Final Determination - Transmission

6 Transmission Plant Switch Houses

Project 6	Transmission Plant Switch Houses
NIE Request	£2,500,000
Project Description	Refurbishment of the 275kV substation buildings at Ballylumford and Kilroot Power Stations.
Project Justification Satement	Recent condition assessment of these buildings, which are located on the coast, has highlighted that the external cladding is extensively corroded. These buildings provide protection from the environment for the installed 275kV switchgear, disconnectors, bus bar support structures and associated protection, control and metering equipment. Failure to maintain the structure of the building would lead to rapid plant deterioration, plant failures and possible loss of generation with implications for commercial agreements and with significant impact on supply availability across the province.
Draft Determination	£2,250,000
NIE Response to Draft Determination	The Utility Regulator has not provided any reason to establish that NIE's costs would be above a benchmark while all the evidence is that they would be below a benchmark.
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Allowance supported by SKM modelling.
UReg View	The need for work at these sites has been well documented. We have included a 10% efficency requirement to the costs as these values have not been benchmarked.
Deliverables	Refurbishment of 2 x 275kV clad steel buildings at Kilroot and Ballylumford, which are in poor condition due to saline corrosion. The remainder of the cladding is planned for replacement during RP6 at a cost of £1.5M.

Final Determination	**£2,345,960.70**	Including consultancy costs of	**£95,960.70**
Fund	**Fund 1**		

Project 7	Kells 110kV Substation
NIE Request	£8,146,000
Project Description	Replacement of the 110kV switchgear, double bus bar structures and ancillary equipment at Kells substation.
Project Justification Satement	The existing 110kV switchgear and double bus bar equipment at Kells was installed during the early 1960s. Condition assessment of the small oil volume 110kV circuit breakers, current transformers, capacitive voltage transformers, bus bars, and associated ancillary equipment has identified extensive corrosion of plant and equipment together with environmental related degradation of the concrete support structures. In addition, the existing equipment is approaching its maximum fault level rating. Failure to replace these assets would have major implications for supply availability over the wider network.
Draft Determination	£8,146,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Allowance supported by SKM modelling.
UReg View	Need for project demonstrated prior to Draft Determination. Cost verified by SKM.
Deliverables	Circuit breakers were purchased in RP4 but no work commenced. The project deliverables for RP5 are: 1) Civil works associated with the bay structures. 2) Replacement of two high level structures. 3) Replacement of busbars. 4) Complete Replacement of all remaining circuit breakers. Except for the two high level structures, specific asset volumes are not given in the information available.

Final Determination	**£8,458,707.70**	Including consultancy costs of	**£312,707.70**
Fund	**Fund 1**		

Project 8 Tandragee 110kV Substation

NIE Request	£3,206,000
Project Description	Completion of the refurbishment of the 110kV switchgear and ancillary equipment at Tandragee substation.
Project Justification Satement	The 110kV circuit breakers at Tandragee were replaced during the early 1990s however the double bus bar equipment and support structures installed during the early 1960s were not replaced at that time. During RP4 work commenced to replace the high level double bus bars and their associated structures which were in poor condition due to environmental degradation. This asset replacement work will continue during RP5 to replace the remaining low level bus bars, disconnectors and associated ancillary equipment all of which are in poor condition. In addition, the existing equipment is approaching its maximum fault level rating. Failure to replace these assets would have major implications for supply availability over the wider network.
Draft Determination	£1,603,000
NIE Response to Draft Determination	NIE Strategy Paper C3 – Castlereagh, Kells and Tandragee, outlines the need to refurbish the 110kV open bus bar meshes at these three sites and describes how this critical work has already been delayed due to the catastrophic failure of oil filled equipment which prevented safe access to the sites. Kells and Castlereagh 110kV asset replacement has been allowed yet Tandragee, which has the same justification, has been cut to 50% due to an unjustified assertion that it should be aligned with the North South interconnector and renewables development. Tandragee 110kV substation asset replacement is justified in NIE Strategy Paper C3 as the completion of urgent asset replacement work. The need for similar asset replacement within Kells and Castlereagh 110kV substations, which utilise the same type of equipment of a similar age and condition, outlined in the same strategy paper, was fully accepted. As previously mentioned, this work has already been delayed due to the catastrophic failure of 110kV equipment on the Tandragee site which prevented safe access. This cause for the delay has now been addressed permitting the replacement to proceed. The need for replacement is based on the poor condition of the existing high voltage equipment and support structures and does not result from the proposed North South Interconnector project.
Additional information provided	Information included in reponse to Draft Determination.
SKM Response to NIE T+D	Allowance supported by SKM modelling.
UReg View	SKM have reviewed the need for this project and are of the opinion that it should be completed within RP5 (Draft Determination had assumed 50% completion during RP5)
Deliverables	Work has commenced in RP4. The project deliverables for RP5 are: 1) Civil works associated with the bay low level structures. 2) Replacement of the low level structures.

8 Tandragee 110kV Substation

3) Replacement of busbars, insulators, disconnectors and fittings.

Specific asset volumes are not given in the information available however this work is continuing from RP4 therefore this allowance is to deliver the complete refurbishment of the 110kV substation.

Final Determination	**£3,255,904.10**	Including consultancy costs of	**£49,904.10**
Fund	**Fund 1**		

Project 9	Castlereagh 110kV Substation
NIE Request	£3,045,000
Project Description	Replacement of 110kV switchgear and ancillary equipment at Castlereagh substation.
Project Justification Satement	The 110kV circuit breakers at Castlereagh were replaced during the early 1990's, however the double bus bar equipment and support structures installed during the early 1960's were not replaced at that time. During RP4 work commenced to replace the high level double bus bars and their associated structures which were in poor condition due to environmental degradation. This asset replacement work will continue during RP5 to replace the remaining low level bus bars, disconnectors and associated ancillary equipment all of which are in poor condition. In addition, the existing equipment is approaching its maximum fault level rating. Failure to replace these assets would have major implications for supply availability over the wider network.
Draft Determination	£3,045,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Allowance supported by SKM modelling.
UReg View	Need established before Draft Determination
Deliverables	Work has commenced in RP4. The project deliverables for RP5 are: 1) Civil works associated with the bay low level structures. 2) Replacement of the low level structures. 3) Replacement of busbars, insulators, disconnectors and fittings. Specific asset volumes are not given in the information available however this works is continuing from RP4 and this allowance is to deliver the complete refurbishment of the 110kV substation.

Final Determination	**£3,107,320.50**	Including consultancy costs of	**£62,320.50**
Fund	**Fund 1**		

Project 10 110kV Switchgear Replacement

NIE Request	£6,350,000
Project Description	Replacement of 110kV switchgear at Ballyvallagh, Dungannon and Lisburn substations.
Project Justification Satement	The 110kV small oil volume circuit breakers were installed during the 1960s and must be replaced due to poor condition, the non-availability of spares and the lack of support from the original equipment manufacturer. The work to replace the circuit breakers at the substations detailed below will include the replacement of concrete support structures, bus bars, disconnectors and associated ancillary equipment. All of this equipment is in poor condition due to extensive corrosion and the concrete support structures are suffering from environmental related degradation. In addition, the majority of this equipment is approaching its maximum assigned fault level rating. Failure to maintain the integrity of this equipment would have major implications for supply availability over the wider network.
Draft Determination	£3,175,000
NIE Response to Draft Determination	In the Utility Regulator's response, an assumption has been made that spares recovered from those breakers removed from the system can yield up a sufficient supply of parts necessary to keep the remaining population operating on the system for longer. The Utility Regulator ignores the fact that NIE has already taken this approach into account when setting the requested numbers. In this category, the least risk option was to replace 20 circuit breakers during RP5 but a higher risk option was chosen. This higher risk option proposes to change only 16 breakers of the initial 20 giving cause for concern and to manage the risk of keeping the remaining 4 operating for a further five years by a more intensive inspection, monitoring and maintenance regime. This approach recognised that 'some spares may be salvaged', considering that 16 breakers may yield up sufficient useable spares for the remaining 4. The assumption by the Utility Regulator that replacing 50% of the population would yield sufficient spares for the remaining 50% is flawed. This is an approach to asset management that is completely inappropriate in a developed economy. Generally the parts that need replacing, such as turbulators, interrupter heads and porcelains, tend to be the same parts that are affected across the entire population and therefore the majority of recovered spares are not reusable. In addition, manufacturing support is no longer available for this equipment, which makes it impossible to gain certification of primary components once refurbished as the original drawings and technical performance requirements are no longer available.
Additional information provided	Details of surveys undertaken and information about the interchangability of plant / options to reuse refurbished equipment.
SKM Response to NIE T+D	NIAUR allowance confirmed by SKM modelling.

10 110kV Switchgear Replacement

UReg View	NIE have highlighted that the individual items of plant cannot be refurbished and reused during RP5 due to the individual asset types involved. They may be able to be reused during RP6.
Deliverables	Replacement of 16 circuit breakers (CBs) and associated cabling, including: - 7 at Ballyvallagh - 5 at Dungannon - 4 at Lisburn. These CBs are being replaced based upon a risk assessment. Expenditure for the CB replacements at Castlereagh, Tandragee and Kells are associated with the individual projects and not included here.

Final Determination	**£6,593,763.20**	Including consultancy costs of	**£243,763.20**
Fund **Fund 1**			

Project 11 275kV Plant Ancillaries

NIE Request	£5,565,754
Project Description	Replacement of 275kV switchgear ancillary equipment.
Project Justification Satement	The 275kV ancillary equipment forms part of the infrastructure of 275kV substations. Replacement and refurbishment requirements have been identified based on condition assessments and compliance with environmental and Health & Safety legislation. The current condition of the equipment and services gives rise to legislative, safety, plant reliability and availability issues together with environmental concerns. The list detailed below identifies equipment and services that were installed during the 1960s and the early 1970s and which are no longer fit for service. Failure to maintain the integrity of these structures and services would have major implications for supply availability over the wider network.
Draft Determination	£2,615,904
NIE Response to Draft Determination	The overall allowance for T11 is 47% of the NIE request. This figure is based on 100% allowances for specific categories as requested, and zero allowances for other categories. Only one category transformer bunding) has been partially allowed (50%). No allowances have been made for: • Concrete A-frame refurbishment • Substation security replacement • Substation earthing • Substation ac services • Drainage In the above categories, a clear need exists and has been documented in NIE Strategy Paper C2. This work is required to ensure the integrity of the backbone 275kV network, and specific examples highlight the critical nature of this investment: • Concrete A-frame refurbishment is necessary, as some of these structures are in poor condition, and present both a network and safety risk. • Substation security. Our 275kV substations are critical components of the commercial and industrial infrastructure of Northern Ireland; some are identified as ‘Key Sites’ under the Centre for Protection of National Infrastructure. Existing security measures are in disrepair, and have been identified as in need of immediate investment by an external consultant. • Substation a.c. supplies are critical to the substation infrastructure. This equipment is ageing, and non-compliant when measured against current standards. Given the relatively low value, but high criticality of this equipment, disallowing this spend disproportionately favours cost over risk. NIE has provided specific and precise information on the need for investment under category T11. Failure to deliver this investment will leave a critical part of the network vulnerable to a range of potential failures, each of which could impact significantly on the network as a whole. The majority of this work is an integral part of other proposed refurbishment work at transmission sites during RP5 and has been costed accordingly. Failure to approve this work will result in projects not being completed, which will result in costly temporary repairs/modifications needing to be carried out. This will result in a reduced level of equipment performance and costly, inefficient follow up work in

	the future. In addition, it may not be possible to apply new site ratings until all works have been completed, which will result in an increased number of network operational restrictions. The level of safety and operational risk implied by the reduced expenditure is unacceptable
Additional information provided	Copies of consultants reports and risk registers

SKM Response to NIE T+D	Allowance supported by SKM modelling.
UReg View	SKM modelling shows that the proposed volume of work falls within that indicated as representing reasonable provisions given the age and type of equipment involved. All locations to be identified by NIE within the new reporting systems.
Deliverables	275kV Transmission Substation Ancillary Systems: 1) Defective catenaries to be replaced at 3 substations - £100,000 2) Protection replacement at 7 substations - £2,191,500 3) Asbestos removal at 1 substation - £100,000 4) Concrete structure refurbishment at 4 substations - £310,000 5) Transformer bunding at 1 substation - £400,000 6) Holthum replacement at 3 substations - £90,000 7) Security system replacement at 2 substations - £630,000 8) Security system replacement commencement at 2 substations (to be completed in RP6 @ £315,000) - £315,000 9) Standby generator replacement at 5 substations - £118,330 10) DC standby system replacement at 6 substations - £340,184 11) FMJL & Reyrolle CT replacement (5 of 3-phase sets) at Ballylumford - £264,000 12) Earthing refurbishment/upgarde at 3 substations - £150,000 13) AC system rewire at 3 substations - £157,740 14) Control room refurbishment at 2 substations - £200,000 15) Drainage upgrade at 2 substations - £200,000

Final Determination	**£5,779,411.30**	Including consultancy costs of	**£213,657.30**
Fund	**Fund 1**		

Project 12 110kV Plant Ancillaries

NIE Request	£7,017,279
Project Description	Replacement of 110kV switchgear ancillary equipment
Project Justification Satement	The 110kV ancillary equipment forms part of the infrastructure of 110kV substations. Replacement and refurbishment requirements have been identified based on condition assessments and compliance with environmental and Health & Safety legislation. The current condition of the equipment and services gives rise to legislative, safety, plant reliability and availability issues together with environmental concerns. The list detailed below identifies equipment and services that were installed during the 1960s and the early 1970s and which are no longer fir for service. Failure to maintain the integrity of these structures and services would have major implications for supply availability over the wider network.
Draft Determination	£3,298,121
NIE Response to Draft Determination	There has been no examination of the specific need for investment at 110kV; the supporting information provided by NIE in paper C2 appears not to have been considered. The determination of need for investment in 110kV ancillaries has been made purely on an arbitrary cross-over from the 275kV decision. This approach provides no engineering rationale whatsoever. As for 275kV Plant Ancillaries, the level of safety and operational risk implied by the reduced expenditure is unacceptable and should not be imposed on NIE.
Additional information provided	Information included in response to Draft Determination
SKM Response to NIE T+D	Allowance based on SKM modelling.
UReg View	SKM modelling shows that the proposed volume of work falls within that indicated as representing reasonable provisions given the age and type of equipment involved. All locations to be identified by NIE as part of the new reporting systems.
Deliverables	110kV Transmission Substation Ancillary Systems: 1) Protection replacement at 23 substations - £2,431,500 2) Cable duct replacement at 2 substation- £70,000 3) Concrete structure refurbishment at 2 substations - £250,000 4) Transformer bunding at 4 substation - £360,000 5) Holthum replacement at 4 substations - £80,000 6) Standby generator installation at 2 substations - £47,332 7) External lighting replacement at 2 substations - £30,000 8) DC standby system replacement at 12 substations - £260,389 9) AC system rewire at 11 substations - £487,058 10) Replacement of busbars, isolators and VTs at 5 substations - £1,206,000 11) Security system installation at 8 substations - £240,000 12) Co2 system replacement at 8 substations - £320,000 13) Earthing upgrade at 5 substations - £200,000

12 110kV Plant Ancillaries

14) Civil refurbishment at 8 substations - £735,000

Final Determination	**£7,286,657.10**	Including consultancy costs of	**£269,378.10**
Fund **Fund 1**			

Project 13 275kV/110kV Transformer Replacement

NIE Request	£7,807,575
Project Description	Replacement of 3 age expired poor condition 275/110kV 240MVA transmission transformers at Castlereagh, Coolkeeragh and Tandragee. These transformers were installed during the early 1960s and 1970s.
Project Justification Satement	There are 16 275/110kV transmission transformers located at 8 transmission substations which between them feed all the customers in Northern Ireland. These assets are major, high risk, high cost items with associated auxiliary systems including transformer cooling plant, control and protection equipment and battery and charger equipment. Additionally, 7 of the 16 275/110kV transformers have shunt reactors and associated switchgear connected to their tertiary windings. Ongoing condition assessment of these assets has highlighted three units and their associated auxiliary equipment that are in most need of replacement. This programme of replacement will minimise the risk of in-service failure of these assets, which would have very serious implications for supply availability over the wider network.
Draft Determination	£5,153,000
NIE Response to Draft Determination	The Draft Determination makes allowances for 2 out of the 3 transformer replacements proposed. NIE Strategy Paper B1- 275/110kV Transformers, outlines the need to replace three aged 275/110kV interbus transformers during RP5 based on their condition, known degradation based on DGA test results and the long term effects of increased and cyclic loading. The three units prioritised for replacement in RP5 are Castlereagh IBTX1, Tandragee IBTX3 and Coolkeeragh IBTX1. During the review period the Utility Regulator requested NIE oil analysis results for consideration. The results provided clearly demonstrated an increasing trend of gases and other compounds consistent with advanced levels of insulation degradation. The difference in risk scoring between the disallowed Coolkeeragh transformer and the permitted Tandragee transformer is marginal (a difference of 2 in a risk score of 342). However although the Tandragee IBTX3 is the younger transformer, the levels of acetylene (C2H2) in the oil have continued to rise which indicates arcing within the main tank. At the time of the submission, the level of C2H2 had increased to 47ppm, a level which indicates a serious condition within the main transformer tank with the potential to cause catastrophic failure. The transformer has since been taken off the system due to high acetylene levels and may not return to service. The tap changer selectors associated with the Coolkeeragh IBTX1 are also continuing to display an increasing gas trend, due to age related degradation. The Coolkeeragh transformer is 4 yrs older and has a higher consequence of failure as its loss would seriously reduce the security of supply to the north west of the province, particularly in the future with high levels of wind generation coming on line. The Draft Determination would impose an unacceptable level of operational risk and perhaps safety risk on NIE.

13 275kV/110kV Transformer Replacement

Additional information provided	Information included in response to Draft Determination. Details of issues that limit options for deferral of investment.
SKM Response to NIE T+D	Allowance based on SKM modelling.
UReg View	SKM modelling shows that the proposed volume of work falls within that indicated as representing reasonable provisions given the age and type of equipment involved. All locations to be identified by NIE as part of the new reporting systems.
Deliverables	Allowances premised on replacement of 2, 275/110kV transformers

Final Determination	**£6,850,847.24**	Including consultancy costs of	**£197,847.74**
Fund **Fund 1**			

Project 14 110/33kV Transformers Replacement

NIE Request	£10,693,232
Project Description	Replacement of eight age expired poor condition 110/33kV transmission transformers at located at Ballymena, Donegall, Enniskillen and Knock Main substations. These transformers were installed during the early 1960s and 1970s.
Project Justification Satement	There are seventy-two 110/33kV transmission transformers located at 32 transmission substations. These assets are major, high risk, high cost items with associated auxiliary systems including transformer cooling plant, control and protection equipment and battery and charger equipment. Ongoing condition assessment of these assets has highlighted eight units and their associated auxiliary equipment that are in need of replacement. This programme of replacement will minimise the risk of in-service failure of these assets which would have very serious implications for supply availability over the wider network.
Draft Determination	£5,025,819
NIE Response to Draft Determination	NIE Strategy Paper B2 - 110/33kV Transformers, outlines the need to replace aged 110/33kV transformers within RP5 based on their condition and known degradation, based on test results. The least risk option for NIE is to replace ten aged transformers, based on their poor condition but it is proposed to change only eight of these ten transformers and to manage the risk of retaining the other two units on the system for a further five years. This strategy would require the purchase of one strategic spare unit and to increase the level of condition monitoring combined with a more intensive programme of maintenance. Apart from the safety risks of the strategy proposed by the Utility Regulator, it is unrealistic to move transformers of this size, age and condition twice and expect them to operate satisfactorily thereafter. In addition, due to the different types of transformers it would be extremely difficult to install a recovered transformer on another site whilst maintaining safety clearances and oil containment facilities. As the transformers have been highlighted for replacement on condition, they are unfit for reuse otherwise they would not be considered for replacement in the first instance. Permitting assets to run to failure, as is being suggested for this category, could leave NIE in breach of Licence Standards and legislation, as such failures could be catastrophic in nature and result in injury to staff, contractors or members of the public and extensive damage to the local environment. Customers could also be severely inconvenienced. NIE has experience of the catastrophic failure of major transformers and the consequences could not be deemed acceptable as part of a responsible asset management strategy. Such events are difficult to accept when they are unexpected and would be totally unacceptable as the inevitable outcome of a defined strategy. Again the Utility Regulator should not consider that it can impose such direct and unacceptable safety and operational risks on NIE.
Additional information provided	Information included in response to Draft Determination. Cost breakdown and number of units replaced during RP4.
SKM Response to NIE T+D	Allowance based on SKM modelling.

14 110/33kV Transformers Replacement

UReg View	All locations to be identified by NIE as part of the new reporting systems.
Deliverables	Allowances premised on replacement of 2, 110kV transformers.

Final Determination	**£3,446,977.19**	Including consultancy costs of	**£71,977.19**
Fund	**Fund 1**		

Project 15 22kV Reactor replacement

NIE Request	£3,669,880
Project Description	Replacement of age expired poor condition 22kV reactors, which are located at Castlereagh, Kells and Tandragee 275/110kV substations. These reactor transformers were manufactured during the 1960s and early 1970s. In addition, one unit will be purchased to provide spares coverage.
Project Justification Satement	There are seven 22kV transmission reactor transformers located at four transmission substations. The reactor transformers are connected to the tertiary winding of a number of 275/110kV transformers to provide reactive power compensation. Ongoing condition assessment of these assets has highlighted four units and their associated auxiliary equipment that are in need of replacement. This programme of replacement will minimise the risk of in-service failure of these assets, which would have very serious implications for voltage control on the network.
Draft Determination	£2,275,326
NIE Response to Draft Determination	The same safety arguments that were made for 110/33kV transformers failing in service can be made for reactors, as can the argument regarding their successful movement as a strategic spare. The same unacceptable risks are associated with the Utility Regulator's draft proposals.
Additional information provided	Information included in response to Draft Determination. Copies of latest oil sample results.
SKM Response to NIE T+D	Allowance based on SKM modelling.
UReg View	All locations to be identified by NIE as part of the new reporting systems.
Deliverables	Allowances premised on replacement of 1, 22kV reactor

Final Determination **£296,161.25** Including consultancy costs of **£10,948.70**

Fund **Fund 1**

Project 16 Transmission Transformer Refurbishment

NIE Request	£1,152,000
Project Description	Replacement and refurbishment of defective transformer and disconnector components.
Project Justification Satement	This project covers the replacement and refurbishment of defective transformer and disconnector components which are not otherwise catered for in the asset replacement programme. There is also a requirement for strategic spares and on-line monitoring equipment to facilitate the ongoing reliable operation of aged and poor condition equipment. Ongoing condition assessment of transmission assets has highlighted the need to carry out minor type refurbishment works associated with particular items of equipment e.g. 275kV and 110kV bushings, 275kV disconnectors, cooler replacement and painting. This programme of replacement and refurbishment will extend the overall asset life and minimise the risk of in-service failure of these assets, which would have very serious implications for the wider network.
Draft Determination	£380,160
NIE Response to Draft Determination	The proposed allowance in this category has been cut back to 33% based on there being 'no failure history or detail of condition assessment provided'. NIE Strategy Paper B6 – Transmission Transformer Refurbishment outlines a requirement to refurbish major transformer components as an alternative to full replacement of the unit, where the main transformer is in acceptable condition. This work is required in conjunction with the proposed replacement programmes to manage the ongoing risk associated with transformer assets. Strategy Paper B6, provided with NIE's submission, describes in detail the types of failure modes and potential failure modes which have historically affected NIE's transmission transformers and their ancillary systems. The paper further provides a list of those units in each category that currently require attention, based on a detailed assessment. Appendix 1 within the Strategy Paper describes those techniques used to make the condition assessments and further describes the historic failures and items with a recorded poor condition that have impacted this equipment in the past. The above assertion does not bear scrutiny nor is the proposed 66% allowance acceptable.
Additional information provided	Information included in response to Draft Determination. Panel of Inquiry reports. Details of types of plant at each location.
SKM Response to NIE T+D	Proposed expenditure captured in overall transmission transformer replacement projections.
UReg View	SKM's view is that this expenditure would be captured in the overall transmission transformer replacement projections.
Deliverables	Whilst no specific allowance identified, the funds identified for 110kV Plant Ancillaries and 275kv/110kV Transformer Replacement are assumed to also cover any necessary transmission transformer refurbishments.

16 Transmission Transformer Refurbishment

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 1**			

Project 17 275kV Overhead Line Asset Replacement

NIE Request	£8,971,405
Project Description	The NIE transmission network has a route length of 1324km and operates at two voltage levels. The 275kV network comprises of 400km route length of 275kV double tower circuit overhead line built in the 1960s and 1970s. A component replacement programme carried out during RP4 has addressed approximately 50% of the insulators on 275kV overhead lines. A prioritised replacement programme, based on recent condition information, will address 30% of the remaining insulators in RP5 and 20% in RP6 to complete the programme. Other components requiring replacement include steelwork members and foundations. Tower painting is also required.
Project Justification Satement	During both RP3 & RP4, several significant component failures have occurred highlighting the requirement for continued asset replacement during RP5 and RP6. When either fittings or conductors fail, it is likely to be a catastrophic event with possible loss of supply to a large number of customers and long repair times. Although the portion of the 275kV network which was refurbished in RP4 is now in satisfactory condition, the remainder is in poor condition. Tower steelwork is of particular concern with heavy levels of surface corrosion on a significant number of overhead line towers. The drivers for asset replacement on steel tower circuits therefore include network availability, reliability and public safety.
Draft Determination	£3,857,704
NIE Response to Draft Determination	The allowances appear arbitrary and are completely unsupported by analysis or justification. Since NIE is required to comply with statutory obligations and to live with the level of risk it decides is manageable, and based on its own detailed knowledge of assets and the various detailed condition information available to it, NIE completely rejects the Utility Regulator's forecast of the costs required to keep these assets serviceable.
Additional information provided	Information included in response to Draft Determination. Condition data.
SKM Response to NIE T+D	Allowance based on SKM modelling. Total amount reduced to adjust for inefficient indirect costs.
UReg View	SKM's view is that NIE proposals for this expenditure are in line with appropriate age/condition related replacemen forecasts for these asset types. All locations to be identified by NIE as part of the new reporting systems.
Deliverables	RP5 Deliverables; Suspension Insulators(Towers) - 556 Tension Insulators(Towers) - 130 Spacers(Spans) - 686

17 275kV Overhead Line Asset Replacement

Tower Painting(Towers) - 297
Colour & No. Plates(Towers) - 343
Foundation Assessment(Towers) - 343
Condition Assessment(Towers) - 594
Vegetation - NA

Final Determination	**£8,738,148.47**	Including consultancy costs of	**£0.00**
Fund	**Fund 1**		

Project 18 Coolkeeragh - Magherafelt 275kV Overhead Line Conductor Replacement

NIE Request	£15,000,000
Project Description	The project is to replace 55km of conductor on both circuits on the Coolkeeragh–Magherafelt 275kV line. During RP5 it is proposed to deliver 55km of re-conductoring.
Project Justification Satement	Recent failures have highlighted the onset of age-related wear in some critical components on the Coolkeeragh – Magherafelt double circuit overhead line. The most recent failure resulted in the loss of supply to more than 44,000 customers in the North-West area for a period in excess of 2 hours. An investigation into this failure concluded that the overall remaining life expectancy of the conductor on this line is less than 5 years. Based on the recent failures on the Coolkeeragh–Magherafelt 275kV line, the strategic importance of this line and the conclusive results drawn from the expert opinion sought at the time of the failures, it is essential to commence conductor replacement during RP5. A tender enquiry document is currently being prepared in order to determine the optimum conductor design. The scope of this document also includes provision for initiatives which will reduce the susceptibility of this line to conductor galloping and ice-accretion. Given the length of time required to complete this project and the potential impact on network availability, it is planned to phase this project over RP5 & RP6.

Draft Determination	£0
NIE Response to Draft Determination	The Utility Regulator has indicated a 0% allowance but has noted that this asset replacement project will be moved to Fund 3.
Additional information provided	A detailed paper covering the preliminary work for this proejct is due soon

SKM Response to NIE T+D	Allowance based on SKM modelling**.**
UReg View	Moved to fund 3 as need is clear but scope is uncertain. Capacity of the circuits to be determined by RIDP.
Deliverables	N/A moved to fund 3

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund	**Fund 3**		

Project 19 110kV Overhead Line Asset Replacement

NIE Request	£9,421,468
Project Description	The NIE transmission network has a route length of 1324km and operates at two voltage levels. The 110kV network comprises of 924km route length. This is made up of 348km of double tower circuit overhead line and 576km route length of single circuit overhead pole line mainly of portal construction although there is some single pole construction. A component replacement programme carried out during RP3 & RP4 has addressed approximately 75% of the 110kV suspension insulators on tower circuits. A prioritised replacement programme, based on recent condition information, will address the remainder of these insulators during RP5. Other components requiring replacement include pole replacement, steelwork members and foundations. Tower painting is also required.
Project Justification Satement	The majority of towers were constructed between the 1940s and the late 1970s with the majority of wood pole lines erected in the 1950s up to the late 1970s. A sizeable portion of the 110kV network is now in excess of 50 years old and some asset replacement has already occurred. The 110kV network, like the 275kV which has already been refurbished, is in satisfactory condition while the remainder is in poor condition. Tower steelwork is of particular concern with heavy levels of surface corrosion on a significant number of towers and with some towers now requiring complete replacement. Pole replacement is also an area for concern with 50% of the asset base being over 50 years old and the number of decayed poles already identified exceeding 15% of the total population. The drivers for asset replacement on steel tower circuits therefore include network availability, reliability and public safety.
Draft Determination	£4,993,378
NIE Response to Draft Determination	The proposed allowance implies that the Utility Regulator considers it has better knowledge of NIE's assets however the allowances appear arbitrary and are completely unsupported by analysis or justification. Since NIE is required to comply with statutory obligations and to live with the level of risk it decides is manageable, and based on its own knowledge of assets and the various detailed condition information available to it, NIE completely rejects the Utility Regulator's prognosis of the costs required to keep these assets serviceable. The 110kV conductor replacement was for the Dungannon – Drumnakelly circuit (Bonds Bridge – Drumnakelly section). This circuit is key to the reliable export of renewable power from the west of the province but the conductor is in extremely poor condition.
Additional information provided	Information included in response to Draft Determination. Asset condition data. Amount spent during RP4.
SKM Response to NIE T+D	Allowance based on SKM modelling. Total amount reduced to adjust for inefficient indirect costs.

19 110kV Overhead Line Asset Replacement

UReg View	SKM's view is that NIE proposals for this expenditure are in line with appropriate age/condition related replacemen forecasts for these asset types. All locations to be identified by NIE as part of the new reporting systems.
Deliverables	RP5 Deliverables; Conductor Replacement - 55 Suspension Insulators - 324 Tension Dampers - 102 Tension Insulators - 56 Tower Painting - 445 Pole Replacement - 800 Colour & No. Plates - 426 Foundation Assessment - 890 Condition Assessment - 890 Vegetation - NA

Final Determination	**£9,176,509.83**	Including consultancy costs of	**£0.00**
Fund **Fund 1**			

Project 20 Transmission Cables

NIE Request	£4,705,000
Project Description	The RP5 programme will include a combination of end to end circuit replacement and targeted refurbishment proposals. Refurbishment will include examination and repair of cable accessories including joints, sealing ends, hydraulic systems and outer PVC sheaths.
Project Justification Satement	It is necessary to carry refurbishment works to the cable tunnels at Ballylumford Power Station. Following a catastrophic failure of a 'stop joint' on the 110kV Castlereagh Main circuit, an investigation indicated that the entire circuit is in poor condition and requires replacement. Following the investigation of the Sheath Voltage Limiter(SVL) failures at Coolkeeragh there is now a requirement to replace all SVL's on the system. It is necessary to flush around 30km of our transmission fluid filled cable circuits and a number of sealing ends should be replaced with a modern equivalent. However, the worst performing 110kV fluid filled circuit which runs between Donegal Main and Whitla Street should be refurbished. There is a requirement for the refurbishment of the above ground cable hydraulic systems and 5 fluid filled transmission circuits have internal corrugated aluminium sheaths which are prone to corrosion failure. It is essential that these circuits are sheath tested and that a programme of sheath refurbishment is progressed.
Draft Determination	£1,552,650
NIE Response to Draft Determination	In paper E1 we have set out a strategic and modern approach to the management of our transmission cable infrastructure. Our expenditure requirements include replacement of the 110kV cables from Castlereagh to Rosebank (2.6km) estimated at £3m which has been justified on the grounds of condition and recent fault history. The benefits of this expenditure include management of unacceptable environmental and network reliability risks. Repair time for faults on 110kV cables can be of the order of 2 weeks using contractors to supply materials and carry out the work. There is a heightened risk of a fault on the second cable causing a loss of supply in East Belfast, including the new Bombardier factory, and North and Mid Down which would result in cyclic load shedding for a lengthy period of time. The remainder of our RP5 proposed expenditure was for essential asset life extension schemes including the refurbishment of cable tunnels at Ballylumford Power Station, fluid filled cable refurbishment (including hydraulic systems, fluid replacement and sheath renewal) along with the replacement of ancillary equipment and SVL's. The level of risk implied by the Utility Regulator proposed allowance is unacceptable.
Additional information provided	Information included in response to Draft Determination. Engineering report and results of fluid samples.
SKM Response to NIE T+D	Allowance based on SKM modelling.

20 Transmission Cables

UReg View	SKM's view is that NIE proposals for this expenditure are in line with appropriate age/condition related replacemen forecasts for these asset types. All locations to be identified by NIE as part of the new reporting systems.
Deliverables	RP5 Deliverables; Refurbishment of cable tunnels & installation of permanent pumps at Ballylum Power Station Replacement of 110kV double circuit (2.6km) (Castlereagh Main - Rosebank Main) Replacement of Sheath Voltage Limiters (All SVL's on the system) Refurbishment of double circuit Donegal Main – Whitla Street Replacement of existing mineral oil with modern DDB fluid (30km of fluid filled cables) Refurbishment of 110kV sealing ends Refurbishment of hydraulic ancillary systems Sheath testing programme and refurbishment (5 fluid filled transmission circuits)

Final Determination	**£4,705,000.00**	Including consultancy costs of	**£0.00**
Fund	**Fund 1**		

Project 21 Transmission Fault & Emergency

NIE Request	£4,135,799
Project Description	This investment provision is for capital work on plant and equipment following faults on the 275kV and 110kV networks.
Project Justification Satement	Each year, the transmission network experiences a number of overhead line, cable, plant and equipment failures and damage due to vandalism or damage due to inclement weather. The restoration of the network following such failures requires the repair and early replacement of assets. The investment level proposed for RP5 reflects RP4 expenditure level outturn for post fault repairs and replacement on transmission plant and circuits.
Draft Determination	£4,135,799
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Allowance based on SKM modelling. Total amount reduced to adjust for inefficient indirect costs.
UReg View	Included in the overall "pot" for works with no measurable output. The amount reflects the outturn for RP4, however with increased spend on both planned programmes, there is potential for this to reduce in RP6.
Deliverables	N/A

Final Determination **£4,082,034.00** Including consultancy costs of **£0.00**

Fund **Fund 1: Input driven item**

Project 22 Transmission Reactive

NIE Request	£722,524
Project Description	The Investment plan includes a category of expenditure which is reactive to unplanned events or is as a result of unanticipated defects or failures which subsequently drives follow up programmes of refurbishment or replacement. It is required to be delivered in addition to the existing planned work programmes.
Project Justification Satement	This reactive investment can either; • result in a new programme of work on assets not previously identified for investment during the period; • relate to assets which have failed early; • result in an interim refurbishment programme until a full replacement programme address the requirements in full; or The investment level proposed for RP5 reflects RP4 level outturn experience on a range of reactive investments including voltage transformer failures, bushing failures and circuit breaker failures.
Draft Determination	£722,524
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Allowance based on SKM modelling. Total amount reduced to adjust for inefficient indirect costs.
UReg View	Included in the overall "pot" for works with no measurable output. The amount reflects the outturn for RP4.
Deliverables	Included in the "pot" without any tangible outputs

Final Determination **£713,131.00** Including consultancy costs of **£0.00**

Fund **Fund 1: Input driven item**

Project 23 Transmission Design and Consultancy

NIE Request	£5,338,879
Project Description	This investment category covers for the direct cost associated with Transmission substation design and project management of capital projects and for certain projects, the use of specialised substation design consultancy.
Project Justification Satement	The majority of NIE's design capability is in-house and the cost of this in-house design and project management is collated and apportioned directly to the respective capital projects. In addition to NIE's internal design capability, NIE utilises the services of a number of specialised design consultants for production of high level and detailed substation designs. The investment level proposed for RP5 is based on current RP4 period outturn costs with allowance made for the increased capital programme on transmission substation projects in RP5.
Draft Determination	£0
NIE Response to Draft Determination	This investment category covers the direct cost associated with Transmission substation design and project management of capital projects and for certain projects, the use of specialised substation design consultancy. The majority of NIE's design capability is in-house and is apportioned directly to the respective capital projects. In addition to NIE's internal design capability, NIE utilises the services of a number of specialised design consultants for production of high level and detailed substation designs. The investment level proposed for RP5 is based on current RP4 period outturn costs with allowance made for the increased capital programme on transmission substation projects in RP5. The Utility Regulator has treated this category of expenditure along with the other overhead cost categories; • T41 Transmission Capitalised Overheads • D12 Distribution Overhead Lines Fixed Costs • D20 Distribution Design & Consultancy • D45 Distribution Capitalised Overheads The Utility Regulator has scaled back these indirect costs on a linear basis to its proposed level of capital expenditure required resulting in a determination of 35% of that requested. In Utility Regulator's calculations, it has made an error and has omitted to include one of the five classes of indirect costs - the costs associated with distribution design and project management. Indirect costs can be classified into the 3 separate categories (as defined in Ofgem's RIGs glossary20) • Closely Associated (Engineering) - these costs can be regarded as broadly linear with the quantum of work on the network i.e. the number and complexity of the projects and programmes of work. • Closely Associated (Other) - these costs are generally non- linear with some costs being generally fixed costs and others subject to step change depending on the size and scope of the work programme. • Business Support Costs - these costs are not directly or indirectly proportional to the level of investment or quantum of work on the network but support the networks business Given that indirects can be fixed, variable and step in nature, it is thus not appropriate for the Utility Regulator to apply a general linear scaling back based

	on the level of capital investment. NIE has calculated that based on the level of capex proposed by the Utility Regulator, the level of indirects in these categories should be more than double what has been proposed. It is not possible for NIE to plan, design and deliver the programme of works within this proposed allowance. Until a final level of capital investment has been agreed, NIE would request that the Utility Regulator revisits the issue of indirects to arrive at a sensible level based the specific nature of these costs.
Additional information provided	Information included in response to Draft Determination, Details of costs assocaited with each item in NIE's capex submission.

SKM Response to NIE T+D	Design and consultancy costs reallocated to individual projects.
UReg View	These costs have now been allocated to the individual projects where the costs would be incurred.
Deliverables	n/a

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 1**			

Project 24 Castlereagh and Tandragee Voltage Support

NIE Request	£17,950,000
Project Description	This project provides for a +/-50MVAr SVC (Statcom) and 2 x 25MVAr fixed units located at both Castlereagh and Tandragee together with controlling circuit breakers. The detailed specification and location of the equipment is subject to further detailed study.
Project Justification Satement	During times of high levels of generation at Ballylumford coupled with a credible contingency there are voltage regulation problems on the transmission network. This is due to the lack of reactive power available close to the main load block of Belfast city which has emerged following the closure of Belfast Power Station West. Other factors such as the connection of wind generation which creates a reactive power demand and the prospect that the Moyle Interconnector may be used for significant export of power also requires additional reactive compensation.
Draft Determination	£17,950,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	Project Need accepted however NIE still have not confirmed specification of equipment (STATCOM, SVC, MS) or indeed demonstrated that the correct balance between technology, capacity and location has been selected. NIE state that the costing presented is preliminary and further detailed studies are required. Recommendation is £0 allowance at present but further detailed studies should be conducted to bottom out project specification and detailed costs which can subsequently be recovered through Fund 3.
UReg View	Project is essential to maintain voltage stability in the greater Belfast area. NIE submissin is based on a report prepared prior to RP4. This needs to be updated to assess the scope of the scheme in the context of renewable electricity targets and current demand projections. Moved to fund 3 as the scope (and cost) of this project could change significantly.
Deliverables	Reallocated to fund 3 to allow NIE to properly define the scope of this critical project

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund	**Fund 3**		

Project 25 North West Reactive Compensation

NIE Request	£10,470,000
Project Description	This project is likely to include a block of fixed capacitors and a statcom / SVC plus at Coolkeeragh. Further studies are required to determine the exact configuration in terms of the proportion of dynamic and fixed support.
Project Justification Satement	The northwest of the province, with approximately 100,000 customers, is supplied by a double circuit 275kV tower line. Coolkeeragh Power Station 400MW CCGT also supplies power to the area and assists in supporting the voltage. During a loss of the 275kV tower line there are voltage regulation issues.
Draft Determination	£10,470,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	As per T24, the need for reactive compensation is accepted howeve based on the preliminary nature of the NIE costing plus uncertainities over the exact specification of the equipment (e.g. STATCOM, SVC, MSC) and timing, a £0 allowance is given. As with T2
UReg View	Project is essential to maintain voltage stability in the north west of NI. NIE submissin is based on a report prepared prior to RP4. This needs to be updated to assess the scope of the scheme in the context of renewable electricity targets, cancellation of the GUA for GT8 and current demand projections. Moved to fund 3 as the scope (and cost) of this project could change significantly.
Deliverables	Reallocated to fund 3 to allow NIE to properly define the scope of this critical project

Final Determination **£0.00** Including consultancy costs of **£0.00**

Fund **Fund 3**

Project 26 Ballylumford 110kV Switchboard Replacement

NIE Request	£15,270,000
Project Description	The project is to establish a new GIS switch house and a 40kA GIS double busbar switchboard with 12 outgoing circuits, a busbar section switch and a busbar coupler. The circuits connected to the existing double busbar will be diverted with cable to the new GIS switchboard. The existing switchboard will be decommissioned and removed. The existing switch house will also be removed.
Project Justification Satement	Under normal system configuration and high levels of generation the fault rating of the 110kV double busbar arrangement at Ballylumford can be exceeded. The system is operated with an abnormal configuration, usually a 275/110kV interbus transformer out of service, to manage the fault level to a safe level. The plant is now obsolete with spares limited and there have been some reliability issues. The building is also in poor condition. It has been recommended that due to health and safety concerns associated with in situ replacement, a new offsite switchboard and house is the only feasible option. The project must be started in RP4 and completed in the early years of RP5 due to the increase in fault level and condition based risks.
Draft Determination	£15,270,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	No comment required.
UReg View	Need established before Draft Determination
Deliverables	Swtchboard Replacement requiring the construction of a new GIS swithcbaord off site and transfer of cables to address Health and safety issues within on site refurbishment.

Final Determination **£15,270,000.00** Including consultancy costs of **£0.00**

Fund **Fund 1**

Project 27 Airport Road 110/33kV Substation

NIE Request	£3,980,000
Project Description	It is necessary to construct a new 110/33kV substation at Airport Road to supply increased demand in the Titanic Quarter and Harbour Estate. The transmission part of the project includes the installation of a pair of 90MVA 110/33kV transformers. These will be connected by re-energising the existing Rosebank Main to Dee Street 110kV tower line. This will involve establishing 110kV switchgear at Rosebank Main and a section of duplicate 110kV cable circuits from the Dee Street terminal tower to the new transformers.
Project Justification Satement	Significant demand growth has been forecast in the Belfast Harbour area due to the Titanic Quarter redevelopment, Bombardier and Belfast Harbour Commissioner proposals. The existing 33kV network in the area has been developed to its maximum potential. To cater for the level of demand growth it is necessary to further develop the network with the introduction of a new 110kV injection point.
Draft Determination	£1,990,000
NIE Response to Draft Determination	NIE does not accept that the Utility Regulator's proposals will lead to a satisfactory solution to the overloading issues that need to be addressed in the centre and east Belfast networks. Conversely, we believe they will lead to nugatory network expenditure and frustration for connection applicants. Taking the Utility Regulator's approach NIE would be required to continue adding demand until an application was received that had the potential to "break the camel's back". At that point, irrespective of the size of the demand that applicant would be required to fund all of the deep reinforcement. Clearly, unless the proposed increased demand was associated with a facility that was sufficiently significant to fund the reinforcement this will lead to a major impediment to development within the area. One also needs to be mindful that present connection charging arrangements require NIE to make connection offers that limit charges to one voltage level up. This means that customers that connect new or additional demand to the LV network cannot be charged for 33kV reinforcement. Similarly customers that connect new or additional demand to the 11kV network cannot be charged for transmission reinforcement. Smaller prospective customers may accept the connection charges associated with an LV connection and possibly even for 11kV assets needed to make the connection. However the consequences of this are that: • the network will become loaded above firm relatively quickly; and secondly • the distribution network configuration will develop in a piecemeal fashion that will be less than optimal when the network is reinforced by a new transmission substation in due course. NIE is strongly of the view that the proposed development is optimum and there is sufficient justification to proceed as soon as possible to address the various loading issues that are present in the network between Rosebank, Mountpottinger and Knock Main substations. However, if the Utility Regulator considers it necessary to allow connection applications to be made and to be addressed or to wait until system loading is unacceptably high with the consequential less than optimum distribution development, then we would suggest that this project be moved from Fund 2 to

	the NIE Pot 3 /Utility Regulator Fund 3 for specific approval by the Utility Regulator before proceeding.
Additional information provided	Information included in response to Draft Determination. Details of the the need for the scheme and the probable solution. Details of how NIE apply the connection charging policy to new or additional load.

SKM Response to NIE T+D	We are satisfied that the project will proceed in RP5, but there is a risk that the work will be completed in RP6 along with questions outstanding over customer funding contribution. RP5 allowance 50%.
UReg View	The timing of this project is uncertain, as is the amount that would be chargable to individual demand customers. We acknowledge that some work is likely to be required here towards the end of RP5 (probably carrying over into RP6). Half of the amount requested has been included for tariff purposes, with the option to log up or down based on the outturn. This is reflected in the distribution decision also.
Deliverables	110/33 kV 2x90MVA substation 2x150m 110 kV cable

Final Determination	**£2,066,392.00**	Including consultancy costs of	**£76,392.00**
Fund **Fund 2**			

Project 28 Ballylumford - Eden 110kV Circuit Upgrade

NIE Request	£2,310,000
Project Description	The project is to replace the existing conductor on the 15km Ballylumford – Eden double circuit tower line. The new conductor should be rated at least 150MVA.
Project Justification Satement	The above circuits are part of an important 110kV link from Ballylumford Power Station through to Castlereagh 275/110kV grid supply point. The Ballylumford – Eden circuits can be overloaded for the loss of the Hannahstown to Ballylumford / Moyle double circuit tower line in winter. The level of overload would cause the remaining circuit to trip and by removing a vital route for power flow into Belfast, contribute to the voltage regulation issues. There are other scenarios which cause this circuit to overload.
Draft Determination	£0
NIE Response to Draft Determination	Two projects are included to upgrade the conductor on the Ballylumford – Eden and Eden - Carnmoney circuits to cater for generation at Ballylumford and the operation of the Moyle Interconnector. NIE license standards are deterministic. The adoption of a probabilistic standard is not possible in the short to medium term and NIE could not predict what impact the acceptance of such a standard might have on network investment needs or on network availability in the future. No other GB network operator has such a standard in place. Probabilistic considerations are built in to the existing standards and contingencies such as (n -1) and (n -2) etc. Are only considered if they are classed as credible contingencies. The most serious levels of overload are for the loss of two 275kV circuits (or one 275kV and one 110kV circuit) supplying Ballylumford. The theoretical probability of an n-m-t (a maintenance outage followed by trip) event in reasonable weather is extremely low. Statistically using typical data the probability of an ‘n-dct’ (loss of both circuits of a double circuit tower line) is also quite low. However this contingency occurred several times in a two day period in 2010. During this period three of the four 275kV circuits connecting Ballylumford Power Station were out of service due to the build up of wet snow and wind. Therefore as the event has occurred twice in the last two years, it is therefore a credible contingency. Also post the commissioning of Kilroot Power Station, there were n-dct events on both 275kV double circuit tower lines leaving the station due to salt pollution. A 2017 study, with the Ballylumford Phase 2 sets retired, examined the loading for the loss of the Hannahstown – Moyle / Ballylumford DCT in winter. The Ballylumford – Eden and Eden – Carnmoney circuits were loaded to 115% and 101% respectively. The operation of the reactive support at Castlereagh can also cause the overloads to get worse. Apart from the loss of two circuits it is also possible for the Ballylumford – Eden and Eden - Carnmoney circuits to be overloaded under n -1 conditions for all seasons. A sensitivity study based on a 2017 scenario, including the Phase 2 sets at Ballylumford retired and Moyle importing 300MW, a single circuit outage of one of the Ballylumford – Eden or Eden - Carnmoney causes the other to be overloaded. The level of loading ranges from 100% to 113%. Studies show that for an n-1 condition Ballylumford GD would have to constrained off and a 275/110kV IBTX operated open to safely remove the risk of overload. In autumn with Moyle importing just under 300MW the level of overload for a

	single circuit outage is 11% again preventing maintenance outage. Any fault outages would immediately result in overload requiring SONI to constrain generation at Ballylumford and or alter the flows on the Moyle Interconnector. Any increase in the export level of the interconnector with Scotland would require NIE to re-assess the levels of all potential overloads including those on the Ballylumford – Eden, Eden – Carnmoney and Carnmoney – Castlereagh circuits.
Additional information provided	Information included in response to Draft Determination. Details of correspondence with SONI regarding planning assumptions.

SKM Response to NIE T+D	Questions remain over the need for the project, particularly given confirmed decommissioning of the Ballylumford B generating units and the reduction in Moyle capacity. Additionally, although the line is fairly old, information provided by NIE suggests that it is in relatively good condition. Recommendation is zero allowance but logged up if credible outage conditions demonstrate project need and greater system risk than already managed.
UReg View	Need for increased capacity not established, especially in the light of potential reductions in the import/export capacity of Moyle. Asset replacement modelling did not demonstrate a need to replace this.
Deliverables	N/A

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 2**			

Project 29 Eden - Carnmoney 110kV Line Upgrade

NIE Request	£2,300,000
Project Description	The project is to uprate conductor to establish a rating above 150MVA.
Project Justification Satement	The above circuits are part of an important 110kV link from Ballylumford Power Station through to Castlereagh 275/110kV grid supply point. The Eden - Carnmoney A & B circuits have a relatively low rating of 69MVA in summer. The circuits can be overloaded for the loss of the Hannahstown to Ballylumford / Moyle double circuit tower line in winter. This level of overload could cause the remaining circuit to trip and by removing a vital route for power flow in Belfast contribute to the voltage regulation issues. There are other scenarios which cause this circuit to overload.
Draft Determination	£0
NIE Response to Draft Determination	Two projects are included to upgrade the conductor on the Ballylumford – Eden and Eden - Carnmoney circuits to cater for generation at Ballylumford and the operation of the Moyle Interconnector. NIE license standards are deterministic. The adoption of a probabilistic standard is not possible in the short to medium term and NIE could not predict what impact the acceptance of such a standard might have on network investment needs or on network availability in the future. No other GB network operator has such a standard in place. Probabilistic considerations are built in to the existing standards and contingencies such as (n -1) and (n -2) etc. are only considered if they are classed as credible contingencies. The most serious levels of overload are for the loss of two 275kV circuits (or one 275kV and one 110kV circuit) supplying Ballylumford. The theoretical probability of an n-m-t (a maintenance outage followed by trip) event in reasonable weather is extremely low. Statistically using typical data the probability of an ‘n-dct’ (loss of both circuits of a double circuit tower line) is also quite low. However this contingency occurred several times in a two day period in 2010. During this period three of the four 275kV circuits connecting Ballylumford Power Station were out of service due to the build up of wet snow and wind. Therefore as the event has occurred twice in the last two years, it is therefore a credible contingency. Also post the commissioning of Kilroot Power Station, there were n-dct events on both 275kV double circuit tower lines leaving the station due to salt pollution. A 2017 study, with the Ballylumford Phase 2 sets retired, examined the loading for the loss of the Hannahstown – Moyle / Ballylumford DCT in winter. The Ballylumford – Eden and Eden – Carnmoney circuits were loaded to 115% and 101% respectively. The operation of the reactive support at Castlereagh can also cause the overloads to get worse. Apart from the loss of two circuits it is also possible for the Ballylumford – Eden and Eden - Carnmoney circuits to be overloaded under n -1 conditions for all seasons. A sensitivity study based on a 2017 scenario, including the Phase 2 sets at Ballylumford retired and Moyle importing 300MW, a single circuit outage of one of the Ballylumford – Eden or Eden - Carnmoney causes the other to be overloaded. The level of loading ranges from 100% to 113%. Studies show that for an n-1 condition Ballylumford GD would have to constrained off and a 275/110kV IBTX operated open to safely remove the risk of overload. In autumn with Moyle importing just under 300MW the level of overload for a

	single circuit outage is 11% again preventing maintenance outage. Any fault outages would immediately result in overload requiring SONI to constrain generation at Ballylumford and or alter the flows on the Moyle Interconnector. Any increase in the export level of the interconnector with Scotland would require NIE to re-assess the levels of all potential overloads including those on the Ballylumford – Eden, Eden – Carnmoney and Carnmoney – Castlereagh circuits.
Additional information provided	Information included in response to Draft Determination. Details of correspondence with SONI regarding planning assumptions.

SKM Response to NIE T+D	Questions remain over the need for the project, particularly given confirmed decommissioning of the Ballylumford B generating units and the reduction in Moyle capacity. Additionally, although the line is fairly old, information provided by NIE suggests that it is in relatively good condition. Recommendation is zero allowance but logged up if credible outage conditions demonstrate project need and greater system risk than already managed.
UReg View	Need for increased capacity not established, especially in the light of potential reductions in the import/export capacity of Moyle. Asset replacement modelling did not demonstrate a need to replace this.
Deliverables	N/A

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 2**			

Project 30 Provision of a 4th transformer at Castlereagh 275/110kV Grid Substation

NIE Request	£2,169,000
Project Description	Castlereagh 275/110kV substation has three 275/110kV interbus transformers (IBTx), each rated at 240MVA. To increase the capacity of the substation to cater for exceptional events required by the applicable standards it is necessary to provide a fourth 240MVA transformer. The proposed 275/110kV transformer will be installed on a new base and connected via cables to the 275kV bay and 110kV busbars.
Project Justification Satement	Castlereagh 275/110kV grid supply point supplies seven 110/33kV substations. The areas supplied include the east and the central business districts of Belfast and Belfast Port. The substation also supplies the major towns and rural areas in mid and north Down. At the level of electricity demand, the licence standards require all supplies to be maintained for a programmed outage of one transformer followed by a forced outage of a second. The demand forecast shows that the installation of the fourth transformer is required during RP5.
Draft Determination	£0
NIE Response to Draft Determination	A decision was taken in 2008 to order a 4th transformer to be installed at Castlereagh. Castlereagh is expected to require a 4th transformer during RP5 in order to comply with Security standard P2/5. This is due to expected demand growth within the Belfast Harbour area. This project has already been started as part of the RP4 Extension. The transformer raft and a blast wall have been installed with the unit expected to arrive in June 2012. Demand growth has slowed, however it is still forecast that the transformer will be required in RP5 and NIE still believes the project should proceed early in RP5. It is planned to change out Transformer 1 due to its age and condition. The prior installation of Transformer 4 would ensure that supplies to Belfast will not be at risk during the 7 month outage period required to change Transformer 1.
Additional information provided	Information included in response to Draft Determination. Details of load growth (connected to Airport Rd) and progress to date.
SKM Response to NIE T+D	Need demonstrated and project costs and scope accepted. RP5 allowance 100%.
UReg View	SKM have reviewed the case of need for this project and are satisfied that it has been established. Some work included in RP4 extension.
Deliverables	275/110 kV 240 MVA transformer (plus short lengths of 275kV and 110kV cable for connections to existing 275 kV and 110 kV busbars).

Final Determination	**£2,220,887.70**	Including consultancy costs of	**£51,887.70**
Fund	**Fund 2**		

Project 31 Armagh Main 110/33kV Substation

NIE Request	£2,000,000
Project Description	A new 110/33kV substation is to be established at Armagh. Two 110kV double busbar bays at Tandragee Main and two 110kV overhead line circuits to Armagh will be required to provide supply to the new substation. The new 110/33kV substation will be located close to the existing Armagh Central 33/11kV substation. As part of the distribution element of the project, the 33kV network will be reconfigured around the new 110/33kV substation. The work in RP5 consists of pre-construction work including site procurement, preliminary civil works and overhead line route selection. The overhead line and substation construction works are planned for RP6.
Project Justification Satement	Drumnakelly Main 110/33kV substation supplies 46,000 customers in Craigavon, Portadown and Armagh city as well as the surrounding rural area. The substation currently has a demand of 106MVA against a rating of 111MVA. The 2010 demand forecast predicts that the demand will rise to almost 114MVA by 2016/17 and the substation firm capacity will be exceeded. The substation provides a supply via a 33kV network to a number of 33/11kV substations in and around Armagh city. This network is now overloaded under n-1 conditions and also has voltage problems.
Draft Determination	£0
NIE Response to Draft Determination	The NIE submission covered pre-construction costs only. The Utility Regulator's assessment has not recognised this. The Utility Regulator has ignored the fact that the establishment of a new overhead line 110/33kV substation at Armagh is not a project that can be completed quickly due to planning and consent issues. This project will take at least 6 years from the beginning of the pre-construction phase to project delivery. The refusal of a preconstruction allowance in RP5 means the project would not be delivered until after 2022. NIE has already stated that the 33kV network that supplies Armagh is currently subject to overfirm loading and voltage problems under single circuit outage conditions (n -1) and the above work is essential to provide load relief on the 33kV network also. The preparatory work cannot wait until RP6 and must be financed during RP5.
Additional information provided	Information included in response to Draft Determination. Cost breakdown.
SKM Response to NIE T+D	Table 2 of NIE's Transmission Network Annual Report 2011 states that for the loss of either 110/33 kV transformer at Drumnakelly Main the remaining transformer would be overloaded to 128% in winter. The new Armagh Main 110/33 kV substation will relieve Drumnakelly Main and address the voltage issues on the 33 kV network in the Armagh area (from the long 33 kV feeders that supply Armagh from Drumnakelly Main). RP5 allowance 100%
UReg View	NIE have demonstrated the need for this project. It is expected to carry over into RP6.

31 Armagh Main 110/33kV Substation

Deliverables	110/33 kV 2x90MVA substation 16.5 km 110 kV double circuit line

Final Determination	**£2,076,775.40**	Including consultancy costs of	**£76,775.40**
Fund	**Fund 2**		

Project 32 Dungannon Main 2nd 110/33kV Substation

NIE Request	£2,360,000
Project Description	The transmission element of the project is to install 2 additional 110/33kV transformers. The distribution part includes the installation of a new 8 panel 33kV switchboard. The five 33kV circuits north to Cookstown will be diverted into the new 33kV switchboard thus relieving the existing substation and providing additional security of supply.
Project Justification Satement	Dungannon Main 110/33kV bulk supply point (BSP) supplies almost 38,000 customers in the large mid Ulster towns of Dungannon and Cookstown 15km to the north. The 110/33kV substation supplies 14 individual 33/11kV substations three of which are dedicated for supply to important manufacturing and food industries. The BSP has 2 x 90MVA transformers and a matched 33kV switchboard. The demand on the substation is forecast to reach 105MVA by 2016/17. For a single circuit outage however the transformer would be loaded to its firm capacity of 117MVA (i.e. Its 30% cyclic overload rating) taking account of losses. A second issue at Dungannon Main is that for the loss of both transformers, for example a maintenance outage followed by a forced outage, there is insufficient capacity in the interconnected 33kV network to provide the minimum level of resupply required by the licence standards.
Draft Determination	£0
NIE Response to Draft Determination	NIE proposed the installation of a second 110/33kV substation at Dungannon Main to reduce transformer loading on the existing substation and also ensure that supplies to customers would be secured in accordance with the licence standards for the loss of two transformers. Normally the probability of a transformer failing during a maintenance outage, or two units in one substation failing at the same time, would be extremely low. However this is a credible contingency which NIE cannot ignore. During December 2011 there was a failure of a tap changer at Drumnakelly Main and the transformer was taken out of service for safety reasons. During this outage there was a serious leak on a 110kV bushing on the remaining transformer. This unit was kept in service however the leak could have resulted in a failure of the bushing and resulted in an n-2 scenario. Dungannon Main substation falls into category D of the NIE amended P2/5. The standard is based on the assumption that "consideration will be given to rota load shedding to reduce the effect of prolonged outages on consumers" and this would be problematical at Dungannon. There is insufficient capacity in the 33kV network to provide the minimum level of resupply required by Security of Supply Standard. Dungannon Main supplies a large geographic area that is constrained by the border with ROI to the south and Lough Neagh to the west. Due to the distance and boundaries, the scope for interconnection is very limited. An n-2 outage in this substation would result in a prolonged loss of supply over a very wide area which would be unacceptable. Both transformers were manufactured in 1974 and are now 38 years old; by the end of RP5 they will be 43 years old and they are very heavily loaded. In the event of a failure of one unit due to the loading there is a higher probability of failure of the second unit. The need for this investment has been established: • The transformers are old; • They are heavily loaded operating at their full rating, there is very little spare

	capacity; • Resupply cannot be provided in accordance with the security standard. The issues that are present create an unacceptable network risk that cannot be ignored.
Additional information provided	Information included in response to Draft Determination. Load data and details of the planning scenarios.

SKM Response to NIE T+D	This project is not justified under the P2/5 Security Standard. No evidence provided of poor voltages to compare against the voltage standards. RP5 allowance 0%.
UReg View	SKM do not believe that this is required to comply with P2/5.
Deliverables	N/A

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 2**			

Project 33 Castlereagh - Knock 110kV Partial Cable Replacement

NIE Request	£1,600,000
Project Description	The project is the partial replacement of 110kV duplicate cables from Castlereagh – Knock. In RP5 it is planned to replace the section from Castlereagh to the start of the Braniel Road, approximately 1.8km. This project could be combined with the similar scheme to replace the Castlereagh to Rosebank 110kV cables.
Project Justification Satement	The replacement of the above cables is required as the fault level now exceeds the through fault rating of the cables under certain circumstances. In the 45 years since these cable circuits were installed, the fault level has increased significantly due to the installation of additional generators, transformers, and circuits. There is now a risk that a fault coupled with a slow protection clearance could cause irreparable damage to the cables. This project is the replacement of the first section, 1.8km, from Castlereagh substation - Braniel Road. During RP5 it will also be necessary to replace a section close to Knock substation, as part of the project to replace the transformers at that site. In addition the Department of Regional Development Road Service have road development proposals along this route. Plans will not be put in place until further information and firm plans are in place from Road Service. For the above reasons and to spread the significant cost it is therefore planned to phase the replacement over two periods. To manage the risk during this period it is proposed to modify the protection on the circuits to minimise the risk of a slow protection clearance.
Draft Determination	£0
NIE Response to Draft Determination	NIE proposes to replace a section of the above duplicate 110kV circuit (from Castlereagh to Braniel Road) in RP5. The fault level at Castlereagh exceeds the 1 second rating of the above cables with the risk that a fault could result in the permanent damage of the entire cable from Castlereagh – Knock. There are also concerns that a fault could cause a catastrophic failure of the cable sealing ends. One of the reasons to replace the section from Castlereagh to Knock is that it would result in the replacement of the cable sealing ends at Castlereagh. NIE has a concern that in the event of a fault downstream these could fail catastrophically leading to a safety issue. This is an unacceptable risk which cannot be imposed on the company. The Utility Regulator has disallowed all the costs therefore NIE has no funding to provide the planned double main protection heightening the risks associated with the continued operation of this cable. This is unacceptable.
Additional information provided	Information included in response to Draft Determination. Details of fault ratings.
SKM Response to NIE T+D	The proposed protection scheme investment plus the investment in cable circuits is accepted. RP5 allowance 55%.
UReg View	Some of this scheme has been justified. Allowance of 55% plus consultancy costs.
Deliverables	Protection modifications (New Main Protection System to act as back-up to existing main protection). 2x1.8 km 110 kV cables

33 Castlereagh - Knock 110kV Partial Cable Replacement

Final Determination	**£924,165.15**	Including consultancy costs of	**£34,165.15**
Fund	**Fund 2**		

Project 34 Tandragee 275kV Substation 2nd Bus Coupler

NIE Request	£1,300,000
Project Description	A third protected zone is required for the 275kV busbars at Tandragee. It will be necessary to construct a second busbar coupler to achieve this. The project will include establishing foundations and structures to support extensions to the main busbars. A busbar coupler circuit breaker, current transformers and associated disconnectors will be established. It will also be necessary to establish a bus section switch on the main busbars and to install a new bus-zone protection scheme or to modify the existing one.
Project Justification Satement	Tandragee Main 275kV double busbar has three interbus transformers as required to supply the demand. The arrangement however only has two protected busbar sections. For any busbar outage it is possible that a fault on the remaining in service section could result in the loss of all 275/110kV transformers, the Tandragee - Louth interconnector, and the four 275kV circuits. Provision of this additional protected busbar section will provide greater operational flexibility for the system operator.

Draft Determination	£0
NIE Response to Draft Determination	Due to concerns raised by SONI regarding the design of the Tandragee 275kV double bus NIE included for the installation of a second busbar coupler. NIE has concerns at allowing the risk to exist for a further prolonged period of time and the risk of losing 3 interbus transformers remains regardless of whether the second N-S interconnector is in place. This is an unacceptable risk to NIE.
Additional information provided	Information included in response to Draft Determination. Paper clarifying need for the project.

SKM Response to NIE T+D	The need for this project is accepted. The second bus coupler is required to secure the demand on Tandragee, the Tandragee – Louth interconnector and the two DCCT lines from Tandragee to Tamnamore and Kilroot/Castlereagh.
UReg View	SKM have accepted the need for this project to secure flows on the existing North-South interconnector.
Deliverables	1x275 kV bus coupler circuit breaker and associated equipment. New bus-zone protection for the new CB.

Final Determination **£1,349,904.10** Including consultancy costs of **£49,904.10**

Fund **Fund 2**

Project 35 Ballylumford G5 & G6 Cable Replacement

NIE Request	£1,600,000
Project Description	The G5 and G6 generator cables run from the 275kV circuit breakers in the 275kV switch house to the generator transformer compounds. They are located in cable tunnels. The project will involve the disconnecting and removal of the existing fluid filled cables and the installation and connection of new XLPE replacement cables in the tunnels.
Project Justification Satement	In January 2003 the Ballylumford G4 generator transformer cable termination failed in service. The failure caused damage to adjacent cable terminations, the generator transformer bushings and earthing switch phase insulators. Some damage was also caused to the compound. As a result of condition assessment the G4 275kV cable was replaced. Generators G5 and G6 are supplied by similar 275kV cables and terminations. These cables were also technically assessed and whilst there was some degradation, at a lower level, this risk was considered manageable in the medium term through ongoing assessment and use of personnel exclusion zones. At the time of the fault on G4 cable, these generators were expected to retire in 2006 but are now not likely to retire before 2016, after which their future is linked to emissions policy. Recent partial discharge tests on the terminations at the G5 generator transformer have indicated partial discharge and heating identified by infra-red monitoring. The G5 cable also has considerable fluid leaks. It is not now considered sustainable to continue the regime of exclusion zones with condition assessment and it is therefore proposed that the cables for G5 and G6 must be replaced.
Draft Determination	£1,600,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	If Ballylumford generators G5 and G6 are to be decommissioned in 2016 due to emissions restrictions then replacing the 275 kV cables now seems expensive, particularly given that the project won't be completed until mid-2013 at the earliest at which point they will have less than 3 years to run. Recommendation is zero allowance and continuation of present operational restrictions and exclusion zone unless NIE can demonstrate that these mitigation measures (which they have implemented for nearly 10 years) are no longer effective in managing the risk.
UReg View	We do not consider this to be an efficent use of customers money given the short life remaining for these generating stations. Should further generation be developed on these sites then replacement cables would for part of the connection assets.
Deliverables	N/A

35 Ballylumford G5 & G6 Cable Replacement

Final Determination	**£0.00**	Including consultancy costs of	**£0.00**
Fund **Fund 1**			

Project 36 Belfast North Main 110/33kV Bulk Supply Substation

NIE Request	£680,000
Project Description	The project is to establish a new 110/33kV substation at Whitla Street. The overall project includes distribution and transmission elements. The distribution element includes the installation of a pair of new 33/6.6kV transformers on new bases, the demolition of the existing 6.6kV switch house (after its replacement as part of an RP4 project) and the construction of a new 33kV switch house and switchboard. The transmission element includes the installation of a pair of new 90MVA transformers connected by turning in the existing Donegall to Belfast Power Station West 110kV cable circuits. On completion this will allow work to begin on recovering the existing 110/33kV substation at Belfast Power Station West, which is in poor condition.
Project Justification Satement	This project is required due to the poor condition of the transformers and 33kV switchboard and building at the former Power Station West site. The location of the new 110/33kV substation at Whitla Street offers many advantages, in terms of proximity to the load and long term operation and maintenance costs over the existing site.

Draft Determination	£510,000
NIE Response to Draft Determination	The Utility Regulator has reduced the allowance against this project to £510k based on the understanding that the project has already started. Whilst the distribution element has started the transmission works will all be incurred in RP5. During the engagement process in January 2012 the Utility Regulator asked “what work has been done and how much will remain until RP5”. The Utility Regulator was advised that the carry over to RP5 would be £1.82m, following a general update of costs and scope changes accounting for a review of surge arrestor protection policy and obsolescence of essential protection relays. The UR has incorrectly disregarded these additional costs.
Additional information provided	Information included in response to Draft Determination

SKM Response to NIE T+D	The project was approved in RP4 and work has commenced with the 110/33 kV transformers already procured in RP4. In November 2011 a revised cost estimate based on a much more detailed review of the work required was produced by NIE increasing the budget to £1,785,057. NIAUR has allowed £510,000, the balance of the project transmission costs. It is considered that the project should be approved based on the revised cost estimate, but with the expenditure allowed in RP4 deducted from the revised estimate.
UReg View	Work has commenced on this project. Adjustment will be made to reeflect the amount spent durinh RP4 and RP4 extension. Allowance based on NIE's latest best estimate of RP5 costs.
Deliverables	110/33 kV 2x90 MVA substation. Turn in of 110 kV Feeders.

Final Determination	**£1,641,103.60**	Including consultancy costs of	**£26,103.60**
Fund	**Fund 2**		

Project 37 Hannahstown - Lisburn 110kV Overhead Line Upgrade

NIE Request	£800,000
Project Description	The project is to upgrade the conductor on the two 7km Hannahstown – Lisburn wood pole overhead lines. The new conductor should be rated at least 150MVA.
Project Justification Satement	The proposed 400kV north-south interconnector is planned to be in service by 2016, will increase the network transfer capability to circa 1000MVA. The rating of the Hannahstown – Lisburn circuits would be overloaded under these conditions. For several credible 275kV fault scenarios, the Hannahstown – Lisburn circuits can be significantly overloaded. Under these conditions the main 275kV power flow route from north to south is not available and higher power flows are forced onto the 110kV circuits. The worst case however is for a specific single circuit 275kV outage followed by a forced outage of one of the Hannahstown – Lisburn 110kV circuits with the other potentially overloaded. With the higher transfers expected with the new north south interconnector this overload can be severe.
Draft Determination	£0
NIE Response to Draft Determination	NIE would accept this approach
Additional information provided	none required - NIE accepted this as zero in their response to the draft determination
SKM Response to NIE T+D	NIE & NIAUR agreed this would be timed to link with N-S interconnector, i.e. In RP6
UReg View	Both NIE and Ureg accept that this upgrade is not required until the Tyrone Cavan Interconnector is commissioned. It has therefore been excluded from RP5.
Deliverables	------

Final Determination **£0.00** Including consultancy costs of **£0.00**

Fund **Fund 2**

Project 38	Cregagh 110kV Substation Isolators and Earth Switches
NIE Request	£400,000
Project Description	This project covers the replacement of the disconnectors, earth switches and associated support structures at Cregagh Main 110kV substation.
Project Justification Satement	The fault level at the Cregagh 'A' 110/33kV transformer at Cregagh Main significantly exceeds the rating of the earth switches and is within 12% of the rating of the main isolators. This is currently managed by installing additional portable earths but a permanent solution is required.
Draft Determination	£400,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	NIAUR approved. RP5 allowance 100%
UReg View	Need established before Draft Determination
Deliverables	Replacement of all 110kV isolators and earth switches all this location.
Final Determination	**£415,355.80** Including consultancy costs of **£15,355.80**
Fund	**Fund 2**

Project 39 Hannahstown & Kells 275kV Substation Sequence Switching Schemes

NIE Request	£210,000
Project Description	The project is to install sequence switching schemes at Hannahstown and Kells 275kV Substations. In the event of a line fault which also disconnects a transformer, the scheme will automatically isolate the line and restore the transformer to service. Equally for a transformer fault the scheme will isolate the transformer and restore the line. The project will mainly involve the installation of automation panels.
Project Justification Satement	The 275kV switchgear at Kells and Hannahstown is in a mesh configuration with two transformers, each coupled to an overhead line. This arrangement causes the loss of a transformer for a line fault until the line can be isolated and the mesh restored. Although less likely, a transformer fault also causes the associated line to trip. The transmission system was subjected to an extreme weather event on 30th and 31st March 2010 as a result of wet snow and winds which exposed the weakness of this configuration. During the storm there were multiple 275kV line trips. The lines associated with the two interbus transformers at Kells are the Ballylumford - Kells and Kilroot - Kells B circuits. These lines experienced multiple transient faults. On two occasions the faults occurred almost simultaneously so that for short periods both interbus transformers were disconnected. This caused overload alarms to be generated on the Kells - Coleraine 110kV circuit and low voltage alarms at the substations fed from Kells i.e. Glengormley Main, Antrim Main and Ballymena Main. Provision has been made for both schemes as a result of the recommendations of the joint NIE/SONI investigation into the March 2010 ice storm.
Draft Determination	£210,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination
SKM Response to NIE T+D	NIAUR approved. RP5 allowance 100%
UReg View	Need established before Draft Determination
Deliverables	Installation of sequence swithcing schemes at Hannashtown and Kells substation. This includes 2 Mincom P134 relays, associated Panel and Multicore cabling.
Final Determination	**£218,065.80** Including consultancy costs of **£8,065.80**
Fund	**Fund 2**

Project 40 ESQCR - Transmission

NIE Request	£2,000,000
Project Description	The Electricity, Safety, Quality and Continuity Regulations 2002 (ESQCR) came into force on 31st January 2003 in Great Britain and were further amended in 2006. They replaced the GB Electricity Supply Regulations. The regulations currently apply to public and private operators in England, Scotland and Wales and are about to be introduced in Northern Ireland. These regulations specify safety standards and are aimed at protecting the general public and customers from danger. In addition, ESQCR specify power quality and supply continuity requirements to ensure an efficient and economic electricity supply to consumers.
Project Justification Satement	On the introduction of ESQCR in GB, Network operators (NOs) were given a period of five years in which to carry out a formal risk assessment of their overhead line network and a period of up to ten years in which to carry out any remedial works although high risk sites are to be rectified as soon as is practicable. It is anticipated that similar regulations and timescales will apply in Northern Ireland. A new requirement is for network operators to establish a formal risk register of their assets. ESQCR also stipulates a range of specific requirements such as the position and insulation of lines and the provision of danger signs, anti-climbing devices and stay insulators. The primary drivers in this asset category are legislative changes.
Draft Determination	£0
NIE Response to Draft Determination	As detailed in paper F1, separate programmes for safety signs etc are required to ensure delivery within the timescales. Appendix 2 of strategy paper F1 details trial vegetation patrols, carried out in accordance with ETR132. These form the basis of the unit cost/km which contributes to the £1.5m submission for this area of work. The deliverable for vegetation is km of network compliant with ETR 132 and hence ESQCR.
Additional information provided	Information included in response to Draft Determination
SKM Response to NIE T+D	Costs included in within Fund 1 'Input driven pot'
UReg View	SKM have incldued the full costs of ESQCR complaince within the distribution project. We note that SKM have highlighted that the mitigation methods assumed by NIE in this submission were not all considered to be appropriate in GB, and in some cases lower cost solutions that delivered the same outcome were successfully adopted. Other approved works are expected to be to new ESQCR standards. Further surveys and risk assessments are funded by this allowance to ensure an appropriate level of allowance in RP6.
Deliverables	

40 ESQCR - Transmission

Final Determination	**£250,000.00**	Including consultancy costs of	**£0.00**
Fund	**Fund 1: Input driven item**		

Project 41 Transmission Capitalised Overheads

NIE Request	£3,627,000
Project Description	Allocation of overheads associated with cost areas and departments involved in the delivery of capital projects. The proportion of overheads capitalised is based on the activity levels within these areas between work which is capital in nature and that which is revenue in nature.
Project Justification Satement	International Accounting Standard 16 'Property, Plant and Equipment' (ISA 16) states that the cost of an asset will include any costs directly attributable to bringing the asset to the location and condition management. The overheads identified directly related to capital projects and therefore it is appropriate that these costs are capitalised.
Draft Determination	£0
NIE Response to Draft Determination	The Utility Regulator has treated this category of expenditure along with the other overhead cost categories; • T23 Transmission Design & Consultancy • D12 Distribution Overhead Lines Fixed Costs • D20 Distribution Design & Consultancy • D45 Distribution Capitalised Overheads The Utility Regulator has scaled back these indirect costs on a linear basis to its proposed level of capital expenditure resulting in a determination of 35% of that requested. This covers the allocation of overheads associated with cost areas and departments involved in the delivery of capital projects. The proportion of overheads capitalised is based on the activity levels within these areas between work which is capital in nature and that which is revenue in nature. International Accounting Standard 16 ‘Property, Plant and Equipment’ (IAS 16) states that the cost of an asset will include any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. The overheads identified directly relate to capital projects and therefore it is appropriate that these costs are capitalised. The following cost areas / departments have been identified as being involved in delivering the capital program and therefore it is appropriate that a proportion of the costs associated with these departments is capitalised. NIE Powerteam Managed Services / Supply Chain costs. The services provided come under the following main headings – Outage Management, Technical Engineers, Asset Solutions and Safety. Supply chain costs relate to the departments involved in the purchasing of materials & services and the stores and logistics functions. Connections department – work carried out by this department includes new connection work, which is capital in nature and recoverable alterations to connections which is treated as R&M. Networks department – work carried out by this department includes programmed planning / control, strategic supply chain, metering revenue, contract and asset management associated with both the capital and maintenance programmes. Technology department – work carried out by this department includes the introduction of new network IT systems which will enhance the efficiency of the business and the maintenance of existing network IT systems. The proportion of

	overheads which iscapitalised is based on the activity levels within the areas between capex and R&M. In the Utility Regulator's calculations, it has made an error and has omitted to include the one out of the five classes of indirect costs - the costs associated with distribution design and project management. Indirect costs can be classified into the 3 separate categories (as defined in Ofgem's RIGs glossary21) • Closely Associated (Engineering) - these costs can be regarded as broadly linear with the quantum of work on the network i.e. the number and complexity of the projects and programmes of work. • Closely Associated (Other) - these costs are generally non- linear with some costs being generally fixed costs and others subject to step change depending on the size and scope of the work programme. • Business Support Costs - these costs are not directly or indirectly proportional to the level of investment or quantum of work on the network but support the networks business Given that indirects can be fixed, variable and step in nature, it is thus not appropriate for the Utility Regulator to apply a general linear scaling back based on the level of capital investment. NIE has calculated that based on the level of capex proposed by the Utility Regulator, the level of indirects in these categories should be more than double what has been proposed. It is not possible for NIE to plan, design and deliver the programme of works within this proposed allowance. Until a final level of capital investment has been agreed, NIE would request that the Utility Regulator revisits the issue of indirects to arrive at a sensible level based on the specific nature of these costs.
Additional information provided	Information included in response to Draft Determination
SKM Response to NIE T+D	Capitalised Overheads apportioned based on total allowed Transmission LR & NLR expenditure divided by NIE requested Transmission LR & NLR expenditure (£125,169,720 + £4,293,809 + £1,045,020 = £130,508,549) then multiplied by 90% as a 10% reduction in indirect costs is required.
UReg View	A certain amount of overhead is required to deliver an efficient capital programme. Some of these costs are captured via what Ofgem refer to as "closely associated indirects" and some would be classed as business support costs. CEPA's benchmarking has highlighted that NIE's indirect costs are 10% higher than GB. SKM have therefore adjusted the amount added to the "pot" to account for the inefficiency and also the reduced programme.
Deliverables	None: allocated to the "pot" without tangible outputs.

Final Determination	**£1,857,054.52**	Including consultancy costs of	**£0.00**
Fund	**Fund 1: Input driven item**		

Project 42	Transmission Substation Flooding Enforcement
NIE Request	£618,000
Project Description	Programme to provide permanent protection to several Transmission substations that have been assessed as being at risk from flood events.
Project Justification Satement	This programme plans to address the risk posed by flooding to NIE's Transmission substations. Flood events in Great Britain and the heightened awareness of the effects of climate change have necessitated the need for this programme. All NIE Transmission substations were assessed during 2008 by NI Rivers Agency and Total Flood Solutions. It was concluded that two sites were at risk from a flood event which could require the substation to be de-energised for safety. The transmission substation flood enforcement programme will provide permanent protection for the main substation buildings, transformers and any external marshalling kiosks or protection/control cubicles.
Draft Determination	£618,000
NIE Response to Draft Determination	
Additional information provided	none requested - included in Draft Determination.
SKM Response to NIE T+D	NIAUR approved. RP5 allowance 100%
UReg View	Need established before Draft Determination
Deliverables	Flood protection works at the two substaions identified as being at risk.
Final Determination	**£641,724.00** Including consultancy costs of **£23,724.00**
Fund	**Fund 2**

Project 43 Real Price Effects

NIE Request	£0
Project Description	An allowance to adjust for the difference between the cost pressures on NIE T&D's capex programme and RPI
Project Justification Satement	Add to database by the Utility Regulator
Draft Determination	£0
NIE Response to Draft Determination	
Additional information provided	Utility regulator review of Ofgem approach, including parameters used to calcualte effect on GB companies
SKM Response to NIE T+D	n/a
UReg View	We have reviewed the approach taken by Ofgem to providing an allowance for real price effects. Our calculation is based on analysis by First Economics and the weighting applied to each cost type by Ofgem. All items have been backcast to 09/10 prices.
Deliverables	none

Final Determination **£200,000.00** Including consultancy costs of **£0.00**

Fund **Fund 1: Input driven item**