Annex – Recompression Engineering Justification Report

September 2020

As part of the NGGT Draft Determination Response

nationalgrid

Executive Summary

This Engineering Justification Paper provides additional context to the funding request for additional recompression equipment for use across the National Transmission System (NTS) as part of National Grid Gas Transmission's (NGGT) response to the Ofgem RIIO-2 draft determinations.

Various NTS maintenance and/or modification activities necessitate isolation, full depressurisation, venting and purging of pipelines or Above Ground Installations (AGI's) to safely access the system. Pipelines Maintenance Centre (PMC) currently operate 3 recompression units (RCUs) which move gas from the isolated pipeline section, into an adjacent one. The RCUs can operate from maximum NTS pressure (94Barg) down to approximately 7Barg and the remaining gas is vented to atmosphere. Up to 300 tonnes of Methane can be released in a single planned venting activity, and approximately 500-2000 tonnes CH4 per annum is avoidable in RIIO-T2. Investment in Low Pressure RCUs would enable NGGT to recompress down below 1Barg, eliminating the vast majority of venting volumes and driving consumer value through reduction in wasted gas and emissions avoidance.

Following an update of cost estimates, NGGT are requesting [redacted] included in December plan. We still believe two new units are the best outcome for consumers and the environment. To fund a Low-Pressure (LP) only option, which is currently Ofgem's minded-to position, we estimate will cost [redacted] more than originally allowed. We do not believe this option represents best value for consumers as;

- This comes with additional risk of synchronising with the existing units. We anticipate that this will extend the programme by an extra year, meaning one year of lower environmental benefits.
- There is a risk of continued running of old recompression units (RCU1&2) that are at risk of critical failure should the LP option be Ofgem's final preferred option. Within the CBA it is difficult to quantify the associated cost, however there are qualitative factors around maintenance, risk to programme and the inherent benefits of newer equipment.
- We are confident that having two new units, one Low-Pressure and one High-Pressure, means that the units can run in synergy.
- The extra year of environmental benefit gives a positive CBA outcome, as indicated in the accompanying CBA.

Key points:

- National Grid's stakeholders have outlined that all emissions, whether they are greenhouse gases or emissions that have the potential to adversely affect local air quality, should be treated the same and managed to reduce their impact on the environment as cost effectively as possible.

- Methane is a potent Greenhouse Gas (GHG) with a Global Warming Potential (GWP) for a 100- year time horizon of 28 times (IPPC AR5 report1) that of Carbon Dioxide (CO2), it is a significant contributor to climate change.
- Changes in public perception and industry focus over the last 12 months, has promoted methane emissions up the agenda of environmental focus. Work by various stakeholders within the industry have outlined a roadmap to identifying methane emissions, set targets and develop technologies and initiatives to reduce emissions.
- This paper proposes the purchase of two recompression units to help reduce NGGT's methane emissions and work towards net zero targets during RIIO-2 and beyond. The proposed expenditure for RIIO-2 would be approximately [redacted].
- As the providence of Net Zero has grown, it is now paramount that all vented emissions are avoided or mitigated, promoting the need for efficient high- and low-pressure recompression equipment. Net Zero, coupled with the works packages within RIIO2, RIIO3 and beyond, mean there is more need to undertake complete isolation of a pipeline, quickly and safely, whilst minimising venting emissions. Current legacy equipment does not minimise emissions as much as is possible. The addition of new high- and low-pressure equipment will ensure commitments to Net Zero are met in the most efficient approach currently available.
- The expenditure will deliver financial returns through traditional return on investment measures (methane saved through reducing venting pressures/quantities), whilst also meeting NGG commitments in the Environment Action Plan (EAP) (CO2e reduction targets) and the expectations of stakeholders. A non-traded carbon price for methane emissions applied to the investment shortens the return period significantly from a financial perspective.

[1] Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Working Group I, The Physical Science Basis, Chapter 8: Anthropogenic and Natural Radiative Forcing

Table of Contents

Name of Project	*Methane recompression*		
Scheme Reference	*N/A*		
Primary Investment Driver	*Environmental*		
Project Initiation Year	FY22		
Project Close Out Year	N/A – project will be ongoing, encompassed into BAU		
Total Installed Cost Estimate (£)	[redacted]		
Cost Estimate Accuracy (%)	>95% - based on quotes from 2017 for FY18/19 prices		
Project Spend to date (£)	*£0*		
Current Project Stage Gate	N/A – equipment purchase		
Reporting Table Ref	*3.01*		
Outputs included in RIIO-T1 Business Plan	*No*		
Spend apportionment	**RIIO-1**	**RIIO-2**	**RIIO-3**
	£0	[redacted]	*£0*

1. Project Status and Request Summary

The Pipeline Maintenance Centre (PMC) use recompression units (RCUs) to reduce pressures in National Grid pipelines and assets to allow for works to be carried out in a safe manner. The pressures are reduced to approximately 7barg and the remaining, lower pressure, gas in the pipe and plant is usually vented to atmosphere. This vented gas is a wasted resource and a significant contribution to National Grid Gas' carbon footprint. The three recompression units used by PMC to reduce pressures in National Grid pipe and plant to approximately 7barg are all aging units, the first 2 which can reach 85barg were brought into service in 1991 (upgraded in 1999 to 85barg), and the third which can accommodate maximum NTS pressure (94barg) was brought into service in 2000.

Technological advances have developed recompression equipment and techniques which can get the pressure in transmission pipes to <1barg; representing an additional improvement (~900 tonnes per annum) and saving for the environment and customer.

The total requested funding for this project is [redacted] to provide both high- and low-pressure equipment.

1. Problem/Opportunity Statement

Within the National Grid Gas NTS, methane leaks and controlled gas releases are inherent within the assets and processes used to move gas from supplier to consumer.

Whereas activities are underway within the existing price control period (RIIO-T1) to reduce compressor venting (~4000 tonnes Methane per annum), methane is also lost from the network through leakage, pipeline venting and inherent processes (e.g. gas actuated valves). This investment seeks to reduce gas lost through pipeline venting during planned investment and maintenance work.

Between 2009 and 2013, a £1.5million National Innovation Allowance 'Alternatives to Venting' project achieved the following:

- Production of a Decision Support Tool for venting, flaring and recompression
- Successful field trial of Low Pressure (LP) recompression and flaring technology. A PMC recompression unit (RCU) coupled to a third-party LP RCU successfully evacuated a pipeline to 0.8Bar.
- Successful field trial of Absorbed Natural Gas (ANG) technology (Note ANG is not considered in this paper as Compressed Natural Gas technology (CNG/recompression) is at higher technological readiness, achieves 97% of the benefits of ANG, and is much less complex)

The decision support tool allows straightforward calculation of gas volumes from pipeline venting predominantly from pipeline diameter, pipeline length, start and finish pressures. For example, to depressurise 25km of 900mm diameter pipe, the calculator estimates 1009 tonnes of gas would be recompressed from 75Barg to 7Barg, with approximately 83 tonnes of gas vented from 7Barg. 1083 tonnes could be recompressed from 75Barg to 0.8Barg with Low Pressure (LP) capability, with just 9 tonnes vented (a 90% reduction in vented volume). Longer pipeline sections, higher pressures and/or higher pipeline diameters than used in this example are typical on the NTS. At Bacton, in March 2017, over 300 tonnes of Methane were vented to atmosphere.

This report's focus is to provide context to the funding request for LP recompression equipment, which is already proven to reduce potential methane emissions from pipelines on the NTS. The request also seeks funding to invest in a new high-pressure recompression unit, as this will operate in tandem with the low-pressure equipment to provide a near-zero emissions approach to pipeline recompression. The December business plan and this papers request include two machines (low and high pressure) as the low-pressure unit is not backwardly-compatible with PMC's existing fleet of high-pressure recompression equipment. Additional benefits include:

- Faster, more efficient recompression leading to efficiencies and a reduction in delays to outages
- A more resilient service offering by providing low- and high-pressure equipment working in tandem
- Redundancy/contingency to the existing aging fleet of mobile recompression equipment.
- Improved DSEAR compliance with a more modern fleet
- Reduce greenhouse gas emissions associated with operating the network by approximately 26,000 Tonnes CO2e/annum
- Recycle up to £170k/annum worth of customer gas back into the network

Related Projects

Legacy mobile recompression equipment is currently in use within PMC; units are able to address all the conditions and operational pressures currently in use on the NTS with gas below 7barg being vented. This project does not interact with other projects associated with

reducing methane emissions but does seek to deliver the same outcomes of reducing emissions. The recompression units being procured will reduce emissions from projects set for delivery in RIIO-2 where pipeline maintenance is required, specifically where complete decompression is necessary.

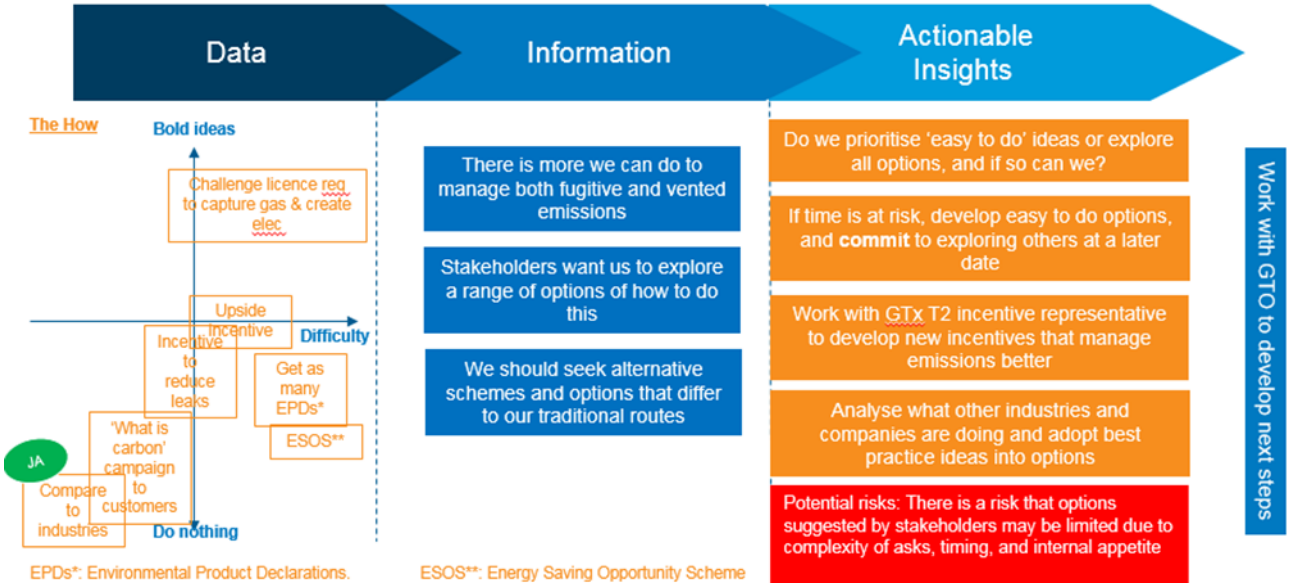
Project Boundaries

The project is limited to and inclusive of all recompression activities of pipelines and above ground installations/equipment (including compressor stations and terminals). Third party commercial recompression activities are also within the existing scope of this service provision.

2. Project Definition

Methane emissions are not presently regulated as strongly as CO2, CO and NOx within the environmental permits NGGT holds with the environmental regulators. Legislation exists to control the emissions of methane (Climate Change Act 2008), however, compliance is met at a lower threshold than other Greenhouse Gases, therefore it has not been a priority for NGGT or the Oil and Gas Industry to reduce emissions beyond the legal requirement.

The need for emissions reduction has been tested on a domestic level during stakeholder events in the 'listen phase' of NGGT's RIIO-2 engagement. During the events (Summer'18), specific questions were put to stakeholders asking how (all) emissions should be considered and managed. The conclusions slide from the event below, demonstrates the mindset of NGGT's stakeholders regarding fugitive and total emissions. There is strong support for NGGT to do more in this area.



Presently recompression of pipelines is undertaken by technology that is >20 years old. There are opportunities to reduce the amount of methane lost during the recompression process by investing in new technology that can operate at lower pressures. The new technology would

take the form of a new low-pressure machine (not currently used by NGGT or PMC) and a new high-pressure unit to complement it, as the technology needs to be designed and operated together. The new low-pressure equipment will not be backwardly compatible with legacy equipment currently owned and operated by PMC due to the age of the technology.

Supply and Demand Scenario Discussion and Selection

Whilst we seek to reduce venting as much as possible, under all supply and demand scenarios, venting of pipelines will still be required. Therefore, this section is not applicable to the scope of this project.

Project Scope Summary

The scope of this project is to outline the need for two new mobile recompression units, working in tandem as a high-pressure and low-pressure technological solution.

Two units are required (making one functional unit, although high-pressure can be used independently), as the high-pressure unit will reduce operating pressures from >90barg to ~7barg (the high pressure unit has an operational ceiling of 101barg), whereas the low-pressure will reduce pressures from ~7barg to atmospheric pressures.

The equipment will be mobile, mounted on heavy-goods vehicles and, stored at PMC locations when not in use.

3. Options Considered

Three options were considered for the paper; do nothing (no investment), invest in low-pressure equipment to work with existing high-pressure legacy equipment and, investment in compatible low- and high-pressure equipment to deliver the full spectrum of benefits.

First Option Summary – Do Nothing (no investment)

The Pipeline Maintenance Centre (PMC) currently own three high-pressure recompression units, which are used to reduce pipeline pressures from NTS pressure (94barg) to ~7barg, with the remaining gas vented to atmosphere when containment integrity is expected to be broken. The current fleet include:

- RCU 1 and 2 purchased in 1991 but uprated to support the 85barg uprating project in 1999. RCU1 and 2 have an operating range of 7 to 85barg.
- RCU4 has an operating range of 7 to 100barg and was purchased in 2000

With no investment, subject to being able to maintain the current obsolete and aging units, PMC would be able to continue to operate in the existing manner, reducing methane emissions from venting significantly, but still allowing a proportion to enter the atmosphere. Increasing project workload will lead to increasing emissions with only the use of the current aging recompression fleet.

Costs associated with this option are linked to the ongoing maintenance of the existing equipment.

There is an inherent risk associated with the legacy high-pressure equipment due to the age of the equipment. The existing fleet of recompression equipment is over 20 years old and is obsolete, with spares difficult to source – providing greater risk of catastrophic failure.

Second Option Summary – Invest in Low-Pressure Equipment (LP)

The acquisition of a low-pressure unit, adapted to the legacy high-pressure units, would provide NGGT and PMC with a service provision to reduce emissions to near zero when decompressing pipelines and other assets. The new equipment would be mobile (as are the legacy units; mounted on an HGV) and would need adapting to meet the requirements and technical specifications of the existing high-pressure units. With an increase in projected workload in RIIO-2 (e.g. diversions such as HS2 and the National AGI Renovation Campaign (NARC)) an additional 6.4mcm (approximately 3,622 tonnes) by procuring low-pressure recompression.

Costs associated with this equipment are [redacted] and are significantly linked to the procurement of the equipment; approximately [redacted] is associated with modifications to the existing RCU to be compatible with the new LP unit, whilst other costs are minimal as the service provisions are already embedded within PMC's operations.

The expenditure would provide a capability to reduce methane emissions to near-zero, a service provision that PMC has not previously had. There are associated risks in employing this technology to complement the existing high-pressure recompression equipment:

- Competency in transport, use and maintenance of new equipment would require training, above that of the existing legacy equipment
- Coupling new equipment with 20+ year old legacy equipment will pair the new unit's reliability with the reliability of the older units. i.e. breakdown of the legacy unit will render the new low-pressure unit unable to operate.
- Adapting the new low-pressure equipment to be retrofitted to the legacy equipment could introduce additional safety and operational risks. New equipment is likely to be built with higher safety specifications than the legacy equipment.
- Adding no additional high-pressure compression equipment does not address the issues with the legacy units becoming obsolete, with no strategic spares to address critical failures. Should one of the legacy units fail beyond repair we would use it as a source of grey spares to maintain the others.

Third Option Summary – Invest in Low- and High-Pressure Equipment (LP+HP)

The acquisition of complementary low- and high-pressure new units provides more resilience and efficiency when undertaking a decompression activity. As with option two, the equipment will be mounted on HGVs so that it can be moved from PMC to any feeder on the NTS. The equipment would be procured as per manufacturer's recommendation, compatible low- and high-pressure units in tandem, providing designed-in efficiency, resilience and performance.

Costs associated with this equipment are [redacted] and are significantly linked to the procurement of the equipment; other costs are minimal as the service provision is already embedded within PMC's operations.

There is a risk associated with new equipment around competency, specifically as the legacy equipment has been in use for the last 20+ years. Training and surveillance will be needed to ensure safe and efficient operability of the equipment.

However, there are significant benefits to be had from utilising this option:

- Purpose-built units, designed to operate in tandem; better compatibility
- Reduced risk of failure
- Improved safety standards and protection
- Improved efficiency as utilising purpose-built units as opposed to mixing old and new technology
- Long-term commitment to delivering Net Zero emissions

Options Cost Estimate Details

Option	Total Cost of Investment	Pros	Cons	Overall Ranking
Do Nothing	£0	No impact of implementation	Low risk - Business as usual Medium risk – Existing units may need major overhauls / replacement in the event of critical failure High risk - Potential reputational damage if National Grid found to vent significant volumes of Gas when abatement technology exists Potential increase to asset health maintenance costs if unit not replaced	**3**
Invest in Low Pressure	[redacted]	Lower investment value to achieve the low-pressure recompression	Medium risk - New unit will take time to integrate and become business–as-usual, the first few jobs may suffer delays High risk - Existing high-pressure units may need major overhauls / replacement in the event of critical failure. This could render the new LP unit inoperable	**2**
Invest in Low Pressure and High Pressure	[redacted]	Increased speed of recompression reducing time taken to prepare pipeline for maintenance work, reducing outage periods (and overrun costs) and saving 20 days working time per year.	Medium risk - New units will take time to integrate and become business-as-usual, the first few jobs may suffer delays High risk – larger investment value	**1**

Item	Note	% of total installed cost
Engineering Design	*Detail costs for studies/FEED/Detailed design as appropriate.*	0
Project Management	*Element of project costs attributed to project management, not direct or indirect company costs.*	[redacted]
Materials	*Bulk materials, breakdown preferred*	[redacted]
Main Works Contractor	*Project construction contractor costs.*	[redacted]
Specialist Services	*Costs for any additional services used to support the project i.e. surveys, data procurement etc*	[redacted]
Vendor Package costs	*Costs of packages purchased for project*	[redacted]
Direct Company Costs	*Refer to Regulatory Instructions and Guidance for definition of direct company costs.*	[redacted]
Indirect Company Cost	*Refer to Regulatory Instructions and Guidance for definition of indirect company costs*	[redacted]
Contingency	*Contingency included in base cost estimate*	[redacted]
Total Installed Cost	*Forecast total project cost including contingency. Sum of all elements noted above.*	[redacted]
Cost Estimate Accuracy	*This is an important element to give confidence that the engineering is mature, and the costs can be relied upon.*	95%

Costs based on preferred option - HP and LP equipment

The costs associated with the table above have been generated using quotes from manufacturers within the UK and Europe, and a provision for project management, materials and direct company costs are provided from historic experience with the legacy equipment.

The material costs include additional pipework and trailer associated with the commissioning of the equipment, ready for use in the field. Within the associated cost tables, there is an additional line item ([redacted]) for providing backward compatibility to the existing fleet of RCUs to provide flexibility of use and resilience.

A breakdown of costs is provided in the data tables associated with this Engineering Justification Paper in NGGT_Annex_Recompression backing data_costs.

Options Summary

Option title	Project start date	Project commissioning date	Project design life	Operating cost	Total installed cost	Cost estimate accuracy (%)
Do nothing	N/A	N/A	N/A	£0.12m	N/A	95%
LP only	01/04/21	01/10/22	20+ years	£0.12m	£2.52m	80%
LP+HP	01/04/21	01/10/21	20+ years	£0.12m	£3.52m	95%

4. Business Case Outline and Discussion

Key Business Case Drivers Description

New LP & HP units together will have a faster recompression rate, which means that by procuring both HP and LP together, recompression work is achieved faster, reducing outage times and increasing network availability. They carry less risk to compatibility and availability to that of the other option (only to invest in LP and coupling it to an existing HP unit), whilst also providing greater resilience to the fleet of recompression units.

Scope:

- High level scope of investment targets for PMC recompression:
    - Increased suction pressure range i.e. able to save more of the gas in a pipeline
    - Reduced operational cost of replacing Unaccounted for Gas (UAG)
- Reduced environmental footprint
- New units are compliant to current standards (e.g. DSEAR)
- Easy integration of new units into the fleet
- Maintainable with PMCs existing maintenance skill set

This project would result in:

- Minimal venting of gas when pipelines must be isolated, depressurised and purged, which will deliver cost savings and reduce environmental impacts:
- Delivery of National Grid's environmental responsibilities and potentially avoiding reputational damage to the company and industry;
- Asset Health – The new unit will increase the flowrate of recompression, allowing for reduced outage periods, or more time to be spent on the actual maintenance work.
- Compliance – New units are compliant with new regulations. Compliance to future venting regulations may also be ensured by the implementation of this project.

This paper therefore seeks funding for a new low-pressure and a new high-pressure recompression machine to bolster PMC's recompression fleet. The investment will ensure a reduction in vented gas when National Grid pipelines need intrusive maintenance. The volume of gas that is vented in these projects is expected to reduce by over 80% following investment, creating a cost saving of an average of £207k/annum across RIIO-2 (£170k/annum post RIIO-2) for the gas consumer; this is indicated in the accompanying data tables associated with this EJP and represents a financial saving to the consumer by not having to replace the vented gas (calculated using the summer average gas price). However, there are additional associated savings when applying a non-traded price of carbon to the vented methane, with a gross average saving of £2.2m/annum across RIIO-2 (£1.8m/annum post RIIO-2). This is important, as this includes the environmental benefits of working towards Net Zero by removing known methane emissions and capturing the complete cost of the impact of the emission.

Supply and Demand Scenario Sensitivities

Whilst we seek to reduce the requirement to vent as much as possible, under all supply and demand scenarios, venting of pipelines will still be required.

Business Case Summary

Option title	*Supply and Demand Scenario*	*Project commissioning date*	*Total installed cost*	*Cost estimate accuracy (%)*	*Project operating lifespan*	*Project NPV*
Do Nothing	*4655 tonnes venting in RIIO-2**	N/A	N/A	N/A	N/A	-£2.18m
LP only		01/10/2022	[redacted]	95%	20+ years	£25.80m
LP+HP		01/10/2021	[redacted]	95%	20+ years	£27.15m

*****See attached data table for NARC and Feeder outage emission totals in NGGT_Annex_Recompression backing data_additional inputs

To support the submission of this Engineering Justification Paper, NGGT have utilised the Ofgem CBA to compare options and provide additional details to support the decision-making process.

In both scenarios, the Ofgem CBA template doesn't provide adequate consideration for the socioenvironmental elements associated with the project. The increased scrutiny from stakeholders indicates that methane emissions should be treated the same, if not more stringently than carbon dioxide. By utilising the non-traded price of carbon, along with the summer average wholesale price of gas, savings from the delivery of the LP+HP option are estimated to be £9.7m across the RIIO-2 period.

Although the bulk of this value is made up of a carbon price, this would not be realised as 'cash' to the consumer and is a figurative saving for the environment, expressed as true monetary value of carbon emissions to the atmosphere. This is something not readily captured by the existing CBA but should be considered as part of the Net Zero agenda – in a Net Zero future, this value would need to be offset, whereas technology exists today, to address the issue.

Following an update of cost estimates, NGGT are requesting [redacted] of the £[redacted] included in December plan. We still believe two units is the best outcome for consumers and the environment. To fund an LP only option, which is currently Ofgem's minded-to position, we estimate that this will cost [redacted] more than originally allowed. We do not believe this option represents best value for consumers as;

- This comes with additional risk of synchronising with the existing units. We anticipate that this extends the programme by an extra year, meaning one year of lower environmental benefits.
- The risk of running an old recompression unit (RCU4) that could otherwise be decommissioned or at risk of critical failure should the LP option be Ofgem's final preferred option. Within the CBA it is difficult to quantify the associated cost, however there are qualitative factors around maintenance, risk to programme and the inherent benefits of newer equipment.
- We are confident that having two new units, one LP and one HP, means that the units can run in synergy.
- The extra year of environmental benefit gives a positive CBA outcome, as indicated in the accompanying CBA.

Errors associated with the CBA Template

As the Engineering Justification Paper has been produced, it has been supported by the creation of a Cost Benefit Analysis tool, using Ofgem's template, to provide better clarity and insight to the costs and benefits associated with the project. However, contained with the CBA template provided by Ofgem, there are two inherent calculation errors which adversely effect the outcomes and financial benefits of the project, most notably:

- The calculation and formula on Rows 155 and 170 on tabs Option1 and Option2; where a formula error was converting tonnes of methane to kilograms and then multiplying by a CO2e emissions factor for tonnes; effectively reducing the benefit by a factor of 1000 (tonnes into kilograms). Within the submitted CBA, we have corrected this error to provide a true representation of the CO2e emissions saving as expressed in tonnes. It is then the CO2e that is multiplied by non-traded carbon price to give an environmental impact.
- The formula within the calculation for CO2e benefit is picking up the non-traded price of carbon for 2020 throughout the entirety of the respective rows, whereas the expectation is that this would reference the correlating years within the FixedData tab to provide an accurate representation for each year for non-traded carbon. We have not corrected this within the submitted CBA; we believe this may be an error, but a reason is not directly apparent – however it is worth considering that if corrected, the NPV would be slightly higher due to the increasing cost of non-traded carbon.

5. Preferred Option Scope and Project Plan

Preferred Option for this Request

The recompression preferred option is to invest in new low- and high-pressure recompression at a capital cost of [redacted]. This is supported by a CBA analysis. Following an update of cost estimates we are requesting £[redacted] of the [redacted] included in the December plan. We still believe two units is the best outcome for consumers and the environment mitigating the risk of coupling new and legacy units and delivering environmental benefits of reduced emissions sooner and more efficiently.

Project Spend Profile

Spend profiles have been provided from the CBA to show the difference between the low-pressure option and the low- and high-pressure options against the baseline of no investment.

The table is from the associated CBA template from Ofgem and provides a summary table for total forecast expenditure for the life cycle of the project. Whereas the capital expenditure for the low- and high-pressure is [redacted], the total expenditure includes all aspects associated with providing the new equipment, including ongoing maintenance throughout the life cycle of the equipment (20+ years). Further details are available within the CBA provided to support this engineering justification paper.

Option No.	Description of Option	Preferred Option	Total Forecast Expenditure *(£m)*	Total NPV *(£m)*	Delta *(Option to baseline) (£m)*
Baseline	**Do Nothing**	**N**	**-£3.69**	**-£2.18**	**£ -**
1	**Investment in Low Pressure Unit Only**	**N**	**-£6.20**	**£25.80**	**£27.99**
2	**Invest in Low- & High-Pressure Units**	**Y**	**-£7.21**	**£27.15**	**£29.34**

Efficient Cost

Lessons Learnt – When the legacy compression equipment was first procured, venting methane was not as scrutinised as it is today. Recompressing most of the gas within a pipeline was considered a significant financial saving using, what was, novel equipment. As the providence of Net Zero has grown, it is now paramount that all vented emissions are avoided or mitigated, promoting the need for efficient high- and low-pressure recompression equipment. Net Zero, coupled with the works packages within RIIO2, RIIO3 and beyond, mean there is more need to mitigate emissions from undertaking complete isolation of a pipeline, quickly and safely, to ensure the efficient return of the pipeline to service. Present legacy equipment does not currently allow for this service to be efficiently completed in its entirety. The addition of new high- and low-pressure equipment will ensure commitments to Net Zero are met in the most efficient approach currently available.

Expert View – NGGT have been working with European industry bodies (GIE and Marcogaz) to share knowledge and best practice around methane emissions abatement. Whereas some operators within Europe use flaring as a technique to reduce the harm from vented pipeline emissions, the majority have employed high- and low-pressure recompression techniques. A report for GIE and Marcogaz (Potential ways the Gas Industry can contribute to the reduction of CH4 - GIE/MARCOGAZ Report, page 66), which NGGT contributed to, outlines the Best Available Techniques for reducing methane emissions from pipeline venting through the utilisation of full recompression, both high- and low-pressure.

Procurement Efficiencies – The high- and low-pressure equipment is purpose-built to the industry, which is only serviced by three major suppliers available within Europe. NGGT have sought quotes from each supplier in order to drive the best price for delivery.

Project Plan

Timeline for delivery of low- and high-pressure recompression equipment	Dec-20	Jan-21	Feb-21	Mar-21	FY 22 Q1	FY22 Q2	FY22 Q3	FY22 Q4	FY23 Q1	FY23 Q2	FY23 Q2	FY23 Q3	FY23 Q4	End of T2	End of T3
Final Determination made / received															
Request updated quote from OEM															
Design Solution / Specification															
Procure Low- and High-pressure unit															
OEM manufacture equipment															
Take delivery of equipment															
Commission new equipment															
Utilise equipment on NTS															

The above project plan provides a simple approach to delivery of the equipment. Due to a significant proportion of the expenditure (>90%) being linked to procure of new equipment, the plan has been developed around the materiality of that expenditure.

Key Business Risks and Opportunities

The table below outlines the key risks and opportunities to the delivery of the project.

Key Risks	Key Opportunities
Reduced funding decision could impact the efficiency and delivery of the outcome of the investment	Delivers a Net Zero approach to venting of pipelines
Delay in the procurement process at the start of RIIO2 could impact on commissioning	Provides resilience to the current aging legacy recompression units
Delays in commissioning could delay the utilisation of the equipment	Provides a more efficient approach to recompression

Outputs included in RIIO-T1 Plans

There were no outputs in RIIO-T1 associated with recompression equipment.

Associated Annexes to be read alongside this EJP

NGGT_Annex_Recompression CBA

NGGT_Annex_Recompression backing data_costs- REDACTED IN FULL

NGGT_Annex_Recompression backing data_additional inputs – REDACTED IN FULL