

Annex 2

Price Control for Northern Ireland's Gas Transmission Networks

GT17

**Final Determination
Replacement Expenditure
1 August 2017**



About the Utility Regulator

The Utility Regulator is the independent non-ministerial government department responsible for regulating Northern Ireland's electricity, gas, water and sewerage industries, to promote the short and long-term interests of consumers.

We are not a policy-making department of government, but we make sure that the energy and water utility industries in Northern Ireland are regulated and developed within ministerial policy as set out in our statutory duties.

We are governed by a Board of Directors and are accountable to the Northern Ireland Assembly through financial and annual reporting obligations.

We are based at Queens House in the centre of Belfast. The Chief Executive leads a management team of directors representing each of the key functional areas in the organisation: Corporate Affairs; Electricity; Gas; Retail and Social; and Water. The staff team includes economists, engineers, accountants, utility specialists, legal advisors and administration professionals.

Our Mission

Value and sustainability in energy and water.

Our Vision

We will make a difference for consumers by listening, innovating and leading.

Our Values

Be a best practice regulator: transparent, consistent, proportional, accountable, and targeted.

Be a united team.

Be collaborative and co-operative.

Be professional.

Listen and explain.

Make a difference.

Act with integrity.

Abstract

We are publishing the final determination for GT17 for the four high pressure gas conveyance licence holders in Northern Ireland; GNI (UK) Ltd, Premier Transmission Ltd (PTL), Belfast Gas Transmission Ltd (BGTL), and West Transmission Ltd (WTL) for the years from October 2017 to September 2022.

The price control sets out the amount the gas transmission companies will have to run their businesses and invest in the gas network. The key decisions for the companies are on operating expenditure, replacement expenditure and rate of return.

This annex focuses on decisions around replacement expenditure (repex) and the outputs expected as a result of the allowances.

Audience

Industry, consumers, network companies & statutory bodies.

Consumer Impact

The price control sets out the allowed transmission revenue for the holders of high pressure gas conveyance licences. The final determination in this document sets out the basis on which we have determined the allowed revenue with consideration of the business plans submitted by the licence holders and the responses received to the consultation on our draft determination.

The impact of implementing the business plans submitted by the companies would be an approximate £5 real terms uplift in the annual bill for domestic consumers. This compares to an approximate £2 increase in the final determination. The final determination therefore results in an approximate £3 saving per annum for domestic customers compared to the company submissions. For industrial and commercial customers, the savings arising from the final determination compared to the business plans will be higher.

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ACRONYMS AND GLOSSARY

AGI	Above Ground Installation
ARM	Asset Replacement Model
ARR	Asset Risk Register
BGTL	Belfast Gas Transmission Limited
BP	Business Plan
c	circa
C&I	Control and Instrumentation
Capex	Capital Expenditure
CCTV	Closed-circuit television
CoF	Consequence of Failure
CP	Cathodic Protection
CPNI	Centre for Protection of National Infrastructure
DCS	Distribution Control System
FSR	Functional Specification & Requirements
GB	Great Britain
GNI (UK)	TSO responsible for the North West and South North pipelines
GT17	This is the name given to the next price control for high pressure gas conveyance licence holders in Northern Ireland covering the years 2017-18 to 2021-22
HAZOP	Hazard and Operability Study
ISO	International Organisation for Standardisation
IT	Information Technology
KPI	Key Performance Indicator

LoF	Likelihood of Failure
m	Million
MEL	Mutual Energy Limited
MERC	Maintenance and Emergency Response Contractor
N/A	Not applicable
NI	Northern Ireland
NWP	North West Pipeline
Opex	Operating Expenditure
OR	Operational Requirement
PLC	Programmable Logic Controllers
PTL	Premier Transmission Limited
Repex	Replacement Expenditure
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SNP	South North Pipeline
TBD	To be defined
TR	Transformer Rectifier
TSOs	Transmission System Operators
UPS	Uninterruptible Power Supply
UR	Utility Regulator
WTL	West Transmission Limited

1 Background

Introduction

- 1.1 This annex details the considerations of the Utility Regulator (UR) in relation to replacement expenditure (repex) for GT17.
- 1.2 The concept of capital expenditure (capex) is only provided for in the WTL and GNI (UK) licences. These allowances are set outside the scope of the price control process.
- 1.3 Much of what might be described as capex in terms of accounting rules, we consider as being maintenance/repex. It does not add to the capacity of the existing pipeline network but rather replaces or upgrades existing equipment. We treat such spending in the same way as *controllable operating expenditure (opex)*.
- 1.4 The purpose of the repex analysis is to capture the larger (>£50k) ad hoc replacement projects. These projects have definable outputs which can be captured and measured as part of the GT17 reporting process. TSOs (Transmission System Operators) were however given the opportunity to submit lower value projects if they so wished.

Detailed Approach – UR Decisions

- 1.5 As part of their business plans, TSOs submitted a list of repex projects for which they sought an allowance. In considering each project we followed a two stage approach. In the case of GNI (UK), this submission focused on larger projects whilst MEL submitted a number of smaller projects as well as larger schemes.
- 1.6 In the first stage we determined whether or not the project should be carried out during the price control period. For projects that passed this first stage we then, in the second stage, considered what the appropriate allowance should be.
- 1.7 In making assessments of the efficient level of spend required, our consultants (Rune Associates) advised as to the reasonableness of costs. In order to reach a final determination, we have considered their views alongside:
 - a) TSO representations;
 - b) Internal engineering advice;
 - c) Experience from other utilities; and
 - d) Benchmarking (where possible).
- 1.8 TSOs have engaged with us since the draft determination was published. This annex provides details on the major repex projects, TSO views, Rune recommendations, final decisions and the resultant outputs.
- 1.9 We intend to incorporate the repex programme (costs and outputs) into the reporting requirements. TSOs will be obliged to report against cost/delivery and provide appropriate commentary. We will monitor and publish this information.
- 1.10 TSOs will have some flexibility in these allowances. If outputs are not required or other priorities arise, there is scope to reallocate funds. However, changes will need to be

justified upfront and a view will need to be taken by the UR on the reasonableness of the reallocation.

2 MEL Repex Programme

Introduction

- 2.1 Mutual Energy Limited (MEL) consists of three separate TSOs¹. Existing pipelines are around 18-21 years old with the new Gas to the West pipeline network currently under construction.
- 2.2 MEL has submitted repex projects for both PTL and BGTL. This chapter provides a summary of the requested projects, costs and allowances. A year-on-year breakdown of the allowances can be found in Appendix 1 of the GT17 final determination main document.

SCADA Refresh

- 2.3 SCADA (Supervisory control and data acquisition) is the IT (information technology) and telemetry which collects, monitors and controls the gas network. It is an essential element of running the gas assets as well other utilities. We treat this as repex in the price control as it is an atypical expenditure with a defined output.
- 2.4 MEL is proposing a SCADA hardware replacement in 2019-20 at a cost of c£0.8m. This is justified on the basis that a hardware refresh is normal every five years and was last undertaken in 2012-13. They are further proposing to move to a 'cloud-based' system which may provide potential benefits.
- 2.5 The TSO has a quote for £1.1m to deliver the cloud solution. They believe this implementation cost can be lowered by c30% based on reduced testing times. The value requested also corresponds with the cost of upgrade in 2012-13.
- 2.6 Some benefits of the new system are listed as follows:
- New hardware and services in minutes as opposed to months;
 - Automated builds, reducing mistakes and failures;
 - 'Pay as you go' model which can be turned off when not in use;
 - Cost transparency;
 - ISO (International Organisation for Standardisation) standards for data security;
 - Potential for savings if low use assets are decommissioned.
- 2.7 Our IT consultants (Gemserv) have considered the SCADA project. In their opinion a hardware refresh every five years is standard. The cost estimate is also accepted given quotes and previous work.
- 2.8 We note that the company plan to conduct a detailed risk assessment prior to any implementation of the *SCADA cloud*. A possibility exists for this to be treated as a 'relevant item' and allowance decided upon at a future date.
- 2.9 However, we accept that a refresh will be required in GT17 and the cost estimate seems in line with previous work. Consequently a full allowance has been provided and the SCADA refresh will form an output of the price control. No relevant item is therefore

¹ Premier Transmission Limited (PTL), Belfast Gas Transmission Limited (BGTL) and West Transmission Limited (WTL).

required in this case. The cost of this project has been allocated to PTL as per the original business plan.

- 2.10 We note that any investment decision regarding the SCADA refresh shall be made with consideration of a potential future implementation of a joint control room between the high pressure licence holders.

Boiler House Replacement

- 2.11 When gas pressures reduce, the temperature also falls. Heating is required at AGIs (Above Ground Installations) so that the gas enters the distribution network at an appropriate temperature.
- 2.12 MEL has requested c£0.9m for the replacement of the boiler systems at Knocknagoney and Larne. This includes not only the heating system but the entire boiler house. The Torytown site has already been replaced.
- 2.13 Justification for the project is based on a variety of factors including:
- a) The expected asset life of heating systems is 15-20 years old;
 - b) These assets are approaching 20 years old and might reasonably be expected to be replaced within the next five years;
 - c) Sub-contractor advised that boilers, control panels and pumps are now obsolete;
 - d) Houses may require reconfiguration if the intention is to replace the heating system within the existing building.
- 2.14 MEL advised that a temporary system would have been required at Torytown if the boilers were to be replaced in the original house. They estimated this cost to be greater than the differential for replacing the entire structure, which did not require a temporary solution. The same rationale is applied to the other AGIs.
- 2.15 Rune accepts the need for the work and justification of costs. However, they do expect procurement benefits given project scale and previous experience. As such, they are recommending that costs will be 7.5% lower.
- 2.16 We believe that the boiler need is established and required within the GT17 period. It is not entirely certain that the boiler house structures must be replaced. Experience at Torytown would suggest that the house was in good condition and design of new boilers may not require additional space.
- 2.17 However, the issue of temporary system costs may still exist. Our decision is therefore to allow the project and requested costs with a 7.5% procurement benefit reduction.
- 2.18 We consider this to be a reasonable position given that the Torytown project has been completed significantly under the expected cost in the business plan.

Ballylumford Water Bath Heater and Control System

- 2.19 PTL has network code obligations to provide gas at a certain pressure to the Ballylumford 'B' power station. The water bath heaters provide the requisite heat to allow pressure reduction.

- 2.20 The power station was expected to be closed by the end of 2015. However generation has continued and the future closure date is unsure. It may be the case that operation could run beyond 2020. MEL has requested c£0.9m to replace the heating system, install a new modular boiler and heat exchanger and change out the control system.
- 2.21 Need for the project is based on:
- a) The unreliability of the water bath heaters;
 - b) The fact that they have been operating outside the design envelope since 2002;
 - c) Age and obsolescence issues with the control system which led to a failure and temporary isolation of a heater.
- 2.22 Work is ongoing between MEL and their consultants around potential solutions. It may be possible to relocate the 'C' station offtake to a point upstream of the heaters so that the assets are operating within their design envelope. Consultants are also looking at the options around maintaining the current system in place. MEL estimates that this will cost at least £250k.
- 2.23 We accept that the need for some work has been identified. However, it may not be in gas consumers' best interests to replace entire assets if the station will be decommissioned in the price control period.
- 2.24 Relocating the 'C' station offtake would indicate that the up scaling elements may not be required. Furthermore, given uncertainty around both the TSO consultant's analysis and the future of the 'B' station, we think it prudent to disallow the majority of costs at this stage.
- 2.25 Allowance has been provided for the control system upgrade (£81k) which has already begun. MEL should continue to preserve the heaters via their maintenance budget. The water bath systems will however be treated as a 'relevant item'. This means that a decision on the asset replacement and allowance can be taken during the GT17 period when the status of the station becomes clearer.

Panel PLC Replacements

- 2.26 Programmable logic controllers (PLCs) collect and transfer data from sites to a central control room. This data is used to monitor asset health and safely operate the gas network. MEL wishes to replace PLCs at five sites for a total cost of c£0.6m.
- 2.27 MEL has evidenced the fact that:
- a) PLCs are 18-20 years old and certain components are no longer supported;
 - b) An external obsolescence report supports the replacement of the PLCs;
 - c) The project has been subject to the ARM (Asset Replacement Model) analysis;
 - d) Elements of the ARR (Asset Risk Register) score for the panel replacement are considered to be high risk.
- 2.28 Rune has advised that the need for the project exists. They do however suggest that procurement and scale benefits may be expected. An overall 7.5% reduction has been recommended.
- 2.29 Our view is that need for this project is well evidenced. This appears to be one of the few projects which have been subject to full ARM analysis. The findings were

demonstrated to Rune and an independent report supporting these conclusions has also been produced.

- 2.30 An example of the risk matrix scoring is provided below. This includes a LoF (Likelihood of Failure) and CoF (Consequence of Failure) score. The two scores are multiplied together to get a risk figure (out of 20).

Figure 1: Risk matrix and scoring for the Ballylumford panel risk

Asset Risk Matrix Score	LOF	COF	Score
PLC (processor and back up comms modules and PSU)	4	3	12
PLC I/O Cards incl PSU	4	3	12
PLC Flow Computer Comms	3	2	6
Flow Computer - Processor	3	3	9
Flow Computer - ADC	2	3	6
KF2	3	2	6
24V Power Supply	5	3	15
Distribution Board	1	3	3
Gas Chromatograph	3	2	6
Gas Chromatograph Controller	3	2	6
Eurotherm Temp Controller	3	2	6
Fibre optic Comms Modules	3	1	3
Panelviews	3	1	3
Isolators/barriers	5	1	5
Relays for meter control	2	3	6
Panel Cabinet	1	3	3

Source: MEL Business Plan, Chapter 7 – Asset Replacement

- 2.31 The final determination provides an allowance of c£0.5m for all five sites in question. The reduction represents the procurement benefits proposed by Rune which we have considered but found no reason to disagree with.

Fire Detection Systems - Kiosks

- 2.32 MEL has requested the installation of fire alarm systems at eight site kiosks. The cost is estimated at £215k. Alarms would be connected to the SCADA system to relay any issues back to the control room. Early response would help minimise on site damage if an issue occurred.
- 2.33 The need appears to be quite well established. The project is supported by a HAZOP (Hazard and Operability) study and insurance audit recommendations.
- 2.34 Rune acknowledges both the need for and benefit of such assets. They recommend the full allowance be provided with a 7.5% saving due to procurement and scale benefits.
- 2.35 We have accepted this view and provided an allowance of £0.2m including the procurement reduction. We have also re-profiled the expenditure so that more of the site alarms are installed earlier. We do not see good reason to postpone introduction of these alarms until the latter end of the price control.

Transformer Rectifiers

- 2.36 Cathodic protection (CP) is a technique used by pipeline operators to avoid corrosion of the pipelines. The *impressed current* CP system consists of sacrificial anode beds powered and monitored by various electronic components.
- 2.37 Transformer rectifiers (TRs) form part of the underground pipeline cathodic protection. They provide current to ground beds to help reduce corrosion. The business plan has provided for £151k to replace eight TRs at a cost of £19k per site. Need is based on the fact that existing TRs are 20 years old.
- 2.38 Rune is of the view that the need is based on rather limited recent experience. They do accept that such work is typically required but the cost per site is high compared to their experience in GB.
- 2.39 Whilst evidence of degradation has not been provided, we are of the opinion that this work might reasonably be expected in the price control period. GNI (UK) has separately assumed the life of these assets to typically be 15 years. This would suggest that the MEL replacement programme is required.
- 2.40 We have provided an allowance to replace all eight rectifiers, but at a reduced cost of £13k per site as per Rune recommendations which we have found no reason to disagree with. This provision is based on Rune experience in GB and gives a total allowance of £104k.

Lagging Replacement

- 2.41 MEL has requested £143k for thermal lagging removal, replacement and visual inspection. The lagging is required for metering pipework between the boiler house and heat exchanger. It ensures that metering accuracy is not affected by solar heat. Additionally it provides operational cost savings in the form of energy efficiency benefits.
- 2.42 The company has provided historic quotes at three sites to support their case for the cost submission. Rune advised that the proposals and inspections such as this are appropriate. They further consider the cost broadly reasonable.
- 2.43 Whilst we agree with Rune that the activity is required, it is not entirely clear how many sites are in view here. It is also unknown what the split is between lagging replacement (repex) and visual inspection (which should form part of normal maintenance). Furthermore, there appear to be resources allocated to this activity in 2016-17 for meter streams and heat exchangers on the BGTL network.
- 2.44 MEL has advised that the lagging typically only has a five year lifespan. As a consequence we might expect some repex in GT17. The final determination provides funding of £71k. This represents a 50% allowance.
- 2.45 Based on the historic quote figures, it does provide an allowance to remove and replace lagging at all four AGIs on the PTL and BGTL network. We consider the cost of visual inspection to be provided for under the maintenance allowance.

Replacement/Overhaul of Valves/Actuators

- 2.46 Valves regulate and control the flow of gas on the network. Actuators are devices used to open and close these valves. This project consists of two elements. The first part is the general replacement of valves and actuators on the network at a run rate of £33k per annum.
- 2.47 The second is replacement of three pneumatic actuators at block valves in Scotland. Cost per site is £48k and includes full replacement, site works and painting. Total funding requested is c£0.3m.
- 2.48 MEL has justified spend on the basis that engineering valves are showing signs of degradation. They further stated that it is their intention to establish a proper scheme of inspection for these assets.
- 2.49 The company noted that the pneumatic actuators are no longer operational and must be replaced. It is also stated that there has been no replacement of parts on these assets since installation in 1996.
- 2.50 Rune considers that there is minimal historical experience to supports forecast general costs of £33k per annum. They have recommended £13k per annum.
- 2.51 They do however consider the block valve work to be necessary and the cost to be reasonable, subject to a 5% scale benefit.
- 2.52 We agree with Rune that the general valve programme is not well evidenced. Given the lack of support and the fact that this should be a normal maintenance activity we are providing no allowance in repex.
- 2.53 Need for the block valve actuator replacement is better supported given age and obsolescence issues. The cost estimate also has merit based on the experience of the work at South Cairn.² We therefore support the replacement of the three actuators at the Rune recommended level of £46k per site.

UPS and Battery Chargers

- 2.54 Uninterruptible Power Supply (UPS) systems are common features of utility assets. They maintain power in the event of an electrical outage so that the plant can continue operation.
- 2.55 MEL has requested £128k to replace UPS systems at five sites and eight of the associated battery charger units. Need is based on a design life estimate of five years.
- 2.56 Rune advised that the proposals are appropriate. They recommend full scope and cost allowance with a 7.5% scale benefit.
- 2.57 We note that the design life seems on the low side, particularly given that GNI (UK) is working on a ten year assumption. However, little money has been spent on these assets in the last price control. We therefore accept the need and provide an allowance in line with Rune recommendations.

² A block valve actuator replacement has been undertaken at this site already.

Other Items

- 2.58 MEL has requested funding for a variety of other smaller projects. The evidence of both need and cost varies depending on the project in question.
- 2.59 The table below details these schemes, proposed cost and final determination. A brief explanation is further provided along with the rationale for the UR allowance.

Table 1: MEL other items projects³

Project	BP ⁴ Request (£m)	Final Determination (£m)
Civils Repairs at AGIs	0.1	0.0
Electrical Distribution Board Replacement	0.1	0.0
Generator Replacement	0.1	0.1
Gas Chromatograph Replacement	0.1	0.1
AGI Pipework Coating	0.1	0.1
Drawing Validation and Legacy Project	0.1	0.0
Scotland Security Works	0.0	0.0
Emergency Exit Gates & Paths	0.1	0.1
Below Ground Pits	0.1	0.1
Block Valve & Pig Trap Arrangement	0.0	0.0
Meter Replacement at Larne AGI	0.1	0.1
Pipework Coating at Larne AGI	0.0	0.0
Marker Buoys in Belfast Lough	0.0	0.0
Electrical - Incoming Supply and Cabinet	0.0	0.0
Total (Pre-efficiency)	0.9	0.6

Figures may not sum due to rounding

Civil Repairs

- 2.60 MEL has requested £102k to build a kiosk at South Cairn and undertake a roof replacement at Torytown. Both projects are scheduled to be completed in the final year of GT17.

³ Figures by TSO, project and year can be found in the appendices to the main determination document.

⁴ Business Plan.

2.61 We are inclined to defer this work given that need is uncertain and MEL has yet to complete a civil survey on asset condition. Rune is in agreement with no allowance.

Electrical Distribution Board Replacements

2.62 MEL has proposed to spend £65k on replacing four distribution boards in 2020-21. Need is based on useful life, though MEL is investigating extending use of the assets.

2.63 Rune has accepted the need for the work and the cost. However, they proposed to disallow one of the boards (Ballylumford) on the basis that money was allocated to this in 2016-17. We accept Rune's position and allow for three boards to be replaced at a cost of £48k.

Standby Generator Replacement

2.64 MEL has requested £114k to replace two standby generators. MEL justifies the project based on the fact that:

- Generators are installed since 2000, yet the asset life is typically 15 years;
- There is a legislative obligation as the single skin fuel tank is non-compliant;
- Cost of maintenance may be prohibitive.

2.65 Rune considers the cost to be high based on quotes for work and knowledge of GB comparators. We have considered this advice and will allow funding of £70k to replace both generators based on Rune recommendations.

Gas Chromatograph

2.66 MEL wants to replace the chromatograph at Ballylumford. Need is based on the age of the asset which is currently around 20 years old. In their business plan MEL initially proposed a value of £97k. However, the subsequent query process response suggest this figure is significantly underestimated given the costs of similar work at Maydown.

2.67 Rune accepts the need but has reduced the allowance to £90k based on GB comparisons. We agree with this proposal. Evidence of a higher allowance is not supported by the cost proposed for similar work by GNI (UK).

AGI Pipework Coating

2.68 MEL typically paints the pipework at AGIs every five years. The business plan has assumed three (Ballylumford, South Cairn and Larne) will be done in GT17 at a cost of £126k. We have allowed this work and the proposed costs. Rune also considers the work necessary.

Drawing Validation & Scotland Security Works

2.69 MEL has asked for funding (£103k) to finalise these two projects which started in GT12. Rune recognises the validity of the work and proposes an allowance.

2.70 Whilst we agree with Rune on project validity, the query process would suggest that the telemetry on Scottish AGIs appears to be largely complete. The scope of the drawing validation project is also uncertain and may be picked up in other work streams. We have therefore decided not to make an allowance.

Emergency Gates and Paths

2.71 Similar to GNI (UK), MEL is proposing safety work at AGIs consisting of new egress routes and pedestrian exclusion gates. Cost is estimated at £108k for five sites.

- 2.72 Rune accepts the proposal but considers a significant scale benefit could be achieved from wider procurement options. Rune further sees merit in accelerating this programme of work for the expected safety benefit.
- 2.73 We agree with Rune's proposal of £85k at £17k per site. We further see merit in accelerating the programme and have provided allowance in the first three years of the price control.

Below Ground Pits

- 2.74 The MERC (Maintenance and Emergency Response Contractor) identified on site inspection that below ground pits may be an issue. This is due to the fact that they are subject to flooding and instrumentation is at risk.
- 2.75 MEL has proposed to spend £71k to resolve the issue for three such pits. Rune accepts the safety driver but has reduced the allowance to £60k to account for scale benefits. We agree with the Rune suggestion.

Block Valve and PIG Trap Arrangement

- 2.76 MEL has asked for £27k to conduct a feasibility study to investigate the arrangements at the Middle Division block valve. The study will investigate the potential problems and solutions if an emergency occurs at Ballylumford.
- 2.77 Rune considers this to be an opex activity. We agree with this conclusion and consider that the study should be undertaken as part of the already funded emergency activities.

Meter Replacement at Larne

- 2.78 The meter at Larne has been operating outside the design envelop as flow demand is less than expected. The company has provided a feasibility study supporting this work which has already begun. We accept this project and provide full allowance of £56k in line with Rune and TSO recommendations.

Marker Buoys in Belfast Lough

- 2.79 The company proposes to put buoys in place to avoid near misses with the shipping industry. Action was identified as necessary by the Belfast Harbour Master and a sub-sea expert. We accept this rationale and provide full allowance.
- 2.80 The project is estimated to cost £22k in GT17. Rune are fully supportive of this project.

Electrical Equipment

- 2.81 MEL has requested £27k to replace sundry electrical items. There is little evidence to support this investment so no provision has been made.

Summary

- 2.82 Overall we are providing an allowance of £557k for these projects against a request of £915k. Outputs are defined for each investment.

Potential Maintenance

- 2.83 Around £0.5m is covered by the remaining projects. These include:
- Bolt and flange replacements;
 - Communications equipment;

- Minor civil repairs;
 - Instrumentation replacements;
 - Pipeline markers;
 - Wind waterline inspections and work; and
 - Other small projects.
- 2.84 Rune has considered the individual merits of each project and proposed an allowance of £380k. Whilst some of these projects are better supported than others, we would make the following observations:
- a) A number of the projects have little or no supporting evidence of need or cost;
 - b) Most of the projects relate to annual expenditure and ongoing activity;
 - c) A large number of the cost lines are very low with no discernible outputs.
- 2.85 The purpose of the repex table was to identify relatively large atypical expenditure so that activities could be reviewed based on their merit. It is our view that these projects appear to relate to ongoing maintenance activity.
- 2.86 Adequate provision has been made within the the relevant 'Pipeline Inspection', 'Emergency Response', 'Routine' and 'Other Unplanned Cost' maintenance lines. As such, no further provision is made in the final determination.

Allowances

- 2.87 MEL repex allowance for the final determination is as follows:

Table 2: MEL repex allowance

Project	BP Request (£m)	Draft Determination (£m)	Final Determination (£m)
SCADA Refresh	0.8	-	0.8
Boiler house Replacement	0.9	0.9	0.9
Ballylumford Water Bath Heaters	0.9	0.0	0.1
C&I Panel PLC Replacement	0.6	0.5	0.5
Fire Detection System - Kiosks	0.2	0.0	0.2
Transformer Replacement	0.2	0.0	0.1
Lagging Replacement	0.1	0.0	0.1
Replacement / Overhaul of Valves	0.3	0.0	0.1
UPS & UPS Battery Replacement	0.1	0.1	0.1
Other Items	0.9	0.4	0.6
Potential Maintenance Activities	0.6		0.0
Total (Pre-efficiency)	5.7	1.9	3.5
Efficiency Challenge	-	0.1	0.1
Total (Post-efficiency)	5.7	1.9	3.4

Figures may not sum due to rounding

- 2.88 The allowance represents a step change from the draft determination figure of £1.9m (pre-efficiency). This is principally due to more engagement with the TSO and the inclusion of the SCADA project. The Ballylumford water bath system remains a 'relevant item'. This project should be discussed with the UR before any decision is taken on further investment.
- 2.89 Against the repex allowance the following outputs are anticipated:

Table 3: MEL repex outputs

Project	MEL GT17 Output
SCADA Refresh	<ul style="list-style-type: none"> • SCADA hardware refresh
Boiler house Replacement	<ul style="list-style-type: none"> • Knocknagoney boiler house replacement • Larne boiler house replacement
Ballylumford Water Bath Heaters	<ul style="list-style-type: none"> • Control system replacement • Water baths TBD (to be defined) when further information is available
C&I Panel PLC Replacement	<ul style="list-style-type: none"> • PLC panel replacement at Ballylumford, South Cairn, Knocknagoney, Middle Division and Torytown
Fire Detection System - Kiosks	<ul style="list-style-type: none"> • Fire detection systems at eight sites
Transformer Replacement	<ul style="list-style-type: none"> • Eight transformer rectifier (TR) replacements
Lagging Replacement	<ul style="list-style-type: none"> • Lagging at Ballylumford, Torytown, Knocknagoney and Larne
Replacement / Overhaul of Valves	<ul style="list-style-type: none"> • Valve actuator replacement and painting at three block valves in Scotland
UPS & UPS Battery Replacement	<ul style="list-style-type: none"> • Five UPS system replacements • Eight battery charger units
Other Items	<ul style="list-style-type: none"> • Three electrical distribution board change outs at South Cairn, Knocknagoney and Torytown • Two standby generator replacements • Gas chromatograph at Ballylumford • AGI pipework coating at three sites • Emergency paths and gates at five sites • Civil works at three below ground pits • Meter replacement at Larne AGI • Marker buoys in Belfast Lough

3 GNI (UK) Repex Programme

Introduction

- 3.1 The GNI (UK) gas network consists of:
- North West Pipeline (NWP) and spurs;
 - South North Pipeline (SNP) and spurs; and
 - Kernan to Derryhale spur.
- 3.2 The Kernan spur was constructed in 2010. The NWP and SNP is 13 and 11 years old respectively, and will be within the 15-20 years old category by the end of the GT17 price control.
- 3.3 Spend on replacement projects was very limited in GT12 given the age of the network. However, this is expected to change in GT17 as any number of relevant pipeline or AGI assets only have a design life of 10-15 years.
- 3.4 This chapter provides a summary of the requested projects, costs and allowances. A year-on-year breakdown of the allowances can be found in Appendix 1 of the GT17 final determination main document.

Cathodic Protection

- 3.5 Cathodic protection (CP) is a technique used by pipeline operators to avoid corrosion of the pipelines. The *impressed current* CP system consists of sacrificial anode beds powered and monitored by various electronic components.
- 3.6 GNI (UK) has requested £247k over the price control period to replace various electrical parts necessary to maintain the CP system. Expenditure is due to be incurred in every year of the price control.
- 3.7 The business plan provides for replacement of various assets. This includes:
- a) Three transformer rectifiers;
 - b) 10 anode ground beds (approx. 30% of the population);
 - c) 10 reference electrodes; and
 - d) 50 test posts.
- 3.8 The company stated that whilst the assets are presently providing an appropriate level of protection, their effectiveness is likely to be exhausted within the GT17 period. This is based on both asset life assumptions and condition data.
- 3.9 The matrix below illustrates the inherent risk (I) at the end of the price control with no repex. It also shows the residual risk (R1) if the business plan option is undertaken.
- 3.10 GNI (UK) has estimated this as a medium risk, even if the project is completed. This is reflective of the fact that corrosion of the pipeline is an asset critical issue.

Figure 2: Risk matrix and scoring for the CP system

Asset Criticality	5	R1	I			
	4					
	3					
	2					
	1					
		1	2	3	4	5
		Asset Health				

RI 1	Risk Index 1	Very Low
RI 2	Risk Index 2	Low
RI 3	Risk Index 3	Medium
RI 4	Risk Index 4	High
RI 5	Risk Index 5	Very High

Source: GNI (UK) response to Query 21

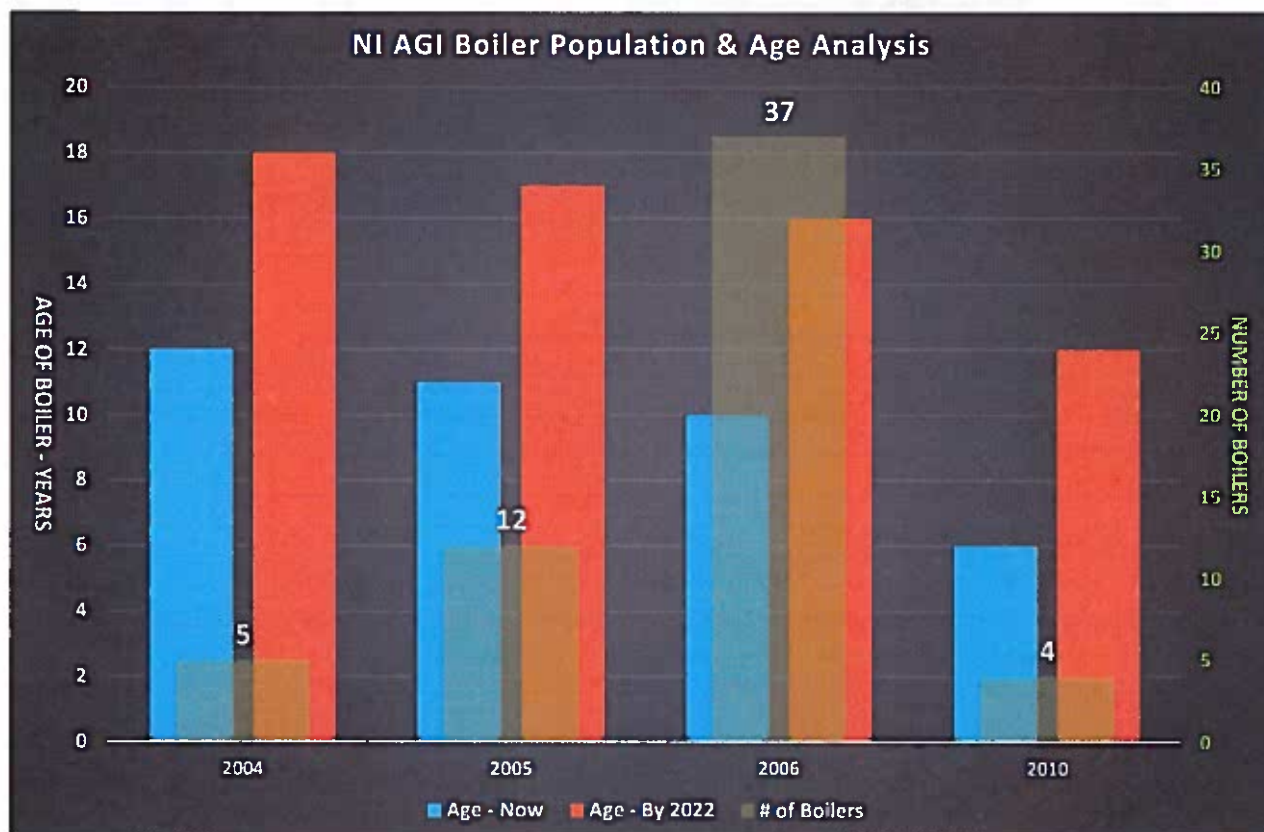
- 3.11 Rune accepts the need for refurbishment, but notes that the evidence of timing is limited. They suggest a reduction in the allowance to £200k. This reflects their experience of unit costs for similar replacements in GB.
- 3.12 We agree that a need exists. However, some concern remains that the TSO is replacing several assets before their estimated design life e.g. ground beds typically last 25 years.
- 3.13 Given that design life is variable and depends on ground conditions, we have determined that £200k is the appropriate allowance. This reflects the risk involved and the need to maintain asset health in this area.

Boiler Refurbishment

- 3.14 GNI (UK) has requested c£2m to replace 50% (27) of their current boiler stock in the Northern Ireland network. The boilers are used to maintain gas temperature at pressure reduction stations to ensure the integrity of the distribution system.
- 3.15 The company has advised that:
 - a) Average life expectancy of boilers is around 10 years and majority of their boilers will be 16 years or older by the end of GT17;
 - b) Expectation is that 50% will fail within the price control period;

- c) The company has experienced 24 corrective maintenance jobs in 2015, five of which relate to failed components;
 - d) Timing of replacement reflects similar experience in Rol and Scotland.
- 3.16 The business plan suggested that the company would replace half the stock of boilers, starting with those most at risk. Parts and spares would then be harvested to maintain the remaining systems. The age of the boilers is the defining aspect of need in the business plan.

Figure 3: Boiler age profile



Source: GNI (UK) response to Query 22

- 3.17 Rune considers that the rationale for replacing 27 units in GT17 is unsubstantiated, though replacement will be required at some point. GNI (UK) also recognises that there is some uncertainty as to how many replacements will be required. They propose an allowance for 10 boilers with a 5% procurement benefit.
- 3.18 The company submitted significant detail on this issue. This included their internal Functional Specification and Requirements (FSR) document on maintaining heating systems. This provided insight and assurance into the rigour of their asset management system. However, it did not support the case for large scale replacement.
- 3.19 Our view is based on a number of factors including:

- a) Number and cost of corrective maintenance jobs is very low at present i.e. 24 jobs at £12k per annum;
 - b) Assets are significantly outperforming the KPI (key performance indicator) targets for alarms and follow on work orders as specified in the FSR;
 - c) MEL is only now at 18-20 years old replacing boiler systems;
 - d) Risk is significantly mitigated by the fact that standby boilers are in place and mobile units are also available.
- 3.20 The TSO have informed us that typically AGIs would have 3-5 boilers at each site. Generally speaking an entire group would be replaced rather than individual boilers.
- 3.21 We accept the Rune view of an allowance for 10 boilers at £700k. This will facilitate the TSO replacing the two/three of the most at risk systems. We have however amended the timing of the spent to be mid-price control period as condition data suggests that the need is not immediate.
- 3.22 We would expect a much more comprehensive asset condition database to be in place for the next price control. This should allow for a better understanding of the need around replacing these assets in future.

Control System Upgrades

- 3.23 The distribution control system (DCS) electronically controls operation of the entire plant. This includes key safety monitoring systems such as fire suppression and gas detection. GNI (UK) has requested £114k to replace the DCS at Gormanston.
- 3.24 Need is based on the fact that:
- Components typically have a 10-15 year lifespan and the current system will be 16 years old by end of the GT17 period;
 - System is now obsolete and spares are not available for purchase;
 - Vendor will withdraw support entirely in 2017.
- 3.25 Rune considers that both need and cost is broadly reasonable. We agree with this conclusion. Our decision is further supported by the fact that the TSO has already undertaken similar work at Carrick and Coolkeeragh AGIs without funding in place. This indicates a level of need and urgency around the project. Full allowance has therefore been provided.

Instrumentation Refurbishment

- 3.26 AGIs which do not have control systems have remote telemetry units or RTUs (Remote Terminal Units). These assets monitor station performance and feed data back to the control room. GNI (UK) has asked for funding to replace four of the seven units on the NWP. The company has stated that the RTUs are no longer supported and spares are not available.
- 3.27 GNI (UK) has further requested funds to replace the uninterruptible power supply (UPS) systems at two sites. The total proposal is for c£0.3m to substitute:
- Four RTUs;
 - Two UPS systems; and
 - Eight battery charger units.

- 3.28 Rune considers that need on the basis of age and obsolescence is broadly reasonable. They also hold the same view of the funding requested. We are largely in agreement with this opinion.
- 3.29 The age estimates of UPS and battery chargers (10-15 years) seem reasonable. The reliability of these assets beyond 10 years old can be uncertain. This has also been the experience observed in other utilities.
- 3.30 The case for RTU replacement is less certain. Typically they will have an asset life of 15-20 years. GNI (UK)'s own risk assessment indicates that these are robust assets in good condition. As such, the risk is considered low even if replacement is not undertaken in GT17.
- 3.31 We do however recognise the difficulty of maintaining equipment which is not supported. Our decision is therefore to provide full allowance in the expectation that spares are harvested to maintain other assets.
- 3.32 Given the early RTU replacement, we would not expect to fund such activity in the next price control unless sufficient condition data can be provided to substantiate any future work.

AGI Metering Recalibration

- 3.33 The requirement to maintain metering accuracy is detailed in the TSO transportation network code. Typically the inaccuracy cannot be greater than 1.1% within a specified flow rate at entry/exit points.
- 3.34 GNI (UK) has requested just over £0.5m to address this issue. Specifically they wish to:
- a) Recalibrate 10 turbine meters (required every 10-12 years);
 - b) Recalibrate four ultrasonic meters (required every 6-8 years);
 - c) Replace 12 flow computers; and
 - d) Replace two gas chromatographs.
- 3.35 The need is based on the fact that no recalibration has been done to date and some meters are now outside their certification period. This does not mean they are inaccurate but it is difficult to test this whilst the meters are in situ. GNI (UK) plans to take the meters offline and have them calibrated by specialists.
- 3.36 Rune considers the work to be necessary, though the timing could be accelerated. They further think the cost might be lower given the scale of the work involved. They therefore recommend a 5% reduction.
- 3.37 We agree with this assessment. An allowance of £492k has been provided to undertake all the work in question.

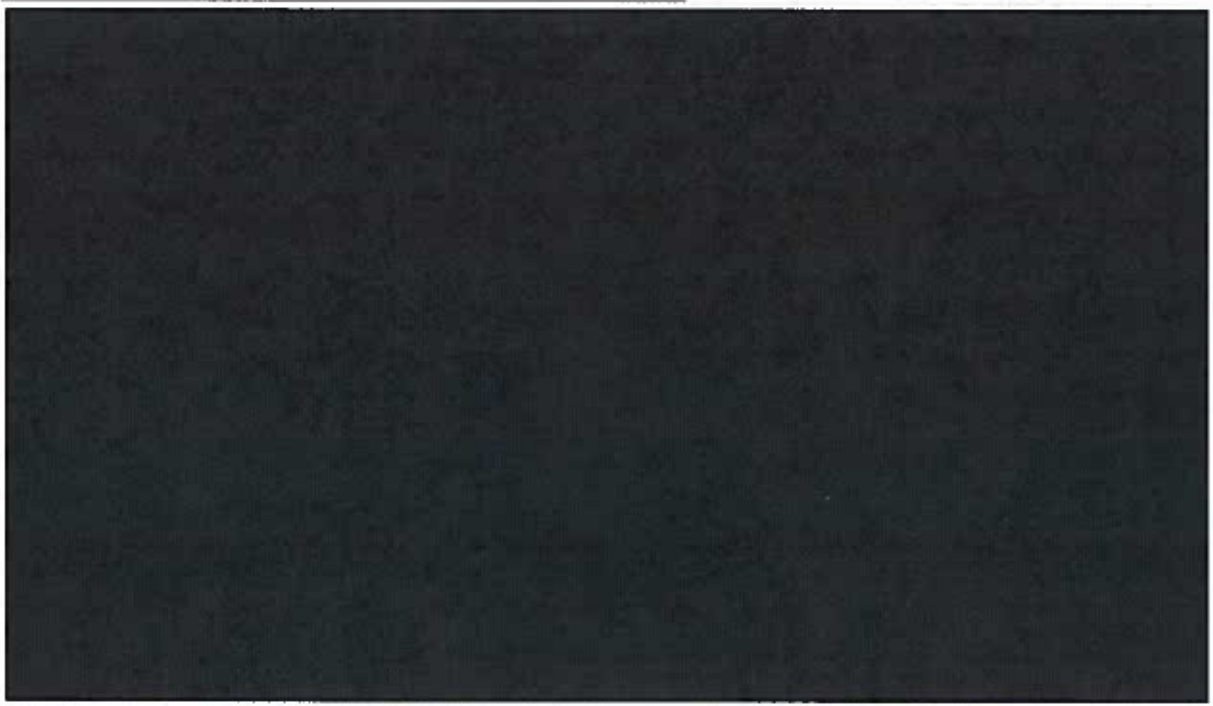
Gormanston Phase II Metering

- 3.38 GNI (UK) has requested c£0.9m⁵ to update the metering facilities at Gormanston to be in line with those at Twynholm. In order to provide the same level of accuracy, the company plans to undertake work consisting of the following:
- a) Replace ultrasonic meters;
 - b) Install a new chromatograph with housing;
 - c) Substitute flow straighteners and insulation;
 - d) Replace secondary instrumentation and two flow computers.
- 3.39 The company has submitted a supporting audit from an independent consultant. The audit findings do suggest that accuracy may be an issue.
- 3.40 Rune has advised that a beneficial case for the project has not been made. This is due to the fact that gas is unlikely to flow through the AGI, except in emergency situations. We are also of this view so have decided to provide no allowance.
- 3.41 Furthermore, it would seem that some of the metering problems result from design issues. We are of the opinion that the gas consumers should not have to pay twice because of this. In the event of future gas flows on the SNP, GNI (UK) should remedy this issue without imposing cost on the NI (Northern Ireland) consumer.

AGI Security

- 3.42 GNI (UK) has requested c£1.1m to upgrade security [REDACTED]
- [REDACTED]
- [REDACTED]

⁵ The company also requested a lower value project (c£350k) to recalibrate meters should the main proposals be rejected. We have made no allowance for either given the low flow rates.



[Redacted text block consisting of multiple lines of blacked-out content]

3.48 We do not provide an allowance at this stage. However, this project will be considered a 'relevant item'. This means that the TSO can submit a cost proposal within the GT17 period which the UR will consider. There is however no guarantee of funding.

Cyber Security Upgrades

3.49 The business plan submission provided for £155k to upgrade IT for the threat of cyber security attacks from malware and hackers. [REDACTED]

3.50 [REDACTED] we fund this activity in full.

Emergency Escapes

3.51 GNI (UK) has requested funding (£641k [REDACTED])

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3.55 [REDACTED]
[REDACTED] Funding of £380k has therefore been provided.

Remote Line Valve Analysis

3.56 The final project requested was £27k to conduct a feasibility study into the required level of remote valves. Rune considers the cost to be high. They do however think this should be completed as part of GNI (UK)'s (opex funded) periodic emergency planning considerations.

3.57 We have considered the Rune recommendations and found no reason to disagree with them. We have therefore decided to make no repex allowance for this work.

Allowances

3.58 GNI (UK) repex for the final determination is as follows:

Table 4: GNI (UK) repex allowance⁶

Project	BP Request (£m)	Draft Determination (£m)	Final Determination (£m)
Cathodic Protection	0.2	0.2	0.2
Boiler Refurbishment	2.0	0.0	0.7
Control System Upgrade	0.1	0.0	0.1
Instrumentation Refurbishment	0.3	0.0	0.3
Metering Recalibration	0.5	0.0	0.5
Gormanston P2 Metering	0.9	0.0	0.0
AGI Security	1.1	0.0	0.0
Cyber Security Upgrade	0.2	0.2	0.2
Emergency Escapes	0.6	0.0	0.4
Remote Line Valve Actuation	0.0	0.0	0.0
Total (Pre-efficiency)	5.9	0.4	2.3
Efficiency Challenge	-	0.0	0.1
Total (Post-efficiency)	5.9	0.4	2.3

Figures may not sum due to rounding

- 3.59 The allowance represents a step change from the draft determination allowance of £0.4m. This reflects the additional detail provided by GNI (UK) and an enhanced understanding of the network replacement priorities by the UR.
- 3.60 Allowance of roughly £0.5m per annum has been made. The reasons for the difference between this amount and the business plan request are:
- Allowance for replacement of 10 rather than the requested 27 boilers during the price control period, accounting for uncertainties regarding the timing of the need for such replacement;
 - No allowance for Gormanston phase 2 metering as no beneficial case for the project has been made;
 - No allowance for the AGI security project at this stage but consideration as 'relevant item'; and
 - Reduced allowance for emergency escapes project, accounting for cost saving potentials.
- 3.61 For the investment of roughly £0.5m per annum we expect a number of defined outputs which will be monitored throughout the GT17 period. The outputs are as follows:

⁶ Breakdown by project and year can be found in the appendices to the main determination document.

Table 5: GNI (UK) repex outputs

Project	GNI (UK) - GT17 Output
Cathodic Protection	<ul style="list-style-type: none"> • Three transformer rectifier replacements • 10 anode ground beds • 10 reference electrodes • 50 test posts
Boiler Refurbishment	<ul style="list-style-type: none"> • Replacement of 10 AGI boilers
Control System Upgrade	<ul style="list-style-type: none"> • New distribution control system (DCS) at Gormanston
Instrumentation Refurbishment	<ul style="list-style-type: none"> • Four remote telemetry units (RTUs) • Two UPS systems • Eight battery charger units
Metering Recalibration	<ul style="list-style-type: none"> • Recalibration of 10 turbine meters • Recalibration of four ultrasonic meters • Replace 12 flow computers • Replace two gas chromatographs
Gormanston P2 Metering	<ul style="list-style-type: none"> • N/A
AGI Security	<ul style="list-style-type: none"> • [REDACTED]
Cyber Security Upgrade	<ul style="list-style-type: none"> • [REDACTED] • [REDACTED]
Emergency Escapes	<ul style="list-style-type: none"> • [REDACTED]
Remote Line Valve Actuation	<ul style="list-style-type: none"> • N/A

