

Decision

St Fergus Compressor Emissions – Final Preferred Option

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We are publishing our decision on the St Fergus Compressor Emissions – Final Preferred Option. This decision has been informed by the responses we received following publication of our consultation on 2 June 2023. Alongside this document we are publishing the non-confidential responses we received in response to our consultation

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Executive summary

St Fergus Compressor Emissions – Final Preferred Option

In compliance with Special Condition 3.11 (Compressor Emissions Re-opener and Price Control Deliverable (CEP_t and CEPRE_t)) of National Gas Transmission's Gas Transporter Licence, National Gas Transmission (NGT) submitted a Final Option Selection Report in January 2023 which identified the Final Preferred Option for compliance with the Medium Combustion Plant Directive (the Directive) at the St Fergus Gas Terminal. The Directive requires that existing gas turbines, between 1MW and 50MW net thermal input, must not exceed an emissions limit of 150mg/m³ Nitrogen Oxide (NO_x) by 1 January 2030. In 2030, the St Fergus Gas Terminal will operate four Avon gas turbine driven compressor units that are not compliant with the Medium Combustion Plant Directive. The terminal will also have two electric drive compressors. A decision is required as to how best to provide the required level of compression post 1 January 2030.

Special Condition 3.11 requires that a Final Option Selection Report is submitted in advance of any funding request. The Final Option Selection Report must contain a Final Preferred Option along with supporting evidence necessary for the Authority to make a determination. The Authority can:

- Approve the proposed Final Preferred Option;
- Reject the proposed Final Preferred Option on the basis that the Authority considers no further work should go ahead at this time;
- Reject the proposed Final Preferred Option and approve one of the other options in the Final Option Selection Report; or
- Reject the proposed Final Preferred Option and set out additional information that should be provided to identify the best option before a resubmission of the Final Option Selection Report.

Our Decision

In accordance with Special Condition 3.11.9, we have decided to approve the Final Preferred Option identified by National Gas Transmission in the Final Option Selection Report.

In reaching our decision we have assessed the evidence presented in the Final Option Selection Report submitted by National Gas Transmission. Our assessment was set out in our Final Preferred Option consultation published on 2 June 2023. We have also taken account of the consultation responses received in reaching our decision.

The Final Preferred Option includes the installation of three new gas turbine driven compressor units of approximately 15MW output power which will be commissioned by 2030. The new units will be installed in existing Plant 1 and Plant 2 locations. In addition, one of the existing Avon units will be retained with significant asset health investment to improve unit availability. There is no preference as to which of the existing Avon units will be retained. The other Avon units will be decommissioned.

1. Introduction

Context and related publications

1.1. In compliance with Special Condition 3.11, National Gas Transmission submitted a Final Option Selection Report in January 2023 which identified the Final Preferred Option for compliance with the Medium Combustion Plant Directive (the Directive) at the St Fergus Gas Terminal. The Directive requires that existing gas turbines, between 1MW and 50MW net thermal input, must not exceed an emissions limit of 150mg/m³ Nitrogen Oxide (NO_x) by 1 January 2030. In 2030, the St Fergus Gas Terminal will operate four Avon gas turbine driven compressor units that are not compliant with the Medium Combustion Plant Directive. The terminal will also have two electric drive compressors. A decision is required as to how best to provide the required level of compression post 1 January 2030.

1.2. Special Condition 3.11 requires that a Final Option Selection Report is submitted in advance of any funding request. The Final Option Selection Report must contain a Final Preferred Option along with supporting evidence necessary for the Authority to make a determination. The Authority can:

- Approve the proposed Final Preferred Option;
- Reject the proposed Final Preferred Option on the basis that the Authority considers no further work should go ahead at this time;
- Reject the proposed Final Preferred Option and approve one of the other options in the Final Option Selection Report; or
- Reject the proposed Final Preferred Option and set out additional information that should be provided to identify the best option before a resubmission of the Final Option Selection Report.

Our decision making process

1.3. We published our proposed Final Preferred Option for consultation on 2 June 2023. This document provides a summary of the responses received and our consideration of these responses. Following publication of this decision, National Gas Transmission may in accordance with Special Condition 3.11.11 submit a Re-opener application seeking a funding direction in June 2025.

General feedback

1.4. We believe that consultation is at the heart of good decision making. We are keen to receive your comments about this decision. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall quality of this document?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand or could it have been better written?
4. Are its conclusions balanced?
5. Did it make reasoned recommendations?
6. Any further comments?

Please send any general feedback comments to stakeholders@ofgem.gov.uk

2. Background

Section summary

This section provides an overview of the RIIO-2 Re-opener mechanism and the St Fergus Compressor Emissions Final Option Selection Report.

Overview of the RIIO-2 Re-Opener mechanism

2.1. The gas transmission network in Great Britain is owned and operated by National Gas Transmission. Economic regulation of the network follows the RIIO (Revenue = Incentives + Innovation + Outputs) price control framework. The current RIIO-T2 price control period will last five years from 1 April 2021 to 31 March 2026. Prior to commencement of the price control period, we set out in our Final Determinations our policy on the economic regulation of the network during the period. These policy decisions were given effect by new Special Conditions in Part C of the National Gas Transmission Gas Transporter licence, which came into force on 1 April 2021.

2.2. In our RIIO-T2 Final Determinations, we accepted the 'needs case' for investment at several sites on the network, including the St Fergus Gas Terminal, to ensure compliance with the Medium Combustion Plant Directive. The Directive requires that by 1 January 2030 the Nitrogen Oxide (NOx) emissions of all gas turbines with a net thermal input of between 1MW and 50MW, do not exceed 150mg/m³.

2.3. However, given the level of uncertainty at the time with respect to both the 'preferred option' and the level of funding required, we decided that this and other similar Compressor Emissions projects, should be funded through our Gas Transmission Project Assessment Process. This two stage process is set out in Special Condition 3.11 Compressor Emissions Re-opener and Price Control Deliverable.

2.4. At Final Determinations we provided £20.08m (2018/19 prices) of baseline funding in the form of a Price Control Deliverable for the St Fergus Compressor Emissions project. The required deliverables were a Final Option Selection Report in January 2023 followed by a Re-opener application seeking a funding direction in June 2025. The Final Option Selection Report must contain a Final Preferred Option along with supporting evidence necessary for the Authority to either accept the Final Preferred Option, or approve an

alternative as the Final Preferred Option, reject the Final Preferred Option on the basis that no further work should go ahead or ask for more information. The Re-opener application must be based on the Final Preferred Option approved by the Authority.

2.5. In compliance with Special Condition 3.11.7, in January 2023, National Gas Transmission submitted a Final Option Selection Report for investment at the St Fergus Gas Terminal to ensure compliance with the Medium Combustion Plant Directive. Following consideration of the Final Option Selection Report, we published our proposed Final Preferred Option for consultation on 2 June 2023. The consultation period closed on 28 July 2023, by which time we had received five responses. In reaching our decision we have given due consideration to these responses.

Final Option Selection Report

2.6. The St Fergus Gas Terminal is one of the most strategically important sites on the National Transmission System, with the combined flows through its three sub-terminals regularly accounting for over 25% of the UK's gas supply. All Future Energy Scenarios indicated that the St Fergus Gas Terminal will continue to be the principal source of gas entering the National Transmission System.

2.7. Gas from the North Sea enters the St Fergus Gas Terminal through three separate sub-terminals owned and operated by Ancala, Shell and North Sea Midstream Partners. Gas supplied through the Ancala and Shell sub-terminals enters the National Transmission System without further compression being required.

2.8. Gas supplied through the North Sea Midstream Partners sub-terminal requires compression (from 40barg to between 60 and 65barg) before entry into the National Transmission System. This unique arrangement is set out in the Network Entry Agreement between National Gas Transmission and the owners of the North Sea Midstream Partners sub-terminal. Shippers delivering gas at the sub-terminal are required to pay the St Fergus Compression Charge to recover the additional variable costs (compressor fuel and carbon emission credits) incurred by National Gas Transmission in providing the compression service. However, the charge does not recover any capital, asset health or site operation

costs incurred in providing the compression and associated services (scrubbing, metering and cooling)¹.

2.9. Compressor assets at the St Fergus Gas Terminal are configured into three separate operating plants. Plant 3 is comprised of two electric Variable Speed Drive compressor units, commissioned in 2015 and provides baseload compression. Plants 1 and 2 are comprised of two Avon gas turbine driven compressors each² which provide support to Plant 3. These four Avon units are currently not compliant with the Medium Combustion Plant Directive. A decision is required as to how best to provide the required level of compression post 1 January 2030.

2.10. The maximum end of day flow is 75 mscm/d, as defined in the Network Entry Agreement, though in recent years the highest flow rate measured is 60 mscm/d. Individual Avon compressor units can support a nominal flow of up to 15 mscm/d whilst a Variable Speed Drive (VSD) compressor can support flows of between 20 and 30 mscm/d. The Avon units perform two separate roles:

- Matching the level of compression available to the nominal flow rate through the North Sea Midstream Partners sub-terminal; and
- Providing back-up during periods of VSD outage.

¹ National Gas Transmission submitted Asset Health Funding requests to upgrade this equipment (January 2023 £44.6m and June 2023 £76.2m 2018/19 prices).

² This describes the configuration in 2030 at present there are three Avon units and one RB211 The existing RB211 unit will cease operations on 31 December 2023 in compliance with the Large Combustion Plant Directive. This is due to be replaced by the relief of one or two Avon units connected but not currently operational.

2.11. Figure 1 below illustrates how the Avon and VSD compressor units can be utilised.

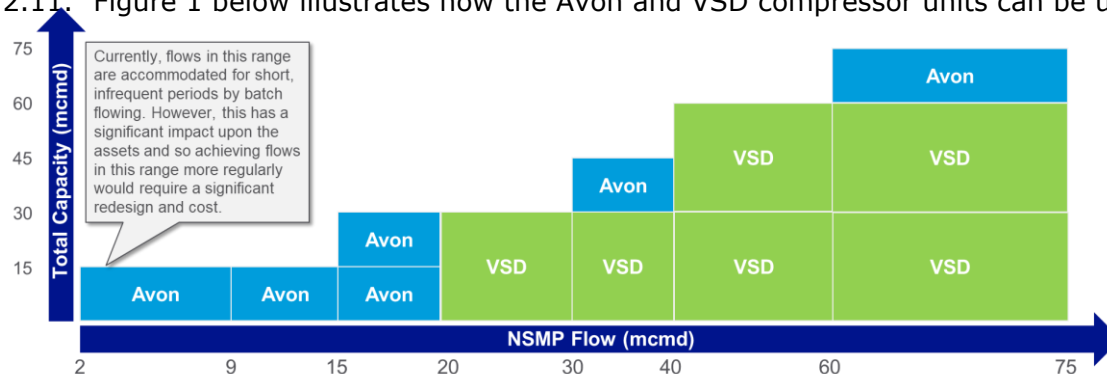


Figure 1 – St Fergus Gas Terminal Compressor Utilisation

2.12. Table 1 below summarises the nineteen shortlisted options considered in the Final Option Selection Report. The high-level options considered included:

- Doing nothing to reduce emissions from the non-compliant Avon units (counterfactual) with the units operated under the Emergency Use Derogation (EUD) i.e. limited to 500 run hours per year beyond 2030;
- Retrofitting of the non-compliant Avon units with emissions abatement technology, Control System Restricted Performance (CSRP) and Dry Low Emissions (DLE);
- Replacement of the non-compliant Avon units with new low-emission high efficiency gas turbine driven units.

Option	Description	Existing Avon	New 15 MW GT	New 23 MW GT	Plants 1 & 2 / Greenfield
0	Counterfactual - 4 x Existing Avon on 500 hrs	4 X EUD			
1	(Brownfield) - 3 x new 15 mscmd GT's		3		
2	(Greenfield) - 3 x new 15 mscmd GT's		3		Greenfield
3	(Brownfield) 2 x new 23 mscmd GT's			2	
4	(Greenfield) 2 x new 23 mscmd GT's			2	Greenfield
5	(Brownfield) 2 x new 15 mscmd and 1 x new 23 mscmd GT's		2	1	
6	(Greenfield) 2 x new 15 mscmd and 1 x new 23 mscmd GT's		2	1	Greenfield
7	(Brownfield) 4 x new 15 mscmd GT's		4		
8	4 x Existing Avon 15 mscmd derated	4 x CSRP			
9	3 x Existing Avon 15 mscmd derated	3 x CSRP			
10	4 x Existing Avon 15 mscmd DLE	4 x DLE			
11	3 x Existing Avon 15 mscmd DLE	3 x DLE			
12	2 x new 15 mscmd GTs and 2 x Existing Avon 15 mscmd + DLE	2 X DLE	2		
13	1 x new 15 mscmd GTs and 3 x Existing Avon 15 mscmd + DLE	3 x DLE	1		
14	3 x new 15 mscmd GTs and 1 x Existing Avon 15 mscmd + DLE	1 x DLE	3		
15	(Brownfield) 1 x new 15 mscmd and 1 x new 23 mscmd GT's		1	1	
16	2 x new 15 mscmd GTs and 1 x Existing Avon 15 mscmd + DLE	1 x DLE	2		
17	1 x new 15 mscmd GTs and 2 x Existing Avon 15 mscmd + DLE	2 x DLE	1		
18	(Brownfield) 2 x new 15 mscmd GT's		2		

Table 1 – Individual site Options summary

2.13. Table 2 below sets out the output from the Cost Benefit Analysis. The option with the highest Net Present Value (in this case the lowest negative) is the one that delivers compliance with the Directive at least cost over the assessment period. The lead option is Option 12 (2 New 15MW GTs + 2 Avon units retrofitted with DLE) under all Future Energy

Scenarios except for Leading the Way where Option 13 has a marginally higher Net Present Value.

2.14. In addition to capital investment and ongoing asset health costs, constraint management, compressor fuel and carbon emission costs were included in the Cost Benefit Analysis.

Option	NPV £m (2018 - 19 prices)	Steady Progression	Consumer Transformation	Leading the Way	System Transformation
0	4 x Existing Avon on 500 hrs	-£1,302 m	-£850 m	-£771 m	-£1,313 m
1	(Brownfield) - 3 x new 15 mscmd GT's	-£589 m	-£451 m	-£435 m	-£587 m
2	(Greenfield) - 3 x new 15 mscmd GT's	-£632 m	-£494 m	-£477 m	-£630 m
3	(Brownfield) 2 x new 23 mscmd GT's	-£1,306 m	-£1,484 m	-£1,536 m	-£1,214 m
4	(Greenfield) 2 x new 23 mscmd GT's	-£1,335 m	-£1,513 m	-£1,565 m	-£1,243 m
5	(Brownfield) 2 x new 15 mscmd and 1 x new 23 mscmd GT's	-£650 m	-£484 m	-£468 m	-£638 m
6	(Greenfield) 2 x new 15 mscmd and 1 x new 23 mscmd GT's	-£698 m	-£532 m	-£516 m	-£686 m
7	(Brownfield) 4 x new 15 mscmd GT's	-£610 m	-£483 m	-£468 m	-£607 m
8	4 x Existing Avon 15 mscmd derated	-£633 m	-£467 m	-£447 m	-£634 m
9	3 x Existing Avon 15 mscmd derated	-£683 m	-£489 m	-£462 m	-£689 m
10	4 x Existing Avon 15 mscmd DLE	-£672 m	-£497 m	-£475 m	-£674 m
11	3 x Existing Avon 15 mscmd DLE	-£743 m	-£530 m	-£499 m	-£752 m
12	2 x new 15 mscmd GTs and 2 x Existing Avon 15 mscmd + DLE	-£580 m	-£445 m	-£428 m	-£579 m
13	1 x new 15 mscmd GTs and 3 x Existing Avon 15 mscmd + DLE	-£599 m	-£446 m	-£426 m	-£602 m
14	3 x new 15 mscmd GTs and 1 x Existing Avon 15 mscmd + DLE	-£594 m	-£464 m	-£449 m	-£592 m
15	(Brownfield) 1 x new 15 mscmd and 1 x new 23 mscmd GT's	-£990 m	-£664 m	-£633 m	-£937 m
16	2 x new 15 mscmd GTs and 1 x Existing Avon 15 mscmd + DLE	-£637 m	-£465 m	-£444 m	-£638 m
17	1 x new 15 mscmd GTs and 2 x Existing Avon 15 mscmd + DLE	-£670 m	-£472 m	-£444 m	-£677 m
18	(Brownfield) 2 x new 15 mscmd GT's	-£690 m	-£480 m	-£450 m	-£701 m

Table 2 - Cost Benefit Analysis Outputs

2.15. The Final Option Selection Report also included a Best Available Technique assessment. All shortlisted options except the counterfactual (do nothing) are assessed as being Best Available Technology.

2.16. The output from the Cost Benefit Analysis was subject to a sensitivity analysis assuming higher constraint management costs. The lead option remained Option 12 (2 New 15 MW GTs + 2 Avon units retrofitted with DLE) under the two low gas Future Energy Scenarios (Customer Transformation Leading the Way), while under the two high gas scenarios (Steady Progression and System Transformation) it is Option 14 (3 New 15 MW GTs + 1 Avon retrofitted with DLE). The differences between these options however are marginal.

2.17. Based on these various analyses, National Gas Transmission's Final Option Selection Report identified Option 14 as the Final Preferred Option.

Our proposed Final Preferred Option

2.18. On 2 June 2023 we published a consultation setting out our assessment of the evidence presented in the Final Option Selection Report. We proposed to accept the option identified by National Gas Transmission as the Final Preferred Option (Option 14).

2.19. The consultation period closed on 28 July 2023, with five responses being received. Those not marked as confidential have been published alongside this decision.

3. Summary of responses and our view

Section summary

This section contains a summary of the responses we received and our views on the various issues raised.

Responses to specific questions

Question 4.1: Do respondents agree with our assessment of the evidence presented in the Final Option Selection Report?

3.1. Two respondents (NGT and NSMP) supported our assessment of the evidence presented in the Final Option Selection Report. Two respondents (██████ and SNSL) noted that North Sea Midstream Partners were in the best position to forecast future flows through the sub-terminal and the level of compression required into the future. One of these respondents (██████) believed that it was entirely possible that the “right” investment outcome could look very different where costs are targeted solely at North Sea Midstream Partners and its users.

Our View

3.2. We believe that the use Future Energy Scenarios in determining Final Preferred Option is appropriate. In making our assessment we consulted the North Sea Transition Authority to confirm that Future Energy Scenarios provided a robust basis for this investment decision.

3.3. Our assessment of the use of Future Energy Scenarios noted that the majority of value in the Cost Benefit Analysis was driven at moderate flow levels, between 8 and 45 mcm/d, rather than by the extremes. In making our assessment of shortlisted options we considered a re-wheel of the VSD compressors in response to reduced daily flows in the late 2030s. This demonstrated that while a re-wheel might deliver value during the latter half of the assessment period it did not impact on current option selection.

3.4. For these reasons we do not believe that a Final Option Selection based on North Sea Midstream Partners forecasts would better facilitate the achievement of our statutory duties.

Question 4.2: Do respondents agree with our decision that compressor fuel and carbon credit costs should be included in the Cost Benefit Analysis?

3.5. Two respondents (NGT and NSMP) supported the inclusion of compressor fuel and carbon credit costs in the Cost Benefit Analysis.

Our View

3.6. We agree that for the reasons set out in our Consultation that these costs should be included in the Cost Benefit Analysis.

Question 4.3: Do respondents agree with our assessment that the Cost Benefit Analysis might be conservative in the estimation of Constraint Management Costs and that the Sensitivity Analysis should be given substantive weight in the selection of the Final Preferred Option?

3.7. Two respondents (NGT and NSMP) agreed that the Sensitivity Analysis should be given substantive weight as it was based on real world market information. Another respondent (SNSL) was of the view that without the detailed knowledge available to North Sea Midstream Partners it was difficult for other consultees to provide informed comment.

Our View

3.8. We agree that for the reasons set out in our Consultation the Sensitivity Analysis should be given substantive weight. Given the various arguments set out in the Final Option Selection Report to justify the Sensitivity Analysis we are not clear why other consultees would not be in a position to make informed comment on at least some of them.

Question 4.4: Do respondents have any views on National Gas Transmission’s proposal to trial Dry Low Emissions technology on one of the existing Avon compressor units at the St Fergus Gas Terminal during the RIIO-2 price control period?

3.9. Two respondents (NGT and NSMP) supported our proposal. One of these (NGT) noted that there remained significant hurdles, both technical and commercial, to be cleared before Dry Low Emissions technology became viable as means of compliance with the Directive. Testing the technology at St Fergus where significant run hours could be guaranteed would make a significant contribution to proving the technology.

Our View

3.10. We recognise the potential value of an operational trial of this technology and will continue to engage with National Gas Transmission on the details of the proposed trial and the associated funding arrangements.

Question 5.1: Do respondents agree with our proposed Final Preferred Option?

3.11. All four respondents who commented on this question (NGT, NSMP, SNSL and [REDACTED]) supported our proposed Final Preferred Option. In their response National Gas Transmission provided two clarifications with respect to the proposed Final Preferred Option. These were:

- Decisions with respect to decommissioning, new unit location and commissioning will be subject to completion of the detailed FEED study prior to submission of a funding direction request in June 2025.
- The trial of Dry Low Emissions technology should be considered as part of a pathway to enabling four unrestricted gas turbine driven units at St Fergus Gas Terminal post 2030.

Our view

3.12. We are content that given the highly complex nature of the St Fergus Gas Terminal some of the details relating to the implementation of the Final Preferred Option will not be finalised until the FEED studies have been completed.

3.13. Our assessment of the predicted running hours evidence presented in the Final Option Selection. Concluded that the benefit of a fourth compressor units can be delivered by retaining one of the existing Avon compressor units operated under the Emergency Use Derogation. Unrestricted operation following a retrofit with Dry Low Emission technology could deliver a similar level of benefit.

3.14. Taking account of the responses received from respondents during the consultation, our Final Preferred Option remains the installation of three new gas turbine driven compressor units and the retention of one of the existing Avon units.

Other issues raised by respondents

3.15. Three respondents (SNSL, [REDACTED] and [REDACTED]) strongly objected to the proposal that costs of delivering the Final Preferred Option would be socialised and not targeted at those who directly benefit including North Sea Midstream Partners and those gas shippers utilising the sub-terminal. Arguments presented in support of this view included:

- The existence of a targeted St Fergus Compression Charge.
- Operators of other St Fergus sub-terminals have borne the cost of compliance themselves.
- The need to ensure a level playing field between sub-terminal operators.
- To avoid cross subsidies between sub-terminal operators and network operators.

3.16. One of these respondents ([REDACTED]) believed it was unfortunate that the issue of targeted charging at St Fergus and Final Option Selection had been decoupled. This decoupling would appear to be at odds with National Gas Transmission's licence obligation to operate in a way that did not distort competition between network users. Ofgem should therefore delay determination of the Final Preferred Option until an appropriate funding mechanism has been agreed.

Our View

3.17. We do not accept the premise that an appropriate decision on the Final Preferred Option can not be made separate from any decision with respect to charging arrangements. None of the evidence presented in the Final Option Selection nor our assessment of it was dependent on the particular mechanism by which the investment is funded.

3.18. We note the ongoing discussions on cost recovery at the National Transmission System Charging Methodology Forum and encourage all interested parties to fully engage through this mechanism.

4. Conclusion

Our decision

4.1. In reaching our decision, we have assessed the Final Option Selection Report submitted by National Gas Transmission. Our assessment was set out in our Final Preferred Option consultation, published on 2 June 2023. We have also taken account of the consultation responses received in reaching our decision.

4.2. In accordance with Special Condition 3.11.9, we have decided to approve the option identified by National Gas Transmission in the Final Option Selection Report (Option 14) as the Final Preferred Option.

4.3. The Final Preferred Option includes the installation of three new gas turbine driven compressor units of approximately 15MW output power which will be commissioned by 2030. The new units will be installed in existing Plant 1 and Plant 2 locations. In addition, one of the existing Avon units will be retained with significant asset health investment to improve unit availability. There is no preference as to which of the existing Avon units will be retained. The other Avon units will be decommissioned.