9,000	0.177	1,747.698
		LCT Uptake	874		
D11b – Replace Service Cut-outs (Three-phase or Complex)	Each	Condition based	6,000	1.191	7,839.162
		LCT Uptake	582		
D11: Service Cut-Outs Total					9,586.860

Note 1. Figures may not sum due to rounding.

Table 3.15: NIE Networks' D11: Service cut-outs proposal

3.100 NIE Networks have proposed a new separate sub-programme to carry out complex service cut-out replacements, leaving existing RP6 sub-programme for simple cut-out replacements only. Included in the new complex sub-

programme is three-phase service cut-outs, which have not been targeted for replacement previously.

- 3.101 NIE Networks stated the justification for splitting of the existing programme was due to the mix of simple versus complex job types it had identified throughout RP6, with complex job types to be addressed increasing to 40%. Therefore, given the magnitude of difference in the tasks involved between simple versus complex/three-phase job types, a blended unit rate based on a 90:10 split was not appropriate.
- 3.102 NIE Networks' proposed volume consists of 15,000 condition-based replacements, across the two sub-programmes, with a further 1,456 replacements driven by consumer uptake of low carbon technologies.
- 3.103 When a consumer is installing a low carbon technology such as an electric vehicle charge point and/or heat pump, their existing older type cut-out may need to be replaced as it is insufficiently rated. In these circumstances, the consumers cut-out would be replaced with a modern equivalent within each customers agreed connection capacity and in accordance with health and safety requirements.
- 3.104 NIE Networks have requested a volume driver uncertainty mechanism to facilitate cut-out replacements driven by consumer uptake of low carbon technologies, with an ex-ante allowance based on its forecast.
- 3.105 NIE Networks also indicated that the volume of condition-based cut-out replacements it undertakes would need to be increased as part of the smart meter roll-out considerations. It stated that current manual meter reading allows for inspection of cut-outs on a quarterly basis, enabling the cut-out condition to be closely monitored and delivery of a prioritised replacement programme. With the advent of smart metering and automatic meter reading, cut-outs will not be subject to as frequent inspection.

Draft Determination

- 3.106 We queried¹³ NIE Networks' proposal to split the existing cut-out replacement programme into two new programmes with revised unit rates. In its submission NIE Networks stated that it had experienced a 60:40 split in RP6, simple versus complex, and this informed its RP7 proposals. The response stated that the additional volume of complex job types had been dealt with under fault repairs rather than under the cut-out replacement programme, and therefore had not been adequately reflected in the outturn unit rate. It went on further to state that its RP7 strategy is to increase the

¹³ UR-0091

number replaced under the planned programme and reduce faults, and as result it revised down its fault cost projections.

3.107 Also in query¹⁴ response, NIE Networks provided its methodology for the proposed unit rates. The complex/three-phase proposal was based on a range of tasks that may be encountered in addition to simple job type tasks. This range and mix of tasks built up the costs for nine further job types, as detailed in the below table, and a forecast blend of these was used to inform the proposed unit rate for the complex/three-phase programme. It was noted that NIE Networks had proposed upgrading the service to three-phase for certain complex single-phase job types where fuller excavations were required.

Job Code	Additional Tasks Required	Upgrade to three-phase	Forecast Cost (£)
C1	Excavate and reinstate concrete meter cupboard floor to achieve additional length on the service cable.	No	490
C2	Dismantle and rebuild meter cupboard	No	609
C5	As per C2 plus excavate and reinstate service joint bay in private property.	No	1,138
C3+	Excavate and reinstate cable trench in private property and joint bay in public.	Yes	1,239
C4+	As per C3+ plus dismantle and rebuild meter cupboard.	Yes	1,590
C6+	As per C4+ plus install 100mm duct up to 3m into property.	Yes	2,044
3C3	Replace three-phase cut-out. Excavate and reinstate service joint bay in private property.	N/A	796
3C4	As per 3C3 plus dismantle and rebuild meter cupboard.	N/A	1,147
3C6	As per 3C4 plus install 100mm duct up to 3m into property.	N/A	1,674

Table 3.16: Proposed complex/three-phase cut-out replacement job types

3.108 We have not accepted the approach of splitting the existing cut-out replacement sub-programme to separate simple and complex/three-phase sub-programmes. Whilst we accept there may be a variation in tasks required when completing a cut-out replacement, which will affect outturn costs, we do not believe it to be good regulatory practice to introduce different unit rates to cater to the variation. We stated in RP6 that rates revealed in one price control should be the basis for the determined rates in subsequent price controls, with the 50:50 cost sharing mechanism providing relief for the company and protection for consumers until the next price

¹⁴ UR-0091

control, should the determined rate not be efficient or there are material changes.

3.109 We also do not consider it appropriate for costs to upgrade single-phase services to three-phase should form part of the consideration for allowances at this stage. Increases to customer connection capacity may be included within our consideration of the current connection charging methodology review¹⁵.

The existing cut-outs replacement programme is now well established, with over 10 years of outturn data available, which will be reflective of a wide variety cut-out replacements, unless there has been a conscious deferral of more complex works. As the figure below shows, the cumulative average unit cost has stabilised within a +/-5% range since 2016, on a cumulative total of 18,866 cut-out replacements, whilst there has been greater variation in the annual average unit cost, which may be representative of the variation of tasks encountered within that year.

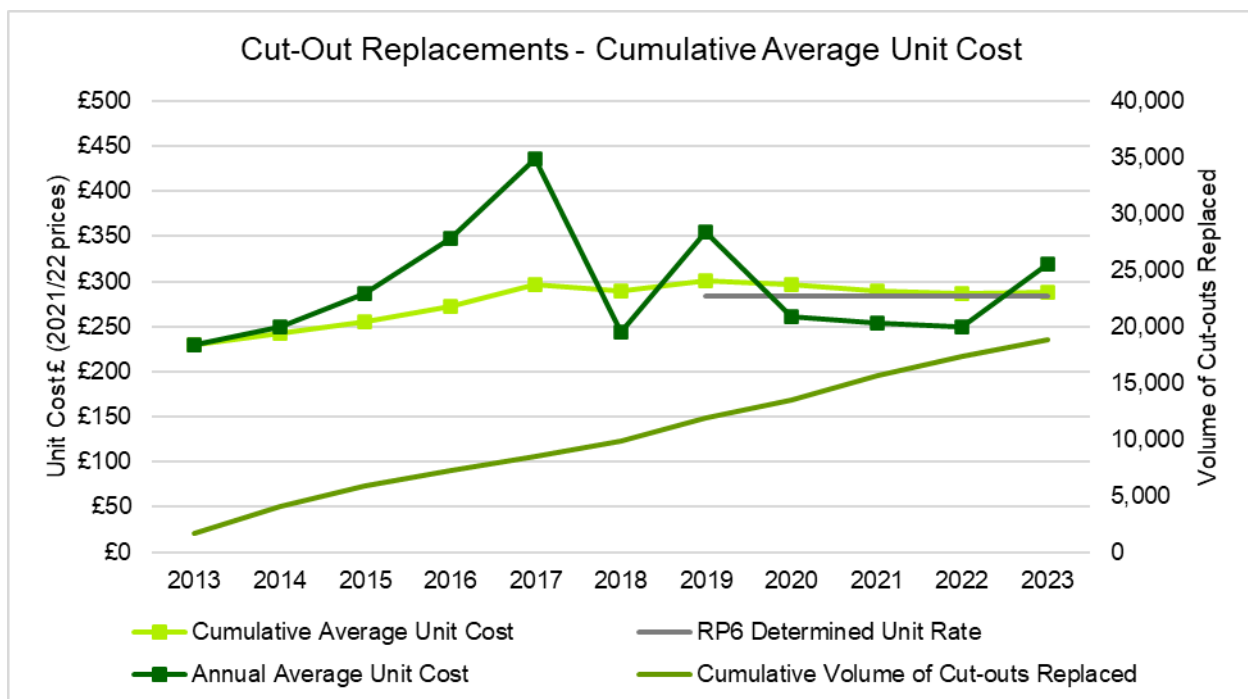


Figure 3.1: Outturn cumulative and annual average unit cost from 2013 to 2023

3.110 For RP6 we set the allowed unit rate at £282.73, which was the RP5 outturn to that stage. NIE Networks argued then that it had undertaken a 98:2 simple versus complex split in RP5 and that determining based on the RP5 outturn wasn't suitable for its forecast 90:10 split in RP6. The RP6 outturn to March 2023 is £288.42, 1.7% above the determined allowance. We believe this

¹⁵ <https://www.uregni.gov.uk/consultations/call-evidence-electricity-connection-policy-framework-review>

indicates our RP6 approach was appropriate and should be maintained going forward. We have therefore set our draft determination unit cost at the RP6 outturn to March 2023.

- 3.111 We have accepted the condition driven volume proposed for all cut-out replacements. There a substantial increase in this works type over RP6 which has been justified as follows:
- three phase cut-out replacements have not been addressed under a planned programme previously.
 - the number of faults attributed to defective cut-outs has continued to increase, indicating the current overall replacement run rates need to increase.
- 3.112 It is preferential to replace cut-outs proactively rather than reactively under fault conditions and NIE Networks reduced its projected costs for related fault works by £1.566m.
- 3.113 We have accepted the proposed volume driver uncertainty mechanism to facilitate additional cut-out replacements driven by consumer uptake of low carbon technologies, and volumes will not be capped. Replacements of this type are reactive which will ensure that expenditure is only incurred when necessary.
- 3.114 We are establishing a separate cut-out replacement programme to capture LCT driven replacements (D11c), distinct from the condition-based replacements. This will simplify analysis and adjustment during annual tariff determinations. The unit cost for both programmes will be the same, and we will account for total volumes and outturn costs across both programmes for the purposes of the cost risk sharing mechanism and informing any future unit rate determinations. We have not allowed ex-ante funding due to the uncertainty and relatively low projected annual costs of £70k based on NIE Networks' forecast volumes and our draft determination unit rate, but will instead true-up annually based on the actual number of LCT related cut-out replacements undertaken.
- 3.115 We will assess what is appropriate for cut-out replacements as a result of smart metering, as part of considerations for that project outside of the RP7 price control process.
- 3.116 We have reconfigured NIE Networks' submission programmes to align with our determination to compare the proposed versus our draft determination level of investment in cut-outs in Table 3.17 below.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D11a – Replace Service Cut-outs - Condition Based	Each	NIE Networks' Proposal	9,874	0.177	1,747.698
		Draft Determination	15,000	0.288	4,326.315
D11b Replace service cut-outs (3 phase)	Each	NIE Networks' Proposal	6,582	1,191	7,839,162
		Draft Determination	0	1,191	0.000
D11c – Replace Service Cut-outs - LCT Uptake Driven	Each	NIE Networks' Proposal	1,456	0.583	848.848
		Draft Determination	1,456	0.288	419.941
D11: Service Cut-Outs Total		NIE Networks' Proposal			10,435.708
		Draft Determination			4,746.256
		Total Change +/-			-5,689,452
		Total Change %			-55%

Note 1. Figures may not sum due to rounding.

Table 3.17: D11: Service cut-outs draft determination

D13: Primary Plant

3.117 See GHD report in Annex R

D13	NIE Networks' proposal	29,903.293
	Draft Determination	27,210.863
	Total Change +/-	-2,692.429
	Total Change %	-9%

Table 3.18: D13 Draft Determination

D14: 33/11kV Transformers

3.118 See GHD report in Annex R

D14	NIE Networks' proposal	16,087.643
	Draft Determination	14,135.897
	Total Change +/-	-1,951.746
	Total Change %	-12%

Table 3.19: D14 Draft Determination

D15: Secondary Plant

3.119 See GHD report in Annex R

D15	NIE Networks' proposal	53,080.006
	Draft Determination	45,997.672
	Total Change +/-	-7,082.333
	Total Change %	-13%

Table 3.20: D15 Draft Determination

D16: Distribution Underground Cables

Scope of Work

- 3.120 NIE Networks have an extensive underground (UG) cable network which is predominantly situated in urban areas where, for safety or aesthetic reasons, it is difficult to build overhead lines. The distribution network consists of approximately 1,100km of 33kV, 4,100 km of HV (6.6kV and 11kV) and 11,000km of LV UG cables.
- 3.121 There are many different types of cable in use on NIE Networks' system. The various types of cable reflect the different standards and manufacturing techniques available at the time of purchase hence the oldest cables utilise Vulcanised Bitumen (VB) or oil impregnated paper as an insulation medium whilst the newest cables will use Cross Linked Polyethylene (XLPE) or Poly Vinyl Chloride (PVC).
- 3.122 CONSAC is a type of LV cable that was utilised by almost all UK distribution network operators (DNOs) during the late 1970s and early 1980s. Due to the design of the cable, it performed very poorly and is the cause of numerous faults. The cable is now considered not fit for purpose and is being systematically replaced by all DNOs who installed it.
- 3.123 The 33kV UG system uses fluid filled cables (FFC), which were installed between the 1940s and the 1970s. They are some of the most reliable and long-lasting electricity network assets; however, they require additional equipment to supply and pressurise the fluid running through the cables. The additional equipment, as well as the cables, necessitate fluid prevention maintenance and strategies, as leaked fluid can be harmful to the environment.
- 3.124 During RP6 NIE Networks executed the following activities on the UG distribution network:

- a) D16i replace HV cable - replace cables or cable sections which have been identified as poor performing or of deteriorated condition.
- b) D16j replace LV cable - replace cables or cable sections which have been identified as poor performing or of deteriorated condition.
- c) D16l refurbish 33kV FFC - refurbish the worst performing circuits with highest leak rates.
- d) D16m part replacement of 33kV paper insulated lead covered (PILC) cable - replace cables or cable sections which have been identified as poor performing or of deteriorated condition.
- e) D16n procure leak management technologies - tagging FFC circuits with tracer fluid that aids rapid leak detection and repair.
- f) D16o distribution cable accessories/ancillaries - refurbish or replace 33kV circuit equipment such as cable boxes and terminations, and FFC hydraulic systems such as tanks and pumps.
- g) D16p procure condition monitoring equipment - procure more advanced condition monitoring equipment that could be used without cable outages.

NIE Networks' RP7 Proposal

3.125 NIE Networks' UG distribution cable RP7 proposals include the continuation of all of the RP6 programmes apart from D16p procure condition monitoring equipment. It has also proposed the addition of the following two new programmes:

- a) D16h part replacement of 33kV FFC - replace sections of poor performing FFC near watercourses that have the highest risk of environmental danger from leakages.
- b) D16s decommission FFC - additional works to remove the environmental hazard of oil leaking from a FFC no longer in service.

3.126 NIE Networks has set out its plans for investment in UG distribution cables in EJPs 1.601 to 1.604 of its RP7 Network Investment Programme suite of documents. These plans are summarised in the table below.

Sub-programme	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D16h - Part replacement of 33kV FFC	m	3,114	0.303	944.502
D16i - Replace HV Cable	m	18,000	0.091	1,641.865
D16j - Replace LV cable	m	78,000	0.155	12,092.207
D16l - Refurbish 33kV FFC	Circuit	9	37.558	338.028
D16m - Part replacement of 33kV PILC Cable	m	15,533	0.303	4,711.287
D16n - Procure leak management technologies	LS	N/A	N/A	1,563.659
D16o - Distribution cable accessories/ancillaries	LS	N/A	N/A	346.168
D16s - Decommission FFC	LS	N/A	N/A	50.000
D16: Distribution Underground Cables Total				21,687.716

Note 1. Figures may not sum due to rounding.

Table 3.21: NIE Networks' D16: Distribution underground cables proposal

3.127 NIE Networks' total RP7 UG cable investment proposals are a large increase over RP6, going from an annual average allowance of £1.2m to £3.6m, a 182% increase. This increase is largely driven by the increased volume of LV and 33kV PILC cable replacement activity, as NIE Networks states existing activity levels are not offsetting the rate of deterioration and faults.

Draft Determination

3.128 Replacement of HV cables is an ongoing task due to the age and condition of the existing assets. We accept the volumes proposed by NIE Networks as they are similar to the RP6 run rates.

3.129 Replacement of LV cables is an ongoing task due to the age and condition of the existing assets. NIE Networks' RP7 proposals are significant increase over the RP6 run rate, going from an annual average of 4.2km to 13km. It has submitted condition assessment and fault data for its LV UG network, which has highlighted that the existing run rates are not adequate, particularly for CONSAC cable. NIE Networks has also started installing monitoring equipment that can help it better target the worst performing circuits. We have therefore accepted the volumes proposed.

3.130 We have not accepted the proposed unit costs for the LV and HV UG cable replacement programmes. In particular the uplift for an increase in excavation and reinstatement costs, that we do not consider to be outside the scope of frontier shift adjustments. As a result, we have adjusted the unit costs for both programmes to the RP6 outturn through March 2023.

3.131 Replacement of 33kV PILC cables is an ongoing task due to the age and condition of the existing assets. NIE Networks' RP7 proposals are significant

increase over the RP6 run rate, going from an annual average of 0.49km to 2.59km.

- 3.132 Its RP7 strategy is to target 33kV PILC circuits which have unacceptably high failure rates, which it has defined as greater than three deterioration-related faults in the previous three years or greater than two faults in a year. The circuit details and fault history are provided in the table below. Each cable provides a supply to either one or two primary substation transformers, resulting in system risk until the fault has been located and repaired which can take several days to complete.

33kV PILC Circuit	Year Installed	Faults
Carnmoney Main to Glengormley Main	1964	2021 (x2), 2023
Carnmoney Main to Monkstown S/D	1964	2014, 2020, 2021
Dunmore S/D to Fortwilliam S/D	1958	2017, 2020
Dunmore S/D to Carrs Glen Tx. C	1951	2014, 2017, 2018, 2019, 2021 (x2)
Finaghy Main (FM23) to Pole (K) 250	1962	2021, 2022
Finaghy Main (FM24) to Tower 501	1962	2014, 2018, 2019, 2020, 2021, 2022
Finaghy Main (FM28) to Tower 501	1962	2012 (x2), 2013, 2015, 2021

Table 3.22: Worst performing 33kV PILC circuits

- 3.133 We have noted that NIE Networks choose to substitute allowances for this programme to the HV UG cable replacement programme during RP6. However, given the fault trends with these circuits, and their importance to the system, we have accepted the volumes proposed.
- 3.134 NIE Networks set its proposed unit cost for the replacement of 33kV PILC cables at the RP6 outturn to March 2022, and we have therefore accepted its proposal.
- 3.135 We have accepted the 33kV FFC refurbishment and new 33kV FFC replacement programmes. These programmes are aimed at refurbishing or replacing those circuits identified as worst performing and providing highest environmental risk. NIE Networks has legal obligations to adequately control inadvertent discharges, and recurrence of a polluting offence may be prosecuted. Given the history and location of the circuits to be addressed, we have accepted the proposals.
- 3.136 For the new 33kV FFC replacement programme, NIE Networks' proposed unit cost is the same as the 33kV PILC cable replacement programme, and we have therefore accepted.

- 3.137 For the refurbishment of 33kV FFC programme, NIE Networks set its proposed unit cost at the RP6 outturn to March 2022, with an uplift to due excavation and reinstatement and material cost increases. We did not consider these uplifts to be outside the scope of our frontier shift adjustments and were minded not to include them. However, we received further data for the 2023 reporting year and added it to the RP6 average calculation. We found NIE Networks' proposal is now below the RP6 outturn rate to March 2023, and we have therefore accepted its proposal.
- 3.138 NIE Networks has proposed a ten-fold increase in expenditure for the leak management technologies programme in comparison to RP6. The increase is driven by a change in strategy from tagging just the circuits with highest leakage, to tagging all circuits. This strategy will ensure all current and future leaks can be addressed more promptly, and identified more cost effectively than conventional methods, and we agree with these proposals. With all circuits addressed this programme would not be required for RP8, however there are developments for self-healing fluids in other networks that may require consideration.
- 3.139 We queried¹⁶ the build-up of costs for this lump sum programme and the number of circuits it had had addressed to date in RP6. NIE Networks detailed that it based costs on the number of oil sections, rather than circuits. It had addressed 11 oil sections in RP6 and was proposing 60 for RP7. It added £6k per section for 14 RP7 oil sections that could only be addressed in publicly accessible areas, necessitating mobile generation for the pumps and 24-hour security for what could be a week-long process.
- 3.140 In our analysis we removed the total additional costs of £84k for mobile generation and security from the RP7 proposal to compare costs on a per oil section basis. We found NIE Networks' proposal to be a 114% increase, going from c.£11.5k per oil section in RP6 to c.£24.7k in RP7. There was no justification for this increase, in fact NIE Networks stated it started carrying out this activity using in house resources during RP6 allowing efficiencies to be made.
- 3.141 We have set the allowance based on the proposed number of oil sections (60) multiplied by the RP6 outturn cost per section c.£11.5k, and added the additional costs (£84k) for mobile generation and security.
- 3.142 We have accepted the proposed lump sum for cable accessories and ancillaries. There is an ongoing requirement to refurbish and replace this equipment, and proposed expenditure is in line with the RP6 run rate.

¹⁶ UR-0351, UR-0401

3.143 We have accepted the proposed lump sum for the decommissioning of a FFC including the additional works to remove the environmental hazard of oil leaking from it.

3.144 Our draft determination for direct investment in UG distribution cables is set out in the table below.

Sub-programme		UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D16h - Part replacement of 33kV FFC	NIE Networks' Proposal	m	3,114	0.303	944.502
	Draft Determination	m	3,114	0.303	944.502
D16i - Replace HV Cable	NIE Networks' Proposal	m	18,000	0.091	1,641.865
	Draft Determination	m	18,000	0.087	1,573.406
D16j - Replace LV cable	NIE Networks' Proposal	m	78,000	0.155	12,092.207
	Draft Determination	m	78,000	0.139	10,880.173
D16l - Refurbish 33kV FFC	NIE Networks' Proposal	Circuit	9	37.558	338.028
	Draft Determination	Circuit	9	37.558	338.028
D16m - Part replacement of 33kV PILC Cable	NIE Networks' Proposal	m	15,533	0.303	4,711.287
	Draft Determination	m	15,533	0.303	4,711.287
D16n - Procure leak management technologies	NIE Networks' Proposal	LS	N/A	N/A	1,563.659
	Draft Determination	LS	N/A	N/A	776.194
D16o - Distribution cable accessories/ancillaries	NIE Networks' Proposal	LS	N/A	N/A	346.168
	Draft Determination	LS	N/A	N/A	346.168
D16s - Decommission FFC	NIE Networks' Proposal	LS	N/A	N/A	50.000
	Draft Determination	LS	N/A	N/A	50.000
D16: Distribution Underground Cables Total	NIE Networks' Proposal				21,687.716
	Draft Determination				19,619.759
	Total Change +/-				-2,067.957
	Total Change %				-10%

Note 1. Figures may not sum due to rounding.

Table 3.23: 16: Distribution underground cables draft determination

D39: SCADA

3.145 See GHD report in Annex R

D39 Total	NIE Networks' proposal	4,802.870
	Draft Determination	4,376.918
	Total Change +/-	-425.952
	Total Change %	-9%

Table 3.24: D39 Draft Determination

D41: Operational Telecoms

3.146 See GHD report in Annex R

D41 Total	NIE Networks' proposal	13,956.326
	Draft Determination	13,504.776
	Total Change +/-	-451.550
	Total Change %	-3%

Table 3.25: D41 Draft Determination

D43: ESQCR

Scope of Work

- 3.147 The Electricity Safety, Quality and Continuity Regulations came into force in Northern Ireland in 2012 and required NIE Networks to carry out certain tasks to ensure its network met the new standards.
- 3.148 In RP5 NIE Networks began scoping out the necessary tasks and began an implementation programme in RP6.
- 3.149 A number of very high/high risk sites were identified in RP6 and these were expected to be complete within the price control.
- 3.150 Due to the number of ground clearance issues on the LV system we amalgamated the ESQCR and LV overhead line refurbishment programme, this provided more efficient work scheduling and reporting.
- 3.151 The regulations stipulated certain conditions relating to the use of flammable insulating mediums in enclosed spaces and substations within office and residential buildings. Hence transformers in these locations are required to have their insulating oil replaced with a non-flammable, ester based fluid.
- 3.152 During the 60s, 70s and 80s many houses were serviced from underground cables and, in order to save money, two houses were serviced from a single cable which fed one property and then looped to the second. As domestic load has steadily increased, this method is now considered inappropriate.

The solution is to install a second service cable and remove the loop between properties. This is an ongoing work programme which has delivered relatively modest volumes during RP6.

- 3.153 Tree cutting is an ongoing, business as usual, work item during any price control and is carried out in accordance with the Energy Networks Association (ENA) technical specification 43-8 which stipulates clearance distances of tree limbs from live conductors.
- 3.154 The ENA developed its Engineering Technical Report, ETR132 to give guidance on a risk based approach to vegetation management to improve network resilience under abnormal weather conditions. This involves calculating the risk of network contact for any given tree and whether the tree can be left untouched, trimmed or felled.
- 3.155 During RP5, NIE Networks completed the resilience cut on the 33kV system and, in RP6 began the resilience cut on the 11kV system.
- 3.156 Retro-filling of primary transformers is a new sub-programme for RP7. It is similar to D43g with the difference being the transformers to be filled are 33/11kV power transformers which are much bigger and require larger volumes of insulating fluid. Only transformers considered to be in high risk areas are considered. These high risk areas include transformers in densely populated areas and/or surrounded by populated buildings.

NIE Networks RP7 Proposal

- 3.157 NIE Networks has identified a further tranche of very high/high risk sites to be completed during RP7. The majority of the sites are located along river banks used by anglers where mitigation is required against accidental contact between live conductors and fishing rods/poles. The extensive use of conductive carbon fibre in the manufacture of modern fishing equipment exacerbates the risk of contact. NIE Networks is proposing expenditure of £7.3m to mitigate this issue and a further £1.2m for new sites identified where a change of land use has occurred e.g. from a field to a football pitch.
- 3.158 It is proposed to ramp up the output volume for LV overhead line refurbishment from ~130km per annum in RP6 to 675km per annum in RP7. NIE Networks has also informed us that, due to large increases in its contractor costs the unit rate for LV overhead line refurbishment has increased from current average outturn of £23.7k/km to £31.6k/km. The ramping up of the programme is necessary to bring 100% of the LV network in compliance with ESQCR within a 15 year timeframe. NIE Networks also included in the LV Refurbishment programme a number of houses fed via undereaves mains.

- 3.159 Distribution transformer insulating medium refill is a continuation of the sub-programme started in RP6 and is basically a "mop up" of the units not identified in the RP6 price control.
- 3.160 Resolution of looped services is also a continuation of the business-as-usual works which began in RP6. Due to the implications of LCT connecting to a looped service, NIE Networks is proposing to increase the volume during RP7.
- 3.161 The 11kV resilience cut was started in RP6 and is another business-as-usual sub-programme. NIE Networks is proposing to increase the volume during RP7.
- 3.162 Primary transformer retro-fill is new sub-programme proposed for RP7 and involves replacing the insulating medium in 8 x 33/11kV transformers situated in high risk areas with respect to damage in the event of a fire in the transformer. The volume of oil to be replaced in these transformers is around 10 times the volume required for a distribution transformer.

Sub-programme	EJP	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D43c: Address very high risk sites	1.201	prog	N/A	N/A	8,462.266
D43d: LV clearances and OH refurbishment	1.508	km	4,050	31.633	128,115.632
D43g: Distribution transformers	1.201	Ea	60	5.379	322.726
D43h: Resolve looped services	1.201	Ea	2,589	1.887	4,885.443
D43i: 11kV Resilience cut	1.201	km	1,570	1.726	2,709.545
D43s: Primary transformers retro-fill	1.201	Ea	8	31.572	252.576
D43 Total					144,748.188

Table 3.26: NIE Networks' ESQCR Proposal

Draft Determination

D43c: Address very high risk sites

- 3.163 We were surprised to find additional high risk sites in the RP7 proposal and raised query UR-0051 to request additional information. In its response, NIE Networks explained that the re-purposing of land can create new high risk sites and this is unavoidable. We accept this explanation and should expect further instances of this in future price controls.

3.164 NIE Networks also explained about its policy decision to classify all fishing sites as very high risk and requiring mitigation during RP7.

3.165 We looked at the outturn expenditure for RP6 to date and found that NIE Networks are currently spending around £3m per annum against an allowance that covers £3.4m per annum. This represents a 7% underspend and is considered to be an efficiency saving. We will, therefore, apply the same percentage saving to the proposed RP7 amount.

D43d: LV overhead refurbishment and address clearance issues

3.166 We are aware that NIE Networks has included 8,000 undereaves fed properties in its RP7 proposal. We do not agree with this methodology and we will disallow this expenditure in the D43d category. We will however, increase the volumes and allowances in the D10 category to compensate. The reason for the movement of volumes from one category to another is to keep all similar works reported under the same category. This way we can monitor costs and output effectively. We will, therefore, disallow 8000 properties @ £627/property = £5,016,000. As the average width per property is 5m we will also reduce volumes by 3km

3.167 NIE Networks has proposed an ambitious plan to increase delivery of LV overhead line refurbishment volume during RP7. The graph shown in figure 3.2 shows output (outturn & forecast) during RP6 and the subsequent increase during RP7.

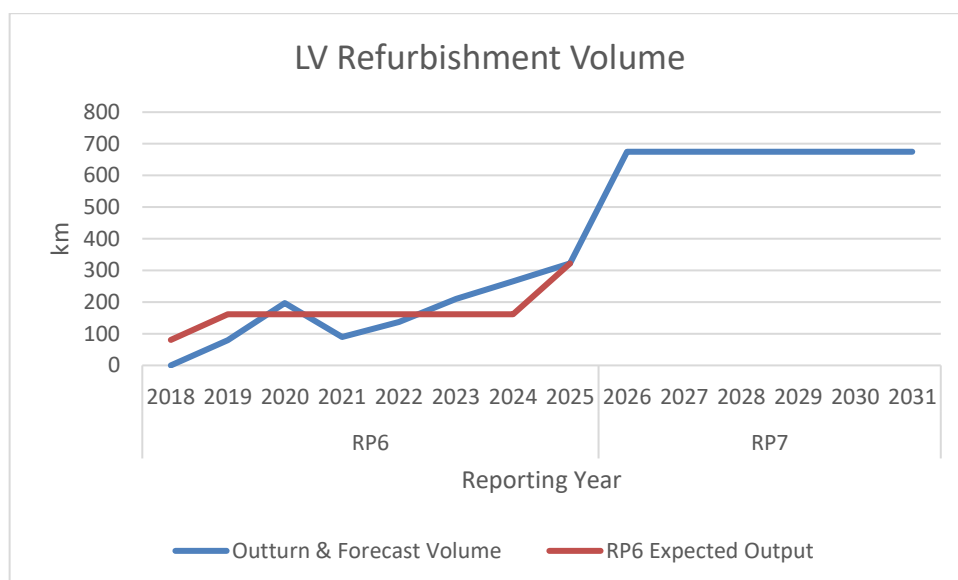


Figure 3.2: Outturn & forecast delivery volumes

3.168 Based on historic outturn volumes being below those expected, we have concerns that NIE Networks will be unable to increase output to its proposed RP7 volumes. However, given the upturn in output since 2021 we are willing

to allow the RP7 proposed volumes (less the deduction in 3.166 above) in the knowledge that the deferral mechanism will deal with any under-delivery in RP7.

3.169 The historic outturn unit cost/km is shown in figure 3.3 below.

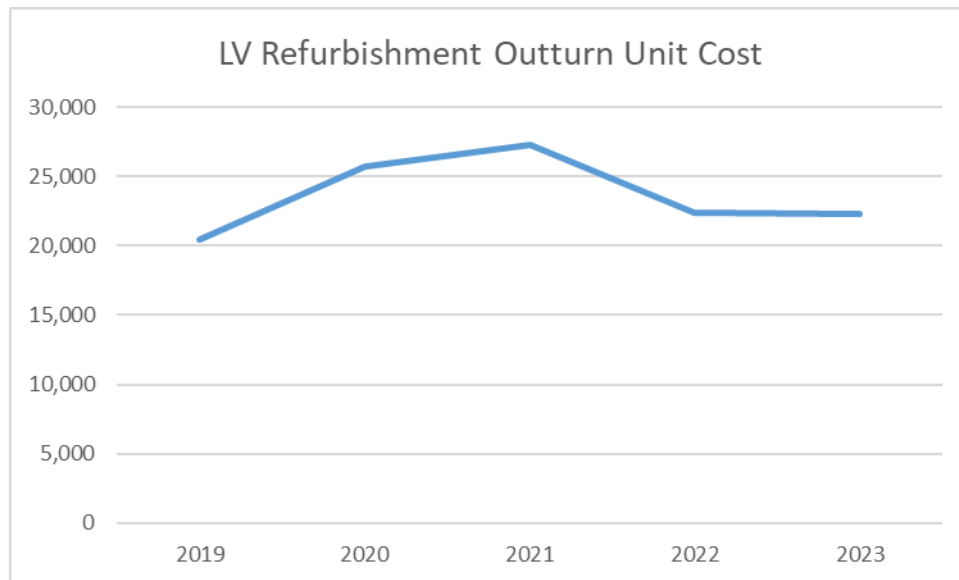


Figure 3.3: Outturn Unit Cost

3.170 We are aware of increased contractor costs negotiated by NIE Networks in the second half of 2022. However, due to reporting lag we have seen no evidence of the increased costs yet.

3.171 As with other overhead related sub-programmes we are minded to allow an addition of 39% to the contractor driven element of the costs. We will however review the situation prior to the publication of our final determination in 2024.

D43g: Distribution transformers

3.172 We found the RP6 outturn unit costs to be very similar to the proposed RP7 unit costs. We also have no issue with the volume proposed for RP7 and accept NIE Networks' explanation that any new transformers installed in enclosed spaces will be filled with non-flammable insulation medium at the time of installation. Therefore, the end of RP7 this should represent the close of this sub-programme.

D43h: Resolve Looped Services

3.173 Current RP6 outturn volume is averaging at 145 per annum and this is proposed to increase to 432 per annum.

- 3.174 Whilst NIE Networks has proposed a unit cost which is below that of the RP6 determination, we believe further savings can be achieved as the current outturn unit cost is around 50% of the RP6 allowance.
- 3.175 We are content to allow the increased volumes in the knowledge that the deferral mechanism will take care of any undelivered volumes, however we require a reduction in the unit cost in line with current delivery costs.

D43i: 11kV Resilience cut

- 3.176 As with some of the sub-programmes mentioned above, NIE Networks is proposing a significant increase in volumes for RP7.
- 3.177 Current RP6 outturn delivery is significantly delayed with only 30% volume delivered with 73% of the price control period elapsed.
- 3.178 Notwithstanding the above point, we are content to allow the increased volumes in the knowledge that the deferral mechanism will take care of any undelivered volume.
- 3.179 Current outturn unit cost is above that proposed by NIE Networks, hence we accept that efficiencies can be found by the company in RP7 and accept the proposed costs.

D43s: Primary transformer retro-fill

- 3.180 This is a new sub-programme proposed for RP7 therefore we have no outturn data on which to base or determination.
- 3.181 We raised query UR-0412 to gain further information regarding the cost breakdown for this task.
- 3.182 In its response, NIE explained that the volume of insulating fluid required for a primary transformer is almost 10 times that of a distribution transformer. However, due to economies of scale the cost is only 7 times more expensive. Labour costs are 4 times more expensive due to the longer time to pump and filter the larger volume of fluid and bought in services are around twice as expensive.
- 3.183 We accepted NIE Networks explanation of costs and allow the proposed costs and volumes in full.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D43c: Address very high risk sites	LS	NIE Networks' proposal	N/A	N/A	8,462.266
	LS	Draft Determination	N/A	N/A	7,869.907
D43d: LV clearances and OH refurbishment	km	NIE Networks' proposal	4,050	31.633	128,115.632
	km	Draft Determination	4,047	30.602	123,940.076
D43g: Distribution transformers	Ea	NIE Networks' proposal	60	5.379	322.726
	Ea	Draft Determination	60	5.379	322.726
D43h: Resolve looped services	Ea	NIE Networks' proposal	2,589	1.887	4,885.443
	Ea	Draft Determination	2,589	1.137	2,943.693
D43i: 11kV Resilience cut	km	NIE Networks' proposal	1,570	1.726	2,709.545
	km	Draft Determination	1,570	1.726	2,709.545
D43s: Primary transformers retro-fill	Ea	NIE Networks' proposal	8	31.572	252.576
	Ea	Draft Determination	8	31.572	252.576
D43	NIE Networks' proposal				144,748.188
	Draft Determination				138,038.522
	Total Change +/-				-6,709.665
	Total Change %				-5%

Table 3.27: D43 Draft Determination

D50: Climate Change Resilience

Scope of Work

- 3.184 Ingress of flood water at substation locations can cause major disruption as switchgear and protection equipment are unable to operate when water damaged.
- 3.185 NIE Networks has undertaken flood mitigation works at keys sites since RP5. The intervention methods vary from site to site and range from installation of

demountable flood defences to physically raising the substation equipment above the expected flood levels.

NIE Networks RP7 Proposal

- 3.186 In RP5, NIE Networks began a programme of protecting larger substations in high flood risk zones. Then, in RP6, a number of primary and secondary sites were protected.
- 3.187 The RP7 proposal is a continuation of the RP6 programme with a further 5 primary substations and 40 secondary sites identified for flood protection.
- 3.188 A third strand of investment is also proposed for RP7 and this involves treating substations affected by high water table. The company has identified 11 sites where high water table causes ingress of water into the lower levels of the substations causing cable faults, accelerated deterioration of steelwork and unhealthy, high humidity conditions.

Sub-programme	EJP	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D50a: Permanent protection of primary substations	1.804	Site	5	111.395	557.977
D50b: RMU flood protection	1.804	Site	40	10.405	416.206
D50c: High water table remediation	1.804	Site	11	36.955	406.509
D50 Total					1,379.692

Table 3.28: NIE Networks Flood Mitigation Proposal

Draft Determination

D50a: Permanent Protection of Primary Substations

- 3.189 During RP6 the company has delivered 5 of the programmed 9 sites to date. The outturn costs have averaged around £144k/site which is higher than the forecast cost proposed in the RP6 business plan.
- 3.190 We are minded to accept NIE Networks' RP7 proposal for primary and secondary sites with the caveat that we will continue dialogue with the company prior to the final determination to explore deferral of some of the works to a later price control.
- 3.191 The high water table remediation sub-programme is a new strand of work and we have no outturn data on which to inform our decision. However the value of the works is sufficiently low to present a low risk to consumers.

Therefore we accept the RP7 proposal and will monitor outturn costs during the price control.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D50a: Permanent protection of primary substations	Site	NIE Networks' proposal	5	111.395	556.977
	Site	Draft Determination	5	111.395	556.977
D50b: RMU flood protection	Site	NIE Networks' proposal	40	10.405	416.206
	Site	Draft Determination	40	10.405	416.206
D50c: High water table remediation	Site	NIE Networks' proposal	11	36.955	406.509
	Site	Draft Determination	11	36.955	406.509
D50	NIE Networks' proposal				1,379.692
	Draft Determination				1,379.692
	Total Change +/-				0
	Total Change %				0%

Table 3.29: D50 Draft Determination

D57m: High Impact Low Probability Events

Scope of Work

3.192 Distribution System Security & Planning Standards in Northern Ireland require a certain amount of redundancy to negate customer outages in the event of a fault. This is classified as "N-1" which means a duplicate asset, such as a transformer or incoming feeder is present and can supply the connected load in the event that a fault occurs on the primary asset.

3.193 With the uptake in LCT and added dependency on the electricity system, NIE Networks has proposed that a number of strategic sites be upgraded to provide an element of N-2 redundancy to prevent long period outages if a high impact low probability event occurs.

NIE Networks RP7 Proposal

3.194 NIE Networks has identified 9 Bulk Supply Points that have <50% back-feed capacity whilst still being compliant with the security of supply standard. One of these sites is being upgraded with a transmission solution through the D5

mechanism. Of the remaining 8 sites, the company has proposed 4 that are cost effective to upgrade and these are:

- (i) Coolkeeragh Main
- (ii) Larne Main
- (iii) Ballynahinch Main
- (iv) Newry Main

3.195 The interventions at these site range between 33kV overhead line rebuild, underground cable overlay and new build circuits. These interventions are proposed to increase the capacity of the resupply circuits in the event that both transformers or both 110kV incoming feeders go on fault simultaneously.

Draft Determination

3.196 Whilst we are in agreement with the scope of the works proposed, we do not agree with the costs put forward in the submission.

3.197 Our assessment of the cost for 33kV overhead line rebuild and the cost for 11kV overhead new build are vastly different from those proposed.

3.198 We based our calculations on the cost for existing tasks in the D07 category for re-engineering 33kV lines which we asses as £30.8k/km.

3.199 For 11kV new build we based our calculations on the cost and volumes RIGs data. Generally, 11kV overhead lines contain 12 poles/km which are reported at £1.7k each. Conductor is reported at £10.4k/km. Therefore the unit rate of $(12 \times 1.7k) + 10.4k = 30.1k$ seems appropriate.

3.200 We will continue to keep dialogue open with NIE Networks leading up to the final determination as we were made aware that costs for underground cables had been embedded in overhead line projects which may have skewed our cost assessment. Furthermore we wish to explore the possibility of unitising this allowance to give greater protection to consumers.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D57m	LS	NIE Networks' proposal	N/A	N/A	4,086.925
	LS	Draft Determination	N/A	N/A	2,783.323
	Total Change +/-				-1,303.602
	Total Change %				-32%

Table 3.30: D57m Draft Determination

D101: Network Alterations

Scope of Work

3.201 D101 network alterations are works that are requested by third parties and that NIE Networks must fully or partially fund. There are two types of expenditure in this area as follows:

- a) Non-recoverable alterations arise where a customer cannot be charged for an alteration to electricity equipment on their land. This arises where the alteration complies with conditions 12 and 13 of an established Wayleave Agreement or where a notice to remove equipment is enforced. For example: electricity infrastructure is impeding a bona fide development.
- b) NIRAUC schemes arise where the Department for Infrastructure (DfI) requires NIE Networks to relocate its apparatus due to highway works. Under the Diversionary Works Code of Practice¹⁷, developed by the Northern Ireland Road Authority and Utility Committees (NIRAUC), utility companies are required to contribute 18% towards the cost of moving its apparatus.

NIE Networks RP7 Proposal

3.202 NIE Networks forecast its D101 networks alterations expenditure for the RP7 period based on its experience to date in RP6. However, it has recommended that expenditure for the D101a non-recoverable alterations programme be subject to a pass-through style uncertainty mechanism. It has recommended this approach as the volume of activity in this area will be driven by customer behaviour and subsequent scope of required works that it has little control over. It believes this approach will give it greater protection

¹⁷ <https://www.infrastructure-ni.gov.uk/sites/default/files/publications/drd/code-of-practice-for-measures-necessary-where-apparatus-is-affected-by-major-work-diversionary-works-2nd-edition.pdf>

should activity significantly increase over RP6 or should activity decrease, costs to consumers will be minimised.

3.203 NIE Networks' forecast D101 networks alterations expenditure for RP7 is set out in the table below.

Sub-programme	UoM	Total Direct Proposal (£k)
D101a - Non-Recoverable Alterations	Lump Sum	18,188.066
D101b - NIRAUC schemes	Lump Sum	29.397
D101 Network Alterations Total		18,217.463

Note 1. Figures may not sum due to rounding.

Table 3.31: NIE Networks' D101: Network alterations proposal

3.204 NIE Networks has also proposed that the scope of works be increased over the current approach to non-recoverable alterations. Specifically, it considers that raising lines to achieve clearances over a property is no longer a technically acceptable solution. Instead, the overhead line route should be altered to ensure no properties are underneath. Currently this solution is offered to connecting customers, but with the customer bearing the additional costs over the line raise.

3.205 With this change in approach, it has forecast that non-recoverable alteration expenditure would require an increase of £5.4m over its RP7 ex-ante request. NIE Networks did not include this value in its ex-ante request, but anticipated that its proposed pass-through style uncertainty mechanism will provide the necessary funding.

Draft Determination

3.206 We agree that the volume and scope of work for the D101a non-recoverable alteration programme is influenced by factors outside of NIE Networks' control; however, NIE Networks is responsible for carrying out the required work. Applying a pass-through mechanism to this expenditure would reduce NIE Networks' incentive to reduce costs for required works.

3.207 We established a determined lump sum allowance for RP6 based on the outturn costs in RP5, as we expected historical spending to be a good predictor of future expenditure in this area. The annual average allowance for RP6 was £2,750k, which compares reasonably to the RP6 outturn of £2,885k to March 2023, a 4.9% difference. Applying the 50:50 cost risk sharing mechanism to this variation means the company has under recovered by £67.5k annually.

3.208 We have not implemented a pass-through mechanism for expenditure in this area for RP7. We wish to maintain a level of incentive for NIE Networks to

minimise costs. The protection provided by the 50:50 cost risk sharing mechanism and low variance between allowance and outturn in RP6 gives comfort to continue our approach from RP6.

3.209 At this stage, we have determined the lump sum allowance for RP7 based on the RP6 outturn costs. We have taken the 2023 reporting year outturn into the RP6 average which has resulted in a reduction from the NIE Networks proposal. We will engage with NIE Networks during the consultation period to further consider its proposed change in approach to what is considered technically acceptable.

3.210 We have accepted the proposed lump sum amount for NIRAUC schemes. We have noted that NIE Networks has underspent its RP6 allowance by £18k or 77% on an annual average basis. We understand that there has been a reduction in the level of works by Dfl during the RP6 period, however, the value proposed for RP7 is sufficiently low to present a low risk to consumers.

3.211 Our draft determination for D101 network alterations is set out in the table below.

Sub-programme		UoM	Total Direct Proposal (£k)
D101a - Non-Recoverable Alterations	NIE Networks' Proposal	Lump Sum	18,188.066
	Draft Determination	Lump Sum	17,311.846
D101b - NIRAUC Schemes	NIE Networks' Proposal	Lump Sum	29.397
	Draft Determination	Lump Sum	29.397
D101: Network Alterations Total	NIE Networks' Proposal		18,217.463
	Draft Determination		17,341.243
	Total Change +/-		-876.220
	Total Change %		-5%

Note 1. Figures may not sum due to rounding.

Table 3.32: D101: Network alterations draft determination

D603: Distribution Protection

3.212 See GHD report in Annex R

D603	NIE Networks' proposal	5,924.161
	Draft Determination	3,342.400
	Total Change +/-	-2,581.761
	Total Change %	-44%

Table 3.33: D603 Draft Determination

D604: Connections Driven Systems Work

Scope of Work

- 3.213 Connections-driven system work is carried out along with a new connection to the assets to which the new connection will connect. For example, an overhead pole may be in a condition where replacement is required to ensure the longevity of that connection and safety NIE Networks' staff who may be required to climb the pole to make the connection.
- 3.214 This lower-level asset replacement achieved alongside the connection job itself is not chargeable to the customer but compliments the planned asset replacement programmes carried out through condition and risk assessed methods. Further details on what works are and aren't chargeable to the connecting customer are detailed in NIE Networks' statement of charges¹⁸. Current connection charging methodology is currently undergoing a review¹⁹.

NIE Networks' RP7 Proposal

- 3.215 NIE Networks' forecast connections driven systems work expenditure for RP7 is set out in the table below.

Sub-programme	UoM	Total Direct Proposal (£k)
D604a - Connection Driven Systems Work	Lump Sum	9,611.187

Table 3.34: NIE Networks' D604: Connections driven systems work proposal

Draft Determination

- 3.216 We have accepted the proposed lump sum amount for connection driven systems works. The value proposed is in line with outturn expenditure through RP6 to date, on an average annual basis. It is noted RP6 expenditure is currently c.£837k, or 108%, greater than the allowance on an annual average basis.
- 3.217 Our draft determination for connections driven systems work is set out in the table below.

¹⁸ <https://www.nienetworks.co.uk/statementofcharges>

¹⁹ <https://www.uregni.gov.uk/consultations/call-evidence-electricity-connection-policy-framework-review>

Sub-programme	UoM	Total Direct Proposal (£k)
D604a - Connections Driven Systems Work	NIE Networks' Proposal	9,611.187
	Draft Determination	9,611.187
	Total Change +/-	0
	Total Change %	0%

Table 3.35: D604: Connections driven systems work draft determination

D605: Network Access and Commissioning

Scope of Work

3.218 Network access and commissioning expenditure relates to two direct network activities which are not incorporated into the other specific programmes or projects. They are as follows:

- a) Commissioning - this includes activities such as those required when a new network asset is connected, to ensure safe and proper operation, as well as ongoing testing of equipment and protective devices.
- b) Network Access - these activities are required to isolate relevant assets in order to allow work or the connection of new assets to the network, and then to restore supplies and perform voltage checks.

NIE Networks' RP7 Proposal

NIE Networks' forecast network access and commissioning expenditure for RP7 is set out in the table below.

Sub-programme	UoM	Total Direct Proposal (£k)
D605a - Network Access and Commissioning	Lump Sum	9,514.002

Table 3.36: NIE Networks' D605: Networks access and commission proposal

Draft Determination

3.219 We have accepted the proposed lump sum amount for network access and commissioning. The value proposed is a 27% decrease on the outturn expenditure through RP6 to date, on an average annual basis. It is noted RP6 expenditure is currently c.£1.3m, or 139%, greater than the allowance on an annual average basis.

3.220 Our draft determination for network access and commissioning is set out in the table below.

Sub-programme		UoM	Total Direct Proposal (£k)
D605a - Network Access and Commissioning	NIE Networks' Proposal	Lump Sum	9,514.002
	Draft Determination	Lump Sum	9,514.002
	Total Change +/-		0
	Total Change %		0%

Table 3.37: D605: Network access and commissioning draft determination

D701: Earthing

Scope of Work

3.221 Earthing systems for transmission and distribution equipment perform a number of safety related roles, these include

- a) Ensuring sufficient fault current flows to enable the operation of protection equipment
- b) Providing a zero volt reference point for transformers with a grounded star connection
- c) Preventing step and touch voltages within substation boundaries providing a safe environment for staff

NIE Networks RP7 Proposal

3.222 NIE Networks has proposed 2 new strands of work for RP7 related to substation earthing

- (i) Earthing surveys - to locate defects
- (ii) Earthing remediation - to repair the defects identified in (i) above

3.223 The purpose of the above tasks is to identify substations where the earthing conductors may be undersized to provide the necessary levels of protection

Sub-programme	EJP	UoM	Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D701a: Earthing surveys		LS	N/A	N/A	324.600
D701b: Earthing remediation		LS	N/A	N/A	1,946.560
D701 Total					2,271.160

Table 3.38: NIE Networks' earthing proposal

Draft Determination

- 3.224 We are minded to disallow the funding requested for substation surveys given the current allowances already in place to carry out substation inspections under IMF&T funding.
- 3.225 Transmission, primary distribution and secondary distribution sites containing batteries are inspected at frequencies of 5 to 13 weeks and these inspections include but are not limited to:
- a) plant and apparatus condition
 - b) visual inspection of substation buildings, civil works and fabric
- 3.226 We believe the earthing system is part of the substation apparatus and, therefore, should have its condition checked during the inspections.
- 3.227 We will, however allow the funding for remediation works as this requires new capital expenditure to bring the substations up to the required standard.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D701a: Earthing surveys	LS	NIE Networks' proposal	N/A	N/A	324.600
	LS	Draft Determination	N/A	N/A	0
D701b: Earthing remediation works	LS	NIE Networks' proposal	N/A	N/A	1,946.560
	LS	Draft Determination	N/A	N/A	1,946.560
D701	NIE Networks' proposal				2,271.160
	Draft Determination				1,946.560
	Total Change +/-				-324.600
	Total Change %				-14%

Table 3.39: D701 Draft Determination

D702: System Performance

Scope of Work

- 3.228 Travel and fault diagnosis are large contributors to the time taken to restore faults. This inconveniences the consumers affected by the fault.

- 3.229 New technology in the form of Active Network Management (ANM) devices can be remotely operated via the SCADA system and will allow rapid network reconfiguration to restore supplies.
- 3.230 In RP6, we identified a developmental objective to establish a Worst Served Customer (WSC) related time series to inform RP7 with respect to targeted standards and/or investment to improve the volumes of WSC
- 3.231 NIE Networks developed data sets against 3 different metrics, these were
- a) NIE Networks RP6 metric – a customer who experiences 6 or more unplanned high voltage interruptions to supply in 18 months (figure 3.5)

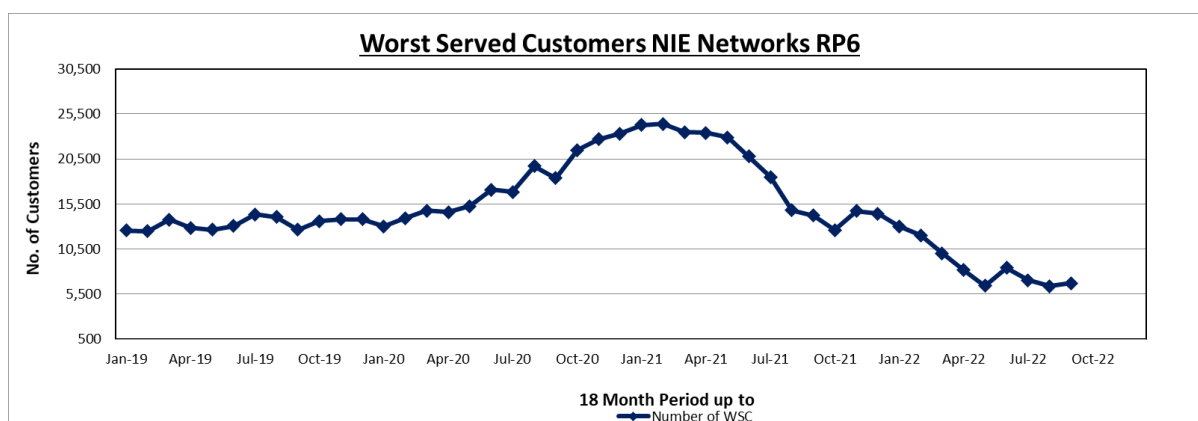


Figure 3.4

- b) OFGEM RIIO-ED1 metric – a customer who experiences 12 or more unplanned high voltage interruptions to supply in 3 years, with 3 or more interruptions in each 12-month period (figure 3.6)

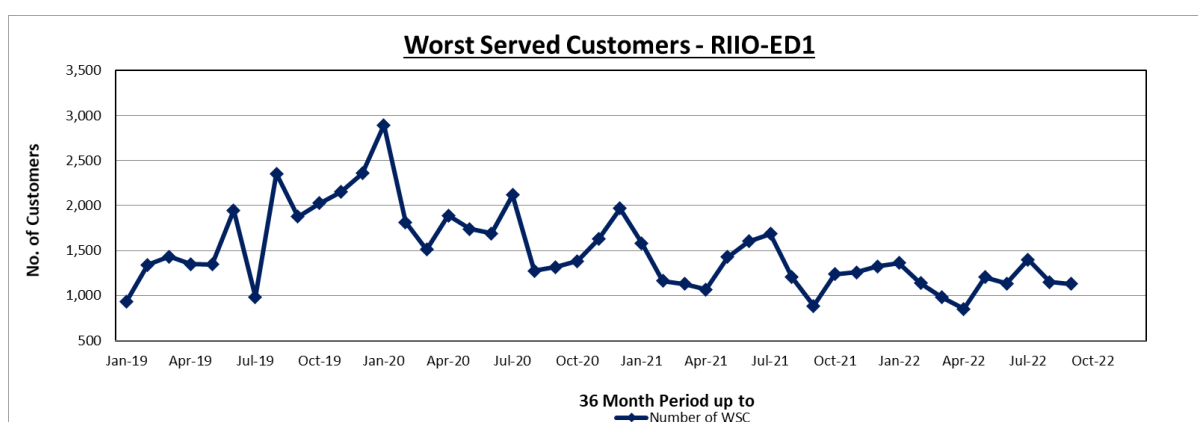


Figure 3.5

- c) OFGEM RIIO-ED2 metric – a customer who experiences 12 or more unplanned high voltage interruptions to supply in 3 years, with 2 or more interruptions in each 12-month period (figure 3.7)

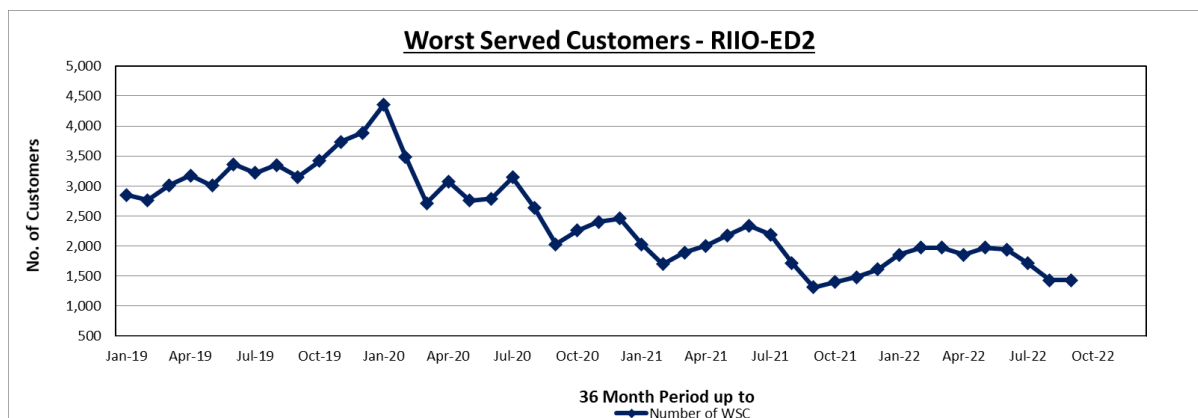


Figure 3.6

NIE Networks RP7 Proposal

- 3.232 The company is proposing to adopt the RIIO-ED2 metric for reporting in RP7. We are in agreement with the adoption of this metric as the RP6 metric does not portray an accurate representation of WSCs due to the volume of customers who may have been subject to a one-off short period of frequent interruptions which could have subsequently been resolved.
- 3.233 The Ofgem metrics provide a much clearer representation of volumes of WSCs due to the long and short-term data included in the calculation. Furthermore, adoption of the ED2 metric will allow future direct benchmarking with GB DNOs.
- 3.234 NIE Networks has also proposed an ex ante lump sum allowance of £3m to enable works on 15 specific HV circuits which will reduce the volume of WSCs by 50% during RP7

Draft Determination

- 3.235 We are in agreement with the introduction of HVANM devices but were concerned that the proposed CML improvements would be rewarded through the reliability incentive thus making the capital allowance redundant causing the company to be over-compensated. Consequently, the reliability incentive was calibrated to take account of HVANM (see Annex M).
- 3.236 At present, we are minded to disallow the funding proposed for WSC.
- 3.237 The company has stated in its submission that current asset investment programmes will have a small effect on the volume of WSCs. This is due to

the limited overlap between rogue circuits requiring cyclic investment and circuits supplying most WSCs.

3.238 Our view is, we are minded to allow ~£195m²⁰ for HV overhead line works during RP7 and we believe this provides sufficient funding and flexibility to allow the company to deliver its RP7 WSC aspirations.

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
D702a: Worst Served Customers	LS	NIE Networks' proposal	N/A	N/A	3,000.000
	LS	Draft Determination	N/A	N/A	0
D702b: HV Active Network Management	LS	NIE Networks' proposal	N/A	N/A	10,719.000
	LS	Draft Determination	N/A	N/A	10,719.000
D702	NIE Networks' proposal				13,719.000
	Draft Determination				10,719.000
	Total Change +/-				-3,000.000
	Total Change %				-22%

Table 3.40: D702 Draft Determination

T10: 110kV Switchgear

3.239 See GHD report in Annex R

T10	NIE Networks' proposal	1,564.534
	Draft Determination	798.407
	Total Change +/-	-766.127
	Total Change %	-49%

Table 3.41: T10 Draft Determination

T11: 275kV Plant Ancillaries

3.240 See GHD report in Annex R

²⁰ £192m for 11kV rebuild + £3m for 11kV remedial works

T11	NIE Networks' proposal	3,815.514
	Draft Determination	3,499.268
	Total Change +/-	-316.246
	Total Change %	-8%

Table 3.42: T11 Draft Determination

T12: 110kV Plant Ancillaries

3.241 See GHD report in Annex R

T12	NIE Networks' proposal	11,322.372
	Draft Determination	10,307.908
	Total Change +/-	-1014.465
	Total Change %	-9%

Table 3.43: T12 Draft Determination

T13: 275/110kV Transformers

3.242 See GHD report in Annex R

T13	NIE Networks' proposal	10,570.439
	Draft Determination	9,953.399
	Total Change +/-	-617.040
	Total Change %	-6%

Table 3.44: T13 Draft Determination

T14: 110/33kV Transformers

3.243 See GHD report in Annex R

T14	NIE Networks' proposal	9,072.831
	Draft Determination	8,640.336
	Total Change +/-	-432.495
	Total Change %	-5%

Table 3.45: T14 Draft Determination

T15: 22kV Reactors

3.244 See GHD report in Annex R

T15	NIE Networks' proposal	2,086.622
	Draft Determination	1,569.849
	Total Change +/-	-516.774
	Total Change %	-25%

Table 3.46: T15 Draft Determination

T16: Transmission Transformer Refurbishment

3.245 See GHD report in Annex R

T16	NIE Networks' proposal	1,416.263
	Draft Determination	1,246.099
	Total Change +/-	-170.165
	Total Change %	-12%

Table 3.47: T16 Draft Determination

T17: 275kV Transmission Overhead Lines

3.246 See GHD report in Annex R

T17	NIE Networks' proposal	18,696.388
	Draft Determination	18,008.989
	Total Change +/-	-687.399
	Total Change %	-4%

Table 3.48: T17 Draft Determination

T19: 110kV Transmission Overhead Lines

3.247 See GHD report in Annex R

T19	NIE Networks' proposal	18,204.154
	Draft Determination	15,790.930
	Total Change +/-	-2,413.224
	Total Change %	-13%

Table 3.49: T19 Draft Determination

T20: Transmission Underground Cables

3.248 See GHD report in Annex R

T20	NIE Networks' proposal	4,701.795
	Draft Determination	3,713.673
	Total Change +/-	-988.122
	Total Change %	-21%

Table 3.50: T20 Draft Determination

T602: Transmission Protection

3.249 See GHD report in Annex R

T602	NIE Networks' proposal	5,697.481
	Draft Determination	5,433.116
	Total Change +/-	-264.365
	Total Change %	-5%

Table 3.51: T602 Draft Determination

T603: Network Access & Commissioning

Scope of Work

3.250 See paragraph 3.218 for scope of work

NIE Networks' RP7 Proposal

3.251 NIE Networks' forecast network access and commissioning expenditure for RP7 is set out in Table 3.52 below.

Sub-programme	UoM	Total Direct Proposal (£k)
T603a - Network Access and Commissioning	Lump Sum	2,274.471

Table 3.52: NIE Networks' T603: Networks access and commission proposal

Draft Determination

3.252 Whilst the proposed value represents a significant increase above RP6 allowance (around 66%), it also represents the outturn run rate to date during RP6. Therefore we have accepted the proposed lump sum amount.

3.253 Our draft determination for network access and commissioning is set out in the table below.

Sub-programme	UoM	Total Direct Proposal (£k)
T603a - Network Access and Commissioning	NIE Networks' Proposal	2,274.471
	Draft Determination	2.274.471
	Total Change +/-	0
	Total Change %	0%

Table 3.53: T603: Network access and commissioning draft determination

T701: Strategic Spares

3.254 See GHD report in Annex R

T701	NIE Networks' proposal	4,414.075
	Draft Determination	4,414.075
	Total Change +/-	0
	Total Change %	0%

Table 3.54: T701 Draft Determination

T702: Earthing

3.255 See Paragraph 3.224

Sub-programme	UoM		Volume	Unit Cost (£k)	Total Direct Proposal (£k)
T701a: Earthing surveys	LS	NIE Networks' proposal	N/A	N/A	199.920
	LS	Draft Determination	N/A	N/A	0
	Total Change +/-				-199.920
	Total Change %				-100%

Table 3.55: T701 Draft Determination