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Consultation

St Fergus and Hatton IED Needs Case Consultation

Publication date:	27 August 2019	**Contact:**	RIIO Team
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This document outlines the scope, purpose and questions of the consultation and how you can get involved. Once the consultation is closed, we will consider all responses. We want to be transparent in our consultations. We will publish the non-confidential responses we receive alongside a decision on next steps on our website at **Ofgem.gov.uk/consultations**. If you want your response – in whole or in part – to be considered confidential, please tell us in your response and explain why. Please clearly mark the parts of your response that you consider to be confidential, and if possible, put the confidential material in separate appendices to your response.

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Executive summary

Introduction

National Grid Gas Transmission (NGGT) operates a number of gas fired compressor units across its transmission network. These units emit air pollutants that NGGT is obliged under law to control and manage.

At the time of setting the RIIO-T1 price control, there was uncertainty around the obligations that would be placed upon NGGT by the emissions legislation. As a result, we set baseline allowances for work on three sites[1] and a further uncertain allowance of £378.2m (£288m in 09/10 prices)[2] for additional sites based on NGGT's forecasts. Two reopener windows were put in place to allow adjustments to this uncertain allowance to be made.

In 2015 and 2018, NGGT put forward reopener submissions which included compressor works at its St Fergus and Hatton sites. We rejected NGGT's application for funding on both occasions. However, as part of our 2018 reopener decision, we stated that we would work with NGGT to review the needs case and its preferred solution for emissions compliance at St Fergus and Hatton once it has made a decision on the solution for each site. We also stated that any funding for the works agreed would be provided as part of the RIIO-2 price control.

In June 2019 NGGT submitted an updated needs case for investment at its St Fergus and Hatton sites. Our assessment of this submission is based on the assessment approach we set out in our reopener 2018 decision, with consideration given to our RIIO-2 objective of ensuring that networks are prepared for the future and reflect the needs of the existing and future consumers.

Our initial views

Our initial views on NGGT's proposed works at St Fergus site are the following:

- We accept the need to decommission two non-compliant RB211 units at St Fergus.
- We do not accept the need to construct any new compressor units at St Fergus at this time.

Our initial views on NGGT's proposed works at Hatton site are the following:

- We accept the need to decommission two non-compliant RB211 units at Hatton.
- We accept there is a need to invest at Hatton in order to maintain resilience at the site. However, we are not convinced of the solution put forward by NGGT at this time as being the most economic and efficient.

Following our assessment, our initial view is that NGGT has not provided a sufficiently robust evidence case to support its proposed works for emissions compliance at the St Fergus and Hatton sites.

[1] Peterborough, Huntingdon, and Aylesbury.
[2] All costs in this document are reported in the 2018/2019 base price, unless otherwise stated.

Next steps

We welcome engagement from interested stakeholders during the consultation period.

This consultation will close on 24th September 2019. Please send your response by emailing us at RIIO2@ofgem.gov.uk.

We intend to publish our decision on the needs case in the Autumn 2019. If our decision is to accept the needs case, we will assess the costs as part of the RIIO-2 Business Plan submission, further detail is included in Section 3.

1. Introduction

What are we consulting on?

1.1. This consultation provides our initial views on National Grid Gas Transmission's (NGGT) June 2019 needs case submission for works at its St Fergus and Hatton sites.

1.2. In 2018, NGGT proposed works that it considered necessary for compliance with the emissions control legislation across nine sites, including compressors at St Fergus and Hatton. We rejected NGGT's application for funding at St Fergus and Hatton, on the basis that there remained uncertainty about the engineering solution and the associated costs of works at both sites.

1.3. As part of our 2018 reopener decision we stated that we would work with NGGT to agree the needs case for its preferred solution to ensure emissions compliance at St Fergus and Hatton. We also stated that funding for agreed works would be provided as part of RIIO-2. At this stage, our assessment is limited to the needs case and proposed solutions and does not give a view on the efficient costs to complete the proposed works.

Context

1.4. NGGT operates a number of gas-fired compressor units across the gas transmission network. These compressors maintain the required pressure of gas on the network and help ensure that gas is transported across the network to where it is needed. The operation of gas compressors results in the emission of air pollutants, such as carbon monoxide and nitrous oxides that NGGT is obliged under law to control and manage.

Legal requirements

1.5. There are three main Directives that influence NGGT's compressor operations in this regard, namely:

- The Industrial Emissions Directive (IED);
- Medium Combustion Plant Directive (MCP); and
- Ambient Air Quality Directive.

1.6. The IED brings together the previous Large Combustion Plant (LCP) and Integrated Pollution Prevention and Control (IPPC) directives. Under the LCP aspect of IED, combustion plants with a rated thermal capacity of over 50MW must comply with specified Emissions Limit Values (ELVs) or cease operation. For existing combustion plants, operators were given the option to put the plant on:

- Limited Life Derogation (LLD), under which it was permitted to run for up to 17,500 hours before decommissioning by 31/12/2023; or
- Emergency Use Derogation (EUD), under which it was permitted to operate without restrictions on ELVs so long as their operation is limited to less than 500 hours per year.

1.7. Compliance with emissions regulations is monitored by the Environment Agency (EA), Scottish Environment Protection Agency (SEPA) and Natural Resources Wales (NRW) for sites in England, Scotland and Wales, respectively.

1.8. Under the IPPC aspect of IED, operators must show they are running their sites using the Best Applicable Techniques (BAT) to achieve year on year emissions reductions in a cost beneficial manner.

1.9. Under MCP, combustion plants with a thermal rating of less than 50MW must meet ELVs in a similar manner to LCP, with the exception of emergency use plants running for less than 500 hours per year on a 5 year rolling average.

1.10. Figure 1 shows the unit type of each compressor currently on the National Transmission System (NTS) and compliance with environmental legislation.

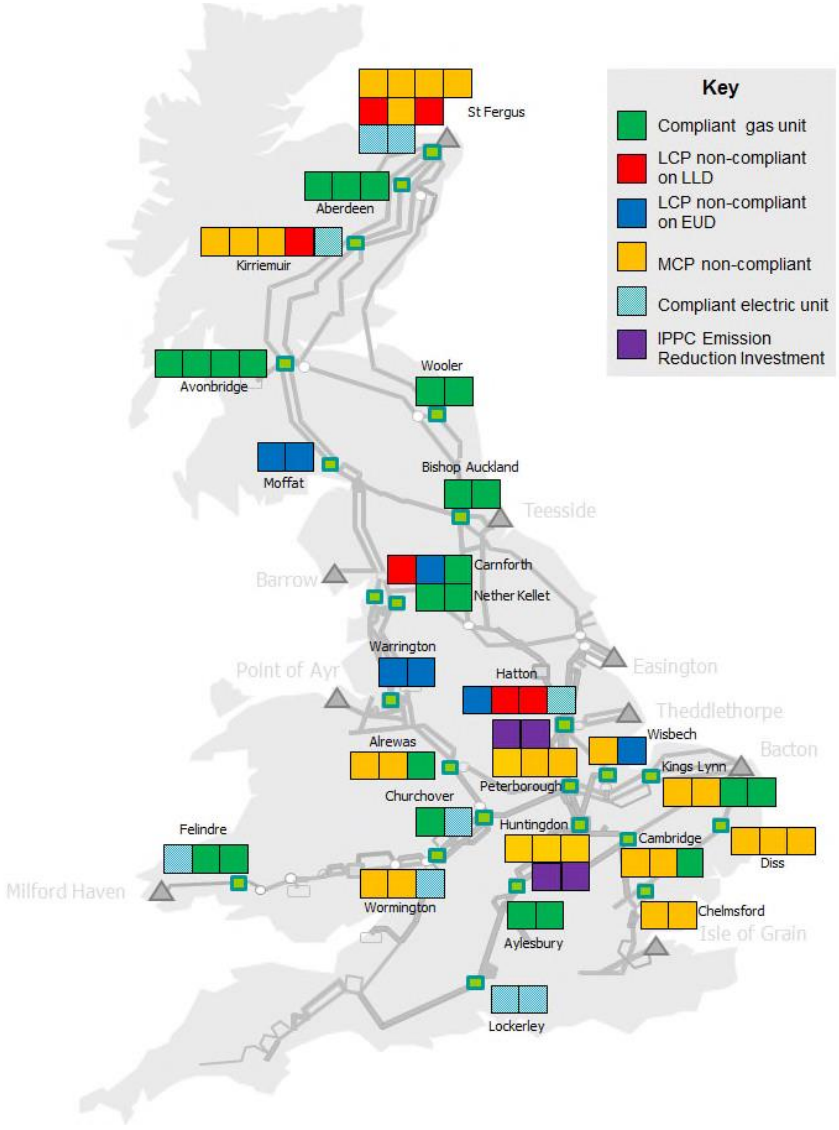


Figure 1 - Compressor unit type and compliance with environmental legislation

1.11. NGGT's needs case looks to address the LCP non-compliant units which are on LLD at St Fergus and Hatton.

RIIO-T1 price control allowances

1.12. In its RIIO-T1 business plan submission, NGGT forecast an expenditure of £1,068.1m[3] (£813.5m in 09/10 prices) for proposed work to ensure compliance with emissions control legislation. We considered that NGGT's proposals were not sufficiently justified. Specifically, in Ofgem's view NGGT had not explored all available options in terms of technical solutions and available derogations. In addition, we found that NGGT had not fully justified its proposed costs for compressor replacement.

1.13. Following our assessment, we provided baseline funding of £187.4m[4] (£142.7m in 09/10 prices) for IED compliance at three sites Peterborough, Huntingdon and Aylesbury.

1.14. We also acknowledged that NGGT may be required to undertake emissions compliance work at other sites. At the time of setting the RIIO-T1 price control, NGGT's plans for these other sites were not developed enough. We stated that we would re-evaluate needs case for these sites during two price control reopeners (2015 and 2018) and set a provisional allowance of £378.2m (£288m in 09/10 prices) for this purpose.[5] The level of this allowance was based on the information provided by NGGT at the time. We said that if NGGT's planned expenditure is different to this amount, we will adjust the allowance up or down.

1.15. In May 2015, NGGT submitted a reopener application for an additional £53.8m[6] (£41.0m in 09/10 prices) to comply with emissions legislation. We rejected NGGT's application for this additional funding. In our view, NGGT had not considered all the options available to it in sufficient detail when developing its solutions for IED compliance. We stated that NGGT should *"include the costs and benefits of all considered options as part of its submission".*[7]

1.16. In May 2018, NGGT submitted a reopener application for a reduced expenditure of £163.0m (£123.4m in 09/10 prices), which included a variety of interventions across nine sites, including:

- St Fergus: £33.0m (£24.7m in 09/10 prices) for preliminary engineering, design and procurement work relating to emissions reduction and compliance work on two compressor units.
- Hatton: £25.0m (18.9m in 09/10 prices) for preliminary engineering, design and procurement work relating emissions reduction and compliance work on one compressor unit.

1.17. In our consultation, we stated the following:

"At St Fergus, we are not convinced by NGGT's CBA and its conclusions. For instance, we note that the proposed works would maintain the compression capability at the

[3] All costs in this document are reported in the 2018/2019 base price, unless otherwise stated.
[4] pg 98 RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas Cost assessment and uncertainty Supporting Document
[5] The figure includes the IQI adjustment and additional allowances for real price effects (RPEs).
[6] pg 1 RIIO-T1: Our decision on National Grid Gas Transmission's application under the RIIO-T1 Compressor Emissions uncertainty mechanism (2015)
[7] pg 3 ibid

site, partly with a view to new emissions restrictions that may come into force by 2030. We are not convinced that it is appropriate to carry out work now (as part of IED compliance work) in anticipation of restrictions that may or may not apply after 2030. The precise requirements beyond 2030 would become clearer in the future, and the most efficient long term solution at St Fergus for consumers may look different then.

At Hatton, NGGT has indicated that the determination of the most efficient solution would depend on the outcome of its FEED study, which would look at a broad range of options, including those involving fitting emissions abatement technology on existing gas compressors at a lower cost than installing a new 30MW gas compressor."[8]

1.18. We rejected NGGT's application for the reduced amount in 2018. In our decision we maintained our view that there remained uncertainty about the best solution and the costs associated with that solution.

1.19. We did, however, agree to work together with NGGT to review the needs case and preferred solution for emissions compliance at St Fergus and Hatton. In our 2018 IED reopener decision we stated that if we were satisfied with the needs case submission, we would provide formal written agreement of the needs case, and assess funding as part of the RIIO-2 price control settlement

Wider industry considerations

1.20. Based on National Grid's Future Energy Scenarios (FES) 2019 report, both annual gas demand and 1-in-20 peak day demand[9] are set to decrease from their current levels in all four scenarios. The FES also forecasts that the volume of gas supplied from the current UK Continental Shelf (UKCS) and Norwegian entry points is also set to change over time with alternative and geographically diverse sources like LNG (Liquefied Natural Gas), shale gas or green gas likely to play a far greater role in the UK's future gas supply.

1.21. Based on an expected fall in total gas flows, along with the likely changes to where the gas enters the transmission system, there is significant uncertainty around the long-term requirements for certain elements of the National Transmission System (NTS).[10] There is a risk that compressor capacity that has been replaced to meet emissions legislation may not be needed in the longer term. This is known as asset stranding. In our assessment of NGGT's needs case submission for St Fergus and Hatton, we have considered the risk and potential consequences of asset stranding on existing and future energy consumers.

1.22. As set out in our RIIO-2 Sector Specific Methodology Decision - Gas Transmission Annex[11], we have required NGGT to undertake an assessment of the physical capability of the NTS. When assessing NGGT's needs case submission for St Fergus

[8] Paragraphs 3.14 – 3.15, RIIO-T1 Reopener Consultation – Industrial Emissions Costs, August 2018.
[9] The 1-in-20 peak day demand output provides a minimum security of supply standard to protect GB gas consumers. NGGT is obliged by its licence to ensure that the transmission system is capable of meeting a level of gas demand which is only likely to be exceeded (whether on one or more days) 1 year within 20 years.
[10] However, we recognise that the gas transmission network has a critical role to play in connecting sources of energy to consumers and may play an important part in the transition to the low-carbon economy.
[11] https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_gt.pdf

and Hatton, we have considered how aligned the proposed investment at the two sites is with the network capability review.

Consultation stages

1.23. The key milestones associated with this consultation are the following:

- Consultation opens on 27th August 2019.
- Consultation closes on 24th September 2019.
- Responses reviewed and published with decision in Autumn 2019.

How to respond

1.24. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document's front page.

1.25. We've asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.

1.26. We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations.

2. NGGT's 2019 needs case submission

Section summary

This section provides an overview of NGGT's needs case submission and the additional development steps undertaken since the 2018 IED reopener.

Submission process

2.1. In June 2019, NGGT submitted its updated needs case for works at St Fergus and Hatton. This submission followed the completion of the pre-FEED (Front End Engineering and Design) process[12] and a preliminary BAT assessment.

2.2. The initial submission lacked key information in a number of areas. Of particular concern was the absence of the following key information:

- installed and required capability for each site;
- 'no investment' counterfactual for St Fergus; and
- sensitivity analysis or justification for forecast costs (e.g. asset health spend or contracting costs) as part of the Cost-Benefit Analysis (CBA).

2.3. Following an extensive engagement process with NGGT, which included four rounds of supplementary questions and six bilateral meetings, we received information necessary for us to undertake our assessment and form our initial views for consultation.

2.4. This Section summaries the key information we have received from NGGT. The original submission can be found alongside this consultation.[13] Where information was provided in response to our supplementary questions, we have provided summaries of the responses we received.

Proposed works at St Fergus

St Fergus site and operation

2.5. The St Fergus site enables the entry of UK Continental Shelf (UKCS) and Norwegian gas supplies onto the NTS. Compression is required to raise the pressure of the gas supplied via the North Sea Mid-Stream Partners (NSMP) sub-terminal to NTS pressure.

[12] This included a tendering process for compressor and turbine equipment.
[13] www.ofgem.gov.uk/publications-and-updates/st-fergus-and-hatton-needs-case-consultation

2.6. The St Fergus site is comprised of ten berths and nine compressor units (see Figure 2 below), including:

- two Variable Speed Drive electric units (VSDs), each supporting a nominal flow of up to 30 mcm/d;
- five 'Avon' gas powered units, each supporting a nominal flow of 15 mcm/d; and
- two 'Rolls Royce RB211' gas powered units, each supporting flows of up to 30mcm/d.

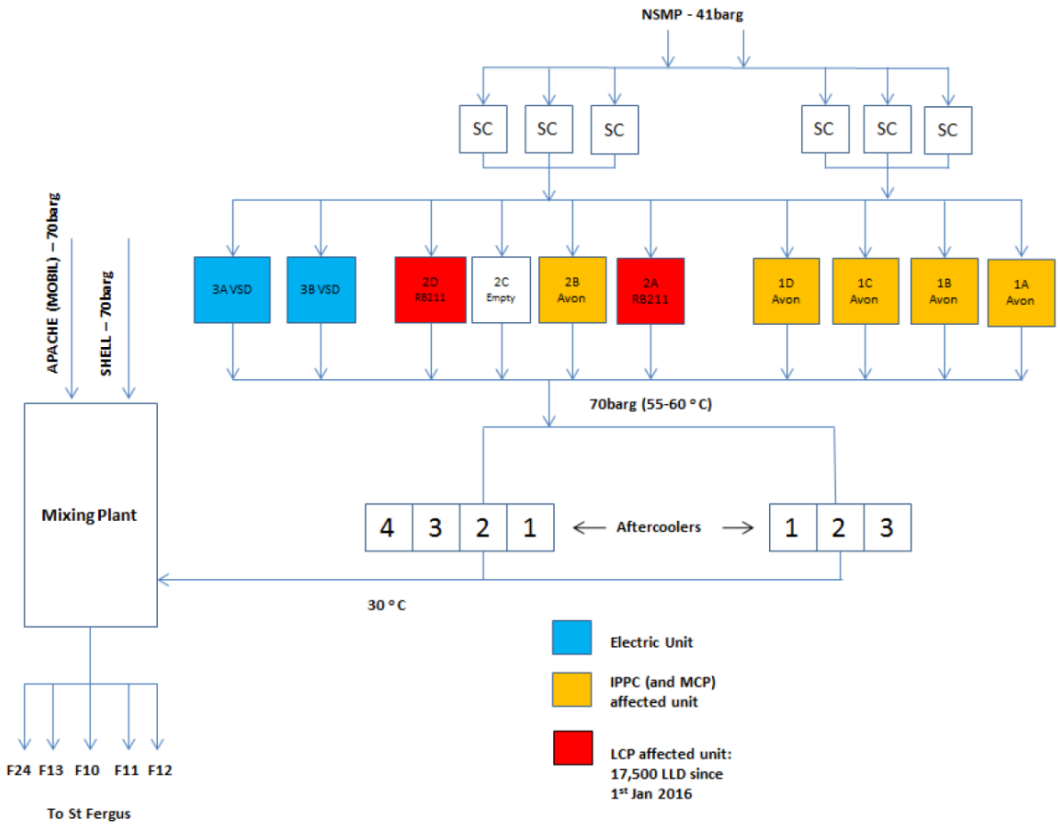


Figure 2 – The St Fergus site configuration

2.7. The design capacity of this sub terminal is up to 75 mcm/d, which represents over 20% of GB gas supplies on a winter day. The only route for this gas to reach consumers from the NSMP terminal is via the compression facility at St Fergus.

Proposed works

2.8. NGGT's proposed works at St Fergus[14] include installation of two new compressor units and decommissioning of the two LCP non-compliant RB211 compressor units. The forecast spend profile of these proposed works is shown in Table 1 below.

[14] In the needs case submission, NGGT refers to its preferred solution as Delta Option.

Table 1 - St Fergus forecast spend profile

£m (18/19 prices)	Prior Years	2018-19	2019-20	2020-21	2021 -22	2022-23	2023-24	2024-25	Total
Delta Option	0.5	0.6	14.6	9.3	21.4	18.4	14.6	1.0	80.4
Decommission RB211		0.0	0.0	0.0	0.0	0.7	1.7	0.0	2.5

Environmental compliance - need to invest

2.9. In response to the requirements of the LCP component of IED, two non-compliant RB211s at St Fergus will need to be decommissioned before 31st December 2023. In its needs case submission, NGGT proposed decommissioning both RB211s at St Fergus at a cost of £2.5m. NGGT stated that at least one new compressor is required at the site in order to reduce the emissions produced by the remaining five Avons in operation at the site. In its needs case, NGGT proposed installing two new compressor units at a cost of £80.4m by the end of 2023. In NGGT's view, this would allow the site to meet the requirements of IPPC and its environmental permit.

2.10. Separately, NGGT highlighted that by 2030, the five Avon units at St Fergus will need to either become compliant with the MCP directive, reduce operation to less than 500 hours per year, or be decommissioned.

Technical requirements - need to invest

2.11. The technical requirements for investment consider compressor capacity (i.e. the volume of gas that a compressor can process) and compressor availability (i.e. the probability that a compressor can be used when it is needed, which takes into account how reliable the compressor is, how long it takes to repair it if it is broken, and any time needed for routine maintenance tasks). Combination of these two factors is fundamental in determining the need for investment at a compressor site to ensure it meets supply/demand needs.

2.12. NGGT summarised the future capacity requirements of the site as needing to meet flows of up to 75mcm/d based upon the maximum capacity of the upstream NSMP pipelines. However, it stated that the highest flow forecast would be up to 68 mcm/d based on projections from the FES.

2.13. NGGT stated that an availability of 78%[15] has been modelled for the electric VSDs at St Fergus in its core CBA, with another CBA run using a 68% availability rating. No availability ratings across the flow distribution were provided as part of the submission.

Cost-Benefit Analysis

[15] Compressor availability is calculated on an annual basis taking account of hours planned and unplanned outages within the hours of a year. This is then multiplied by expected run hours to determine a shortfall, which would be met by alternative compressor units or commercial actions.

2.14. The counterfactual case provided by NGGT in its CBA involved decommissioning both RB211s at the site. The counterfactual assumed that in order to meet the capacity requirements at the site, and to remain compliant with IPPC, an Avon-sized unit would need to be installed immediately.[16] The counterfactual also assumed increased asset health spend for the existing Avon units on the site would be of the same magnitude as the cost of the new compressor unit.

2.15. Following several rounds of supplementary questions, NGGT provided an updated counterfactual. The updated counterfactual involved decommissioning the two RB211s with no investment in a new compressor unit. [17] This option included significant constraint and asset health costs that, in NGGT's view, would make this option the least preferred solution.

Proposed works at Hatton

Hatton site and operation

2.16. Hatton compressor station is located in the east of England. It is used for the following:

- to facilitate gas flows from terminals to the north;
- to support the operation of storage sites in the North West;
- to provide demand support in the south east; and
- to support interconnector flows at Bacton gas terminal.

2.17. The Hatton site comprises four berths and four compressor units (see Figure 3 below), including:

- three RB211-24 gas turbine driven compressor units (Units A, B and C), with a maximum flow rate of 65 mcm/d each; and
- one electrically powered VSD unit (Unit D), with a maximum flow rate of 93 mcm/d.

2.18. Hatton provides operational flexibility on the NTS. Its location - sited between the demand centre of London and a significant supply point at Easington - means that it is used to support gas flows up to 130 mcm/d.

[16] NGGT discounted commercial options for meeting the capacity requirements due to the nature of the Aggregated System Entry Point (ASEP) between the three terminals and the unique agreement between NGGT and NSMP.
[17] If NGGT cannot supply compression capability to NSMP, constraint costs will be incurred as defined by Section I of the Uniform Network Code.

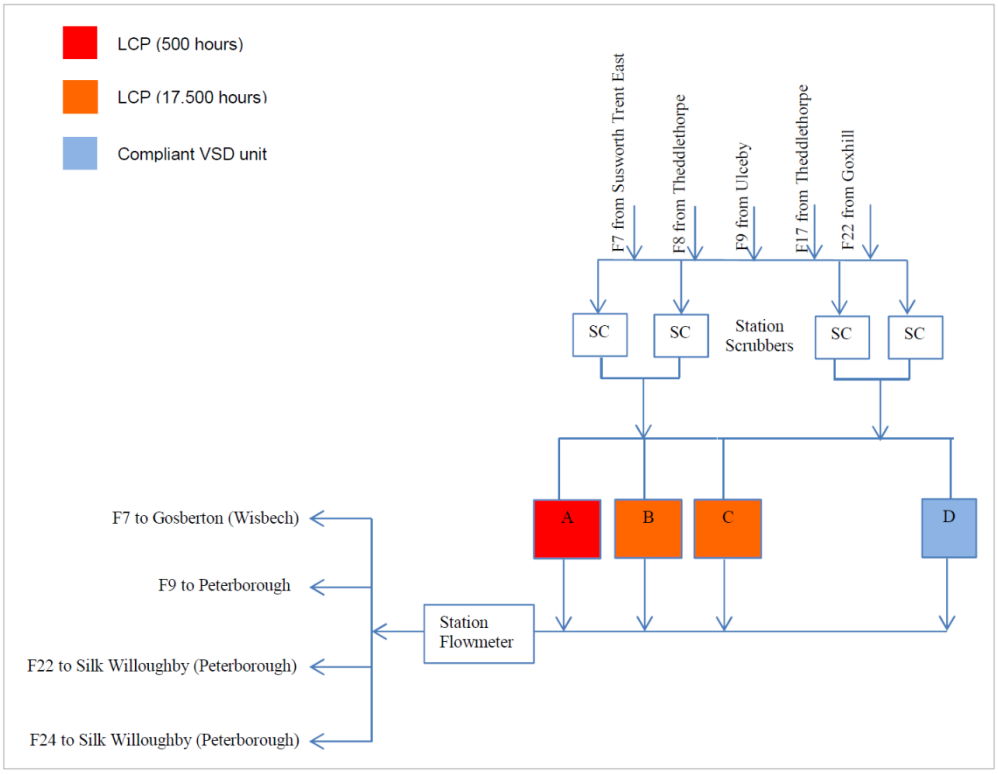


Figure 3 – The Hatton site configuration

Proposed works

2.19. NGGT's proposed works at Hatton[18] include installation of new compression and decommissioning of the two LCP non-compliant RB211 compressor units. The forecast spend profile of these proposed works is shown in Table 2 below.

Table 2 – Hatton forecast spend profile

£m (18/19 prices)	Prior Years	2018-19	2019-20	2020-21	2021 -22	2022-23	2023-24	2024-25	Total
Theta Option	0.2	0.5	16.1	10.1	24.1	21.5	17.0	1.2	90.8
Decommission two RB211		0.0	0.0	0.0	0.0	1.5	3.5	0.0	5.0

Environmental compliance - need to invest

2.20. In response to the requirements of the LCP component of IED, two non-compliant RB211s at Hatton site will need to be decommissioned before 31st December 2023. In its needs case, NGGT proposed decommissioning two of the RB211s at Hatton at a cost of £5.0m. NGGT further proposed installing new compression at a cost of £90.8m (18/19 prices) by the end of 2023.

[18] In the needs case submission, NGGT refers to its preferred solution as Theta Option.

2.21. In its submission, NGGT proposed to retain the remaining RB211 that is on derogation(EUD) to accommodate for 1-in-20 peak demand[19] resilience.

2.22. The results of the BAT assessment undertaken by NGGT for the Hatton site were presented to the EA. The decision of support in principle was given to NGGT's proposed solution at Hatton.

Technical need to invest

2.23. NGGT summarised the future capacity requirements of the site as needing to meet bulk flows of up to 93mcm/d for the majority of the year, and up to 130mcm/d during times of peak demand.

2.24. In its needs case submission, NGGT highlighted that Hatton allows for bulk transportation to take a shorter East Coast route down to the high demand areas in the South of England, facilitates gas export via IUK at the Bacton terminal, and helps to manage within-day fluctuations on the NTS. These functions were not quantified and were not included in the CBA for Hatton.

2.25. NGGT stated that an availability of 78% has been modelled for the electric VSDs at Hatton in its core CBA, with another CBA run using a 68% availability rating. The needs case submission also noted that the VSD unit at Hatton was taken out of service in December 2017 due to damage sustained to the compressor rotor, and that the unit should be back in service by 23 June 2019.

2.26. NGGT undertook analysis of the impact of investment at Hatton compared with alternative investment elsewhere on the network, known as the 'Cluster Analysis'. This formed a separate CBA as part of the 2018 IED reopener, and the outcome of this was that investment at Hatton was preferred compared to investment at multiple sites on the western route of the network.

Cost-Benefit Analysis

2.27. NGGT's counterfactual case for their CBA involved decommissioning the two RB211s on derogation (LLD) at the site, and retaining the remaining RB211 unit on derogation (EUD). NGGT considered several commercial options to avoid the need for investment at Hatton:

- A 'turn-up' contract with an LNG terminal to meet 1-in-20 demand requirements. This was included in the CBA, with cost estimates for this based upon the volume of gas required and cost per unit of gas. [20]

[19] The 1-in-20 peak day demand output provides a minimum security of supply standard to protect GB gas consumers. NGGT is obliged by its licence to ensure that the transmission system is capable of meeting a level of gas demand which is only likely to be exceeded (whether on one or more days) 1 year within 20 years.

[20] 'Turn-down' contracts were referenced in the submission but were not factored into the CBA.

- Renegotiation of Assured Operating Pressures (AOPs) was considered but discounted due to the need to renegotiate changes to agreements with owners of twelve different offtakes.

- NGGT considered that reduction of Assumed Normal Operating Pressures could be required without investment at Hatton. This needs case submission assumed that this would be negotiated as required, but no cost was assigned as part of the CBA.

3. Our Assessment

Section summary

We assess NGGT's submission site by site, assess their assumptions and develop our initial views based on their submission.

Questions

Q1: In your view has NGGT clearly set out the need for the proposed investment to comply with emissions legislation, including the impact on network capability and resilience at St Fergus and Hatton?

Background

3.1. In our 2018 IED reopener decision we stated that before agreeing the needs case for St Fergus and Hatton, *"we would expect to see a formal submission from NGGT that sets out the following information:*

- *An explanation of the needs case for investment, along with a clear statement of why the investment is needed for complying with emissions control legislation.*
- *A full specification of the final option to be delivered and timelines for delivery, including key milestones.*
- *A full cost benefit analysis to support the choice of solution, including details of alternative options considered.*
- *A detailed breakdown of the costs that are expected to be incurred to deliver that solution.*
- *The overall value to consumers that it expects to be delivered as a result of its chosen solution. This must include a statement of the expected impact of its solution on network capability, resilience, flexibility and long term costs."*[21]

3.2. We further added that "our assessment of NGGT's submission would consider whether it demonstrates that:

- *The proposed solution is triggered as a result of emissions control related legislation (in line with the definition of Industrial Emissions Costs in NGGT's licence).*
- *Its proposed solution delivers the most long-term value for consumers through a detailed cost benefit analysis that considers a range of reasonable options.*
- *It sets out clear and unambiguous regulatory commitments on the value that would be delivered for consumers, taking account of factors such as site compression capacity,*

[21] Page 8, RIIO-T1 Reopener Decision Letter, September 2018

system resilience, flexibility and long term costs. This should be expressed in the form of regulatory outputs.

- *A detailed forecast of the costs that is expected to be incurred in delivering its proposed solution (both during the RIIO-T1 and RIIO-T2 price control periods)."*[22]

3.3. Our 2018 IED reopener decision set out that our assessment approach would consider whether the proposed solutions for St Fergus and Hatton delivered value for consumers in terms of site compression capacity and system resilience.

St Fergus

Environmental compliance - need to invest

3.4. IED (LCP) – we agree on the need to decommission the existing RB211s at St Fergus in order to meet the IED LCP requirements for ELVs on units over 50MW thermal capacity.

3.5. IED (IPPC) – NGGT has claimed that in order to remain compliant with IPPC, some of the duty of the Avons at the site needs to be taken up by at least one new build Dry Low Emissions (DLE)[23] gas turbine.

3.6. In order to make up the duty of the decommissioned RB211 units, NGGT expected two Avons would need to be run in the place of one RB211. NGGT considers that running two Avons to take up the duty of one of the decommissioned RB211s will lead to an increase in emissions. Based on emissions figures provided by NGGT for each type of gas turbine, this substitution of units leads to a 40% reduction in NOx and a 20% increase in CO2 per compressor run-hour.

3.7. NGGT's estimate of emission levels per compressor run-hour is based on their preferred operational arrangement and availability of the remaining units at the site. Based on the evidence submitted, we are not convinced that NGGT has fully explored all potential operational arrangements at the site. For example, improving the availability of the VSDs could bring down emission per compressor run-hour. Based on our understanding of the age and type of equipment, the availability of the existing electric VSDs can be increased from the modelled 78% to above 90%. If this level of availability can be delivered on a consistent basis, this would directly reduce the use of older gas turbines on the site, thus reducing emissions level and mitigating the need for investment in new units.

3.8. In any case, the gas flow through St Fergus is predicted to drop (as per the FES and the Oil and Gas Authority's forecasts). This means that the required run hours at the site will decrease, resulting in decreasing trend of both NOX and CO2 emissions.

3.9. We, therefore, are not convinced that the proposed £80.4m investment is required to achieve compliance with IPPC.

[22] Ibid.
[23] Dry low emission is a technology that reduces NOx exhaust emissions of gas fired turbines.

3.10. MCP – In the absence of investment in new compressors in 2023, we note that new investment may be needed to support gas flows from 2030 onwards due to the restricted running hours on the Avons. This is based on NGGT's projects for flows through St Fergus. We expect NGGT to continue to review the capability at St Fergus and consider what the most economic and efficient approach to operating the site whilst complying with the relevant emissions legislation.

Technical requirements - need to invest

3.11. Due to the requirement to decommission the RB211s at St Fergus, the ability of the site to meet future capacity and availability requirements must be considered. In NGGT's submission only a peak flow requirement at St Fergus of up to 75mcm/d was specified, with limited data and analysis provided to justify the peak flow requirement that has been used as the basis of the submission.

3.12. In response to supplementary questions, NGGT provided Figure 4 below illustrating the flow distributions at the site over the past 5 years with the capacity of different compressor configurations as reference points. Flows above 60mcm/d represent less than 2.5% of the operational hours at the site.

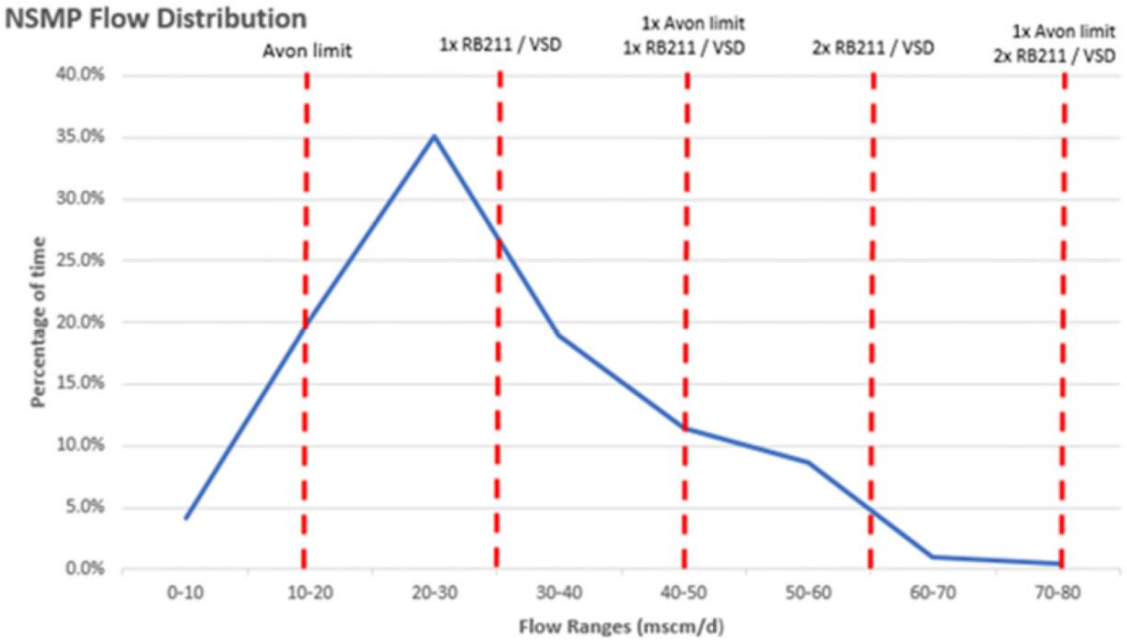


Figure 4 – Historical flow profile at St Fergus with associated compressor configurations

3.13. NGGTs preferred operating arrangement for the St Fergus site is shown in the table below. The provision of multiple compressors provides resilience and caters for times when compressors are not available because of faults or planned maintenance.

Table 3 – NGGT's current normal operating line up at St Fergus

Flow range	Compressor Arrangement
0-15 mcm/d	One Avon Unit
15-30 mcm/d	One VSD Unit
30-45 mcm/d	One Avon Unit and One VSD Unit
45-60 mcm/d	Two VSD Units
65+ mcm/d	Two VSD Units and One Avon

3.14. Using NGGT's initial needs case submission, it is difficult to ascertain the actual installed capacity at St Fergus, and the flows that the site will need to accommodate in the future. In response to supplementary questions, NGGT supplied us with their forecast flows at various ranges of compressor capacity.

3.15. NGGT has based its submission on the Steady Progression FES and provided sensitivity analysis for other scenarios. Based on NGGT's forecasts, flows through St Fergus are set to decrease under all FES scenarios. NGGT have provided evidence to show that flows in the 60-75mcm range will cease from 2020 onwards, with flows in the 45-60mcm range dropping significantly in the late 2020s.

3.16. Following the decommissioning of the RB211s at St Fergus, the site returns to a configuration similar to how the site operated prior to the installation of the two VSDs. Following the decommissioning of the RB211s, the site will have a fleet of 5 Avons and 2 VSDs remaining. In our view this provides significant resilience at the site. Based on the data provided, a single Avon and VSD will cover 90% of the flows through the NSMP terminal from 2020 onwards. The two VSDs will cover all flows forecast above this range, with the Avons available in the event of a VSD outage. Therefore, we do not currently see a need to invest in additional capability at the site.

3.17. We therefore do not see a reason the site could not continue to operate as it did historically, taking into account that flows are forecast to decline over the next decade.

3.18. Following the MCP compliance date of 01/01/2030, the Avons at St Fergus would need to reduce operation to a 5-year rolling average of less than 500 hours per annum. With this limitation, from 2030 onwards the site may not be able to meet all required flows without new compressor investment. As such, significant constraint costs may be incurred by NGGT unless investment is undertaken. We expect NGGT to continue to review the capability and availability at St Fergus on an ongoing basis.

Cost-Benefit Analysis

3.19. NGGT submitted a CBA for each site as part of its submission which, due to the commercial sensitivity, we have not published. In NGGT's CBA for St Fergus, the counterfactual case assumed that at least one new compressor unit had to be installed in order to remain compliant with the IPPC aspect of the IED. The "no investment" option was not considered as an option in the initial submission, despite our statement from the 2018 IED reopener that we were not convinced of the need to retain compression capability at the site. After requesting this NGGT provided an updated CBA to include a no investment option.

3.20. The CBA included a number of costs, including the capital cost of the proposed investment, on-going asset health costs and other operational costs such as fuel and emissions costs. Where appropriate NGGT also included contracting and buy-back costs and the explanation and justification for any costs was provided on request.

3.21. For the no investment option at St Fergus, NGGT claimed that significant asset health work would be required on the existing Avon fleet. The proposal would be for at least one Avon to undergo a full refurbishment at a cost almost equivalent to a new compressor unit.

3.22. NGGT made the assumption that a major overhaul of at least one existing Avon would be required but did not provide any asset condition information to support this.

Additionally, NGGT assumed that the asset would be needed for the same period as a new asset and did not consider that it would be reviewing its investment plan for the MCP deadline, which may only require the asset to operate for another 10 years. Hence, we are not convinced that comprehensive refurbishment work on these compressors is required.

3.23. NGGT's counterfactual also proposed to replace the existing compressor housing. In response to our supplementary questions, NGGT provided photos showing the condition of the building. Our view is that there is insufficient evidence of structural integrity issues which would require the housing to be replaced.

3.24. We have not carried out a detailed assessment of the asset health costs as part of this submission as it would be more appropriate for us to assess these asset health costs alongside the RIIO-2 submission to give a better basis for benchmarking and to understand the interaction between different asset health programmes. At this stage, given the lack of robust evidence to support the efficiency of these costs in the counterfactual, we are not convinced of the outcome of NGGT's CBA in favour of higher new investment options.

3.25. NGGT included buy-back costs at St Fergus for options where the site is not able to provide the necessary compression. These costs follow the calculation set out in Section I of Uniform Network Code (UNC), which we agree is appropriate.

3.26. Section I costs are incurred in all CBA beyond 2030 due to the restricted operation of the Avons at the site. The no investment option in particular shows over £20m per year in constraint costs once the Avons are limited to 500 hours per year.

3.27. We recognise that investment may be required for MCP at St Fergus in due course. However this deadline is in 11 years and the current consideration is the IED deadline of 2023. NGGT has not demonstrated that it is appropriate to invest at this time to address future constraint costs due to MCP.

Solution

3.28. We agree with the need to decommission the RB211s at St Fergus, however based on the environmental and technical requirements at the site our initial view is NGGT do not need to invest in new compressor units at this time.

Hatton

Environmental compliance - need to invest

3.29. IED (LCP) – we agree there is a need to decommission the two RB211s on derogation (LLD) at Hatton in order to meet the emissions (IED LCP) requirements for ELVs on units over 50MW thermal capacity. Additionally, we accept that retaining one RB211 on derogation (EUD) is necessary for times of high South Eastern demand. The explanation for our view is provided later in this section.

Technical requirements - need to invest

3.30. Due to the need to decommission two of the RB211s at Hatton and the third RB211 facing restricted running hours, the need for future capacity and resilience at the site must be considered.

3.31. Figure 5 below displays the flow profile range for the site between 2013/14 and 2017/18 with existing compressor operational limits also noted. Flows of above 98mcm/d represent less than 4% of operational hours on the site.

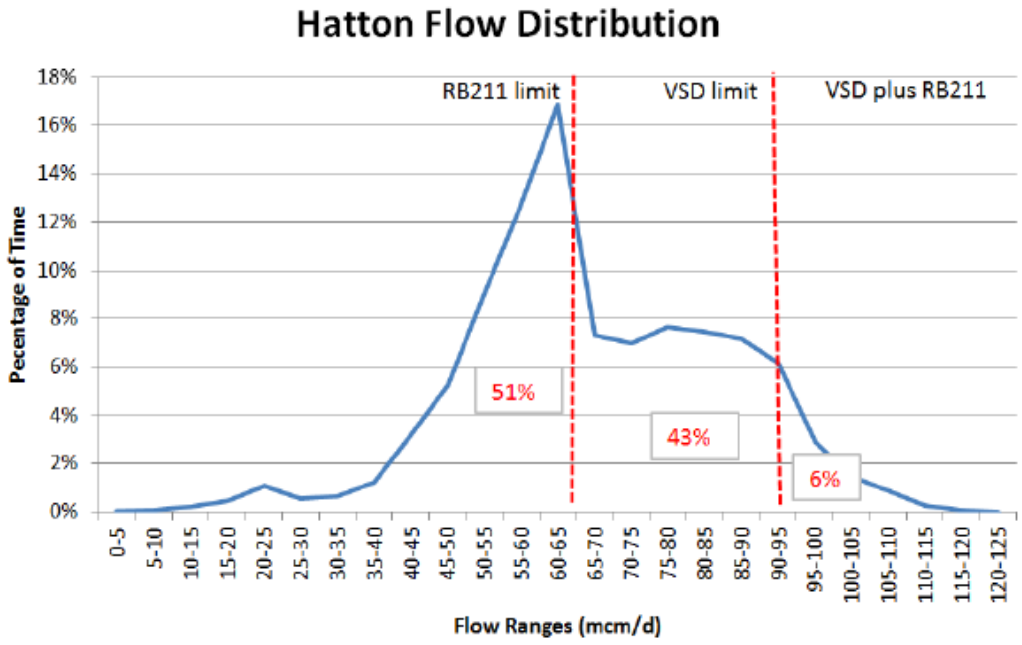


Figure 5 - Hatton Flow Distribution

3.32. NGGT's preferred operating arrangement for the existing Hatton site is shown in the table below. The provision of multiple RB211s provides resilience and caters for times when the VSD is not available because of faults or planned maintenance.

Table 4 – NGGT's current normal operating line up at Hatton

Flow range	Compressor Arrangement
50-93 mcm/d	One VSD Unit
93-125 mcm/d	One VSD Unit + One RB211

3.33. The VSD at Hatton would remain as the lead compression unit with a single RB211 only available for a maximum of 500 hours per year. Therefore, if there was no investment at the site then the overall capacity of Hatton would be significantly reduced compared with current operations. Whilst the capacity would still be sufficient to meet all forecast flows there would not be any resilience for 1-in-20 demands at the site were either the VSD or RB211 unavailable.

3.34. Based on information we have received from NGGT, whilst the sites around Hatton can take up bulk gas transport duties when Hatton is unavailable, they are not able to meet 1-in-20 South East demand.

3.35. Based on the projections of the Steady Progression FES, with reduced capacity at Hatton there is a risk that 1-in-20 demand levels could not be met. To mitigate this, NGGT would need to secure a supply contract. Under the Two Degrees FES scenario[24] reduced demand levels would mean this risk does not materialise and this contract wouldn't be required.

3.36. NGGT has included contracting costs in the CBA for Hatton for options where the site is not able to provide the necessary compression. On request NGGT also provided the calculation used for each of these costs.

3.37. For the contracting costs at Hatton, we have not reviewed the method NGGT has used to determine these costs in detail and are not accepting or rejecting the approach. NGGT has assumed that contracting would be required rather than considering whether compressors at other sites can help provide the necessary compression which would avoid any contracting costs. The contracting costs incurred are greater than the cost of investing in new compression capability.

3.38. NGGT also highlighted that a long-term supply contract of this kind has not been established before, and there is a significant risk that if the contract could not be maintained, it may be impossible to guarantee 1-in-20 demands can be met in the long run.

3.39. As such, when considering the need for bulk transportation capability, the reduced need for future investment at other sites, and the need to meet 1-in-20 demands on the network, we accept the technical need to invest in compression capability at Hatton.

Solution

3.40. NGGT's preferred solution requires construction of new compression on a greenfield location within the site's boundaries. This need for a greenfield construction is driven by a proposal to retain an RB211 on 500 hours' derogation.

3.41. We do not agree that the solution NGGT has proposed at Hatton represents the most efficient means of retaining resilience at the site, in terms of the total compression capability provided and the way lower capital spend options such as retrofit have been discounted. These options are discussed below.

3.42. We agree with NGGT's proposal to retain the existing RB211 as this provides resilience for 1-in-20 flows without investing in a new compressor unit.

3.43. NGGT claims that the retention of this RB211 requires asset health spend of similar magnitude to the construction of a new compressor unit within all options, with the level of spend varying from option to option.

3.44. The difference in asset health costs for this RB211 would be enough to swing the CBA in favour of NGGT's non-preferred new build options. We would expect asset health spend to be no different for each option given the unit is limited to 500hrs/yr and this

[24] In Two Degrees, large-scale solutions are delivered and consumers are supported to choose alternative heat and transport options (particularly hydrogen) to meet the 2050 decarbonisation target.

means that asset health costs would not determine the outcome of the CBA options where investment in at least one new unit is proposed.

3.45. Furthermore, as we have outlined above we do not accept NGGT's view that a major refurbishment of the RB211 would be required at Hatton due to a lack of condition based evidence.

Retrofit

3.46. Our view is that generally, the lowest cost means of meeting emissions compliance for a compressor unit would be to fit a low emissions version of the existing gas turbine and retain the exiting compressor system. This is known as a retrofit solution. Both Ofgem and the consultants who reviewed the 2015 IED reopener have questioned NGGT discounting this option in the past[25].

3.47. The responses we have received[26] to discount this option have been qualitative, referencing how additional engineering work would be needed to fit a DLE RB211 to the existing compressors. NGGT also raised concerns around the ability of the DLE RB211 to meet required emissions levels at low loads. However, this has not been quantified and there may be engineering solutions available to overcome this issue. In addition, NGGT stated that the timing of when DLE RB211 would become available on the market would make this option not plausible.

3.48. NGGT has not provided costs or a CBA for a DLE retrofit option, as such it is not clear to us that potential engineering costs are grounds for discounting this option entirely when it could potentially avoid the need to build on greenfield and overall save on costs for construction and new equipment.

3.49. Based on the information we have received to date, we are not convinced that a retrofit option at Hatton should be discounted.

Single unit solution

3.50. A single large compressor option presented in NGGT's CBA shows lower capital costs than the other investment options but higher asset health and contracting costs which means it does not come out favourably in the CBA. The unit selected was presented as being incapable of running alongside the VSD at times of peak demand. As such, this reduces availability at 1-in-20 demand levels compared with the other options presented because it can only run alongside the RB211. Due to this reduced availability NGGT's view is that contracts are still required to ensure 1-in-20 demands can be met reliably.

3.51. As detailed above we do not agree that the asset health costs for this single compressor unit option would be higher than the other options because the RB211 is limited to 500hrs and NGGT has not provided any evidence to support this assumption.

[25] Pg9 https://www.ofgem.gov.uk/ofgem-publications/96032/14606-rpt-pm-001reviewofngiedinvestmentc1redacted1-pdf

[26] Responses from NGGT to our supplementary questions during 2015 reopener, 2018 reopener, and current needs case submission.

3.52. NGGT has not considered the option of altering the design of the proposed single compressor unit to reduce peak output in order to allow parallel operation with the VSD. This reconfiguration should be possible, and would give the proposed single compressor unit similar levels of 1-in-20 resilience to the preferred solution.

3.53. We are also concerned that NGGT's design duty points[27] have been based around building new compressors to provide equivalent capability to the VSD, rather than considering whether a lower capability would be sufficient at the site.

[27] A compressor duty point is a combination of pressure and gas flow. NGGT provide a range of duty points to OEMs during the tendering process for new compressors, and solutions are put forward based upon these operating scenarios.

4. Our Initial Views

Section summary

This Section sets out our initial views on the needs case and options put forward for St Fergus and Hatton, and our proposed Cost Assessment approach.

Consultation Questions:

Q2: Do you agree with our initial view that new investment at St Fergus is not required at this time as there is sufficient capability from existing compressors at the site?

Q3: Do you agree with our initial view that new investment at Hatton is needed at this time to maintain the existing capability and resilience at the site?

Q4: Do you agree with our initial view that NGGT has not sufficiently demonstrated that the current proposed solution at Hatton is the most economic option?

Q5: Do you agree that our approach to assessing the technical aspect of the options proposed by NGGT is appropriate?

St Fergus needs case

4.1. Based on our assessment of NGGT's submission we agree with the need to decommission the RB211s at St Fergus. We do not currently consider there to be a technical need to invest as the existing compressor fleet is able to meet current forecasts of flows at the site. We are not convinced that the proposed £80.4m investment is required to achieve compliance with IPPC.

4.2. Additionally, given a lack of evidence regarding asset condition, we do not accept NGGT's view of asset health work that has been included for the no investment option and we are not convinced by the CBA presented. Since the assessment of the asset health costs is out of scope for this consultation, we have not provided our view of the efficient asset health spend. However, this is not relevant to forming our initial view.

4.3. There is significant uncertainty over the future of gas as seen in the latest FES publication. The ability of the St Fergus site to meet required gas flows may need to be reviewed for the 2030 MCP deadline. We will assess any future needs case and proposed solution based on the merits of the submission at the time.

Hatton needs case

4.4. Based on our assessment of NGGT's submission we accept that there is a need for investing in new compression capacity at Hatton while complying with IED. This initial view is based on our assessment that it is appropriate to have resilience at Hatton to

avoid investment at multiple other sites and to ensure that 1-in-20 demand can be met without having to rely on contracting with third parties.

4.5. However, based on our review of the options selection process undertaken by NGGT and relative costs of the options, we are not convinced of the solution put forward by NGGT at this time. This initial view is based on our assessment that NGGT has not considered an appropriate set of options, in particular the inadequate qualitative reasoning for not considering retrofitting an existing RB211.

4.6. Furthermore, NGGT has not considered adjusting design duty points and this has driven the market to only provide single unit solutions which are oversized, or complex multi-unit solutions which require expansion of the existing site. It may be possible to invest in a slightly smaller single unit solution at Hatton which could result in lower overall costs.

4.7. We would welcome further evidence on the parallel operation of a single compressor unit with the VSD at Hatton and the appropriateness of the duty points on which the current solutions are based. Where appropriate, the findings of this work should be reflected in an updated CBA.

4.8. We have not considered whether the cost of the preferred solution is efficient. However, we would question whether it is necessary to build on a greenfield site rather than make use of the existing compressor bays. NGGT has claimed that this is due to revised proximity limits in its health and safety processes. However, we would want NGGT to clearly show the relevant legislative conditions that prevent this from being an option.

Cost assessment approach

4.9. If, as a result of this consultation including further evidence provided, we agree on the needs case and proposed solution in our decision document, we will undertake cost assessment for the project as part of RIIO-2 price control settlement.

4.10. Where we do not agree with the needs case, we expect NGGT to continue to review the capability requirements of the network and, if appropriate, propose its view of the appropriate way forward as part of its RIIO-2 Business Plan. We will assess the proposals based on the merits of the submission presented to us at the time.

Appendices

Index

Appendix 1 – Consultation questions

This Appendix lists out all of the consultation questions that are set out throughout this document:

Q1. In your view has NGGT clearly set out the need for the proposed investment to comply with emissions legislation, including the impact on network capability and resilience at St Fergus and Hatton?

Q2. Do you agree with our initial view that new investment at St Fergus is not required at this time as there is sufficient capability from existing compressors at the site?

Q3. Do you agree with our initial view that new investment at Hatton is needed at this time to maintain the existing capability and resilience at the site?

Q4. Do you agree with our initial view that NGGT has not sufficiently demonstrated that the current proposed solution at Hatton is the most economic option?

Q5 Do you agree that our approach to assessing the technical aspect of the options proposed by NGGT is appropriate?

Appendix 2 – Responding to this consultation

How to respond

We want to hear from anyone interested in this consultation. Please send your response to the team and the email address set out in this document's front page.

We have asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.

We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations and will put it in our library.

Your response, data, and confidentiality

You can ask us to keep your response, or parts of your response, confidential. We will respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do wish us to keep your response confidential, please clearly mark this on your response and explain why.

If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you do wish to be kept confidential and those that you do not wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we'll get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.

If the information you give in your response contains personal data under the General Data Protection Regulations 2016/379 (GDPR) and domestic legislation on data protection, the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy notice on consultations in Appendix 3.

If you wish to respond confidentially, we will keep your response confidential but will publish the number (but not the names) of confidential responses we receive. We will not link responses to respondents if we publish a summary of responses. We will evaluate each response on its own merits without undermining your right to confidentiality.

General feedback

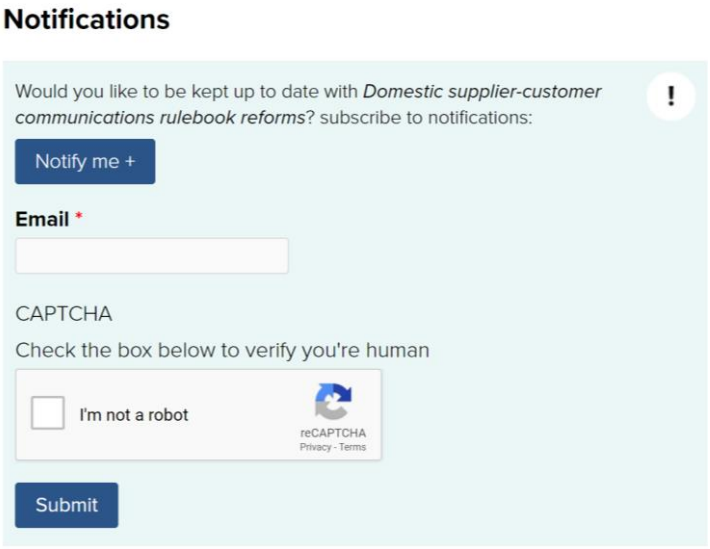
We believe that consultation is at the heart of good policy development. We welcome any comments about how we've run this consultation. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall process of this consultation?
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. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

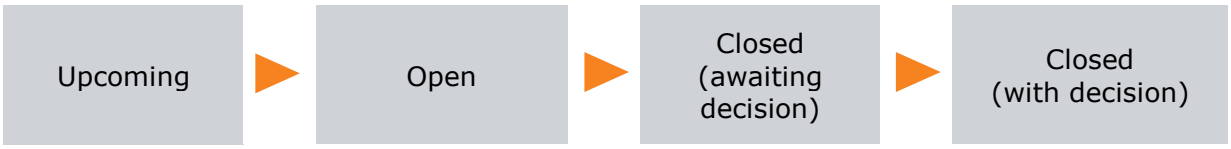
Please send any general feedback comments to stakeholders@ofgem.gov.uk

How to track the progress of the consultation

You can track the progress of a consultation from upcoming to decision status using the 'notify me' function on a consultation page when published on our website. Ofgem.gov.uk/consultations.



Once subscribed to the notifications for a particular consultation, you will receive an email to notify you when it has changed status. Our consultation stages are:



Appendix 3 – Privacy notice on consultations

Personal data

The following explains your rights and gives you the information you are entitled to under the General Data Protection Regulation (GDPR).

Note that this section only refers to your personal data (your name address and anything that could be used to identify you personally) not the content of your response to the consultation.

The identity of the controller and contact details of our Data Protection Officer

The Gas and Electricity Markets Authority is the controller (for ease of reference, "Ofgem"). The Data Protection Officer can be contacted at dpo@ofgem.gov.uk

Why we are collecting your personal data

Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

Our legal basis for processing your personal data

As a public authority, the GDPR makes provision for Ofgem to process personal data as necessary for the effective performance of a task carried out in the public interest, i.e. a consultation.

With whom we will be sharing your personal data

- Where the disclosure is required by law, statutory direction, court orders, or is necessary for the purposes of RIIO-2 price control.
- Where you give us explicit permission to disclose it.

For how long we will keep your personal data, or criteria used to determine the retention period.

We will retain your personal data for the duration of the RIIO-2 price control plus 6 years.

Your rights

The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right to:

- know how we use your personal data
- access your personal data
- have personal data corrected if it is inaccurate or incomplete
- ask us to delete personal data when we no longer need it
- ask us to restrict how we process your data
- get your data from us and re-use it across other services
- object to certain ways we use your data

- be safeguarded against risks where decisions based on your data are taken entirely automatically
- tell us if we can share your information with 3rd parties
- tell us your preferred frequency, content and format of our communications with you
- to lodge a complaint with the independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at https://ico.org.uk/, or telephone 0303 123 1113.

Your personal data will not be sent overseas.

Your personal data will not be used for any automated decision making.

Your personal data will be stored in a secure government IT system.

More information

For more information on how Ofgem processes your data, click on the link to our "Ofgem privacy promise".