Making a positive difference for energy consumers

Guidance

Compressor Emissions Compliance Strategy Guidance

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This is a guidance document to support National Grid Gas Transmission (NGGT) to develop its Compressor Emissions Compliance Strategy.

This document has been produced by Ofgem but contains contributions from the Environment Agency, Scottish Environment Protection Agency and Natural Resources Wales, collectively referred to as the Environmental Regulators. These contributions are clearly outlined in the Appendix to this document.

Contents

1. Introduction

Context

1.1 National Grid Gas Transmission (NGGT) operates a number of gas-fired compressors across the gas transmission network. These compressors maintain the pressure of gas on the network and help ensure that gas is transported across Great Britain to areas where it is needed. The operation of gas compressors results in the emission of a range of air pollutants which NGGT is legally obliged to control and manage. This document focuses on carbon monoxide and nitrogen oxide emissions.

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

- The Industrial Emissions Directive;
- Medium Combustion Plant Directive; and
- Ambient Air Quality Directive.

1.3 Compliance with emissions regulations is assessed by the Environment Agency (EA), Scottish Environment Protection Agency (SEPA) and Natural Resources Wales (NRW) for sites in England, Scotland and Wales, respectively.[1]

1.4 NGGT's proposed expenditure for compressor investment and relevant associated equipment is assessed by Ofgem and agreed on an ex ante basis for the duration of a price control period.

1.5 Through discussions held at a working level between Ofgem and the ERs, we[2] have identified potential benefits from joint working between the regulators to ensure NGGT's investment to ensure compliance with its environmental obligations is done in an economic and efficient manner.

1.6 Ofgem engaged previously with the ERs when reviewing NGGT's 2018 reopener submission regarding industrial emissions costs, which determined the level of funding granted for works specifically linked to emissions compliance. During this process, we identified that collaboration between Ofgem and the ERs on future emissions reduction projects would provide benefits for all parties involved.

1.7 To this end, we have decided that NGGT should produce a Compressor Emissions Compliance Strategy (CECS). This strategy should cover all works relating to compressors and relevant associated equipment in order to meet industrial emissions legislation through to the end of RIIO-2, and in the subsequent price control periods. The CECS should be submitted alongside NGGT's RIIO-2 Business Plan.

1.8 The CECS should represent an optimal compressor investment and system operation plan that will meet emissions legislation and long-term needs of the network.

[1] These organisations will collectively be referred to as the Environmental Regulators (ERs) throughout this document.
2 The terms "we", "Ofgem", "the Authority" are used interchangeably, unless stated otherwise.

Purpose of this document

1.9 This guidance document aims to provide greater transparency and certainty to Ofgem and the ERs on NGGT's proposed approach to compressor emissions compliance over the RIIO-2 price control period, and in the subsequent price control periods. We expect NGGT to develop CECS in reference to this guidance document.

1.10 For the avoidance of doubt, this document does not cover the Emissions Trading Scheme, which places specific requirements on the system operator which have to be met.

1.11 This document does not provide any new compliance/ legal requirements or assessment criteria. Instead, it aims to provide transparency to the decision making processes adopted by Ofgem for approving funding for NGGT's large-scale projects and by ERs for issuing environmental permits.

1.12 By working together to produce this guidance, Ofgem and the ERs are aiming to ensure that NGGT's CECS will deliver a programme of work that is both environmentally compliant and cost efficient, thus meeting the requirements of ERs and Ofgem.

1.13 Rather than giving direct guidance on environmental legislation itself, in Appendix 1, the ERs have provided a summary of the relevant legislation and links are provided throughout this document to pre-existing reference material.

Structure of this document

1.14 Following this introduction, the rest of the document is structured as follows:

- Chapter 2: Ofgem RIIO-2 Priorities – this chapter provides an overview of Ofgem's RIIO-2 priorities and highlights overlaps between CECS and other RIIO-2 outputs.
- Chapter 3: CECS – this chapter provides guidance on the topics that should be covered by the CECS as a minimum standard. It also sets out at a high-level Ofgem's approach to assessing NGGT's CECS.
- Chapter 4: Next Steps.
- Appendix 1: ERs' Contribution to this Document - this Appendix includes ERs' summary of relevant legislation, overview of ERs' priorities for 2021-2026 and beyond, and ERs' high level approach to assessing NGGT's CECS.

2. Ofgem RIIO-2 Priorities

This chapter outlines Ofgem's role in assessing NGGT's compressor investment programme within the RIIO framework. It also highlights overlaps between the CECS and other RIIO-2 outputs.

Ofgem's role

2.1 Ofgem's principal objective in carrying out its functions is to protect the interests of existing and future consumers.

2.2 We set price controls for the gas and electricity networks within Great Britain (GB) using the RIIO Framework.[3] The RIIO-2 price control period will commence on 1 April 2021 and will last 5 years. Within this period, NGGT has highlighted that it will be proposing to undertake a significant investment programme to ensure its fleet of gas-fired compressors meet key deadlines for compliance with environmental legislation in 2023[4] and 2030[5].

Monitoring of delivery against outputs and funding adjustments

2.3 Funding for large-scale projects is provided on an ex-ante basis, where possible. Through the use of Price Control Deliverables (PCDs)[6], consumers are protected from under-delivery on proposed investment.

2.4 In our RIIO-2 Sector Specific Methodology Consultation – Gas Transmission, published in December 2018, we proposed two types of PCDs that could be set for compressor works:

- Option 1: PCDs may be specified as specific asset solutions, e.g. two new 15MW gas turbine compressor units at site X, or one existing 30MW gas unit at site Y fitted with Selective Catalytic Reduction technology.
- Option 2: PCDs may be specified by reference to specific asset solutions (as in Option 1) but with an explicit option to deliver a different solution that provides equivalent long term network capability, e.g. a long term bidirectional flow capability at site X of 50 mcm/day or higher.

2.5 We also considered two approaches for assessing compliance against PCDs under option 2:

- Option 2A: We would accept any solution that provides equivalent long-term network capability; or

[3] The RIIO model focuses on setting Revenues using Incentives to deliver Innovation and Outputs to encourage energy companies to a) play a fuller role in delivery of a more sustainable energy sector, and b) deliver value for money network services for existing and future consumers.
[4] http://ec.europa.eu/environment/industry/stationary/lcp/chapter3.htm
[5] http://ec.europa.eu/environment/industry/stationary/mcp.htm
[6] PCDs capture those outputs that are directly funded through the price control and where the funding provided is not transferrable to a different output or project.

- Option 2B: We would accept any solution that provides equivalent long-term network capability as long as the change of solution is demonstrated by NGGT to be driven by genuine innovation.

2.6 As outlined in RIIO-2 Sector Specific Methodology Decision - Gas Transmission, published in May 2019, we intend to use outcome-based PCDs (as described above under Option 2A) to hold NGGT to account for the delivery of emissions reduction across its compressor fleet, where applicable, based on the information in NGGT's Business Plan. These PCDs will allow some flexibility in the solutions NGGT uses, so long as the solutions provide equivalent long-term network capability.

2.7 We expect NGGT to propose PCDs for any investment associated with compressor works in its Business Plan, including the most appropriate measure to assess the outputs against. We will consider the design of proposed PCDs as part of our assessment of the Business Plan. Where we are unable to agree on a suitable measure we may revert to input-based PCDs (as described above under Option 1). If a solution is changed such that it no longer delivers the agreed PCD, we expect to claw back the associated funding.

2.8 Where there is uncertainty around the needs case for retaining compression capability at a site, or around the costs of replacement work for non-compliant units, we expect to provide an allowance subject to a reopener within year 2 of the RIIO-2 price control period. This would be subject to our assessment of the Business Plan.

Dealing with medium to long-term uncertainty

2.9 Based on National Grid's Future Energy Scenarios (FES) 2018 report, both annual gas demand and 1-in-20 peak day demand[7] are set to decrease from their current levels in all four scenarios. 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, shale gas or green gas likely to play a far greater role in the UKs future gas supply.

2.10 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).[8] There is a risk that compression capacity that has been replaced to meet emissions legislation may no longer be needed in the long term. This is known as asset stranding. Its risk and potential consequences should be considered when assessing the needs case for any replacement work on the NTS.

2.11 As set out in our RIIO-2 Sector Specific Methodology Decision - Gas Transmission Annex, we have decided that NGGT should undertake an assessment of the physical capability of the National Transmission System (NTS). The following reports will be delivered as part of its Business Plan:

[7] 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.

[8] 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.

- an initial network capability report setting out the physical capability requirements of the NTS on 1 April 2021 based on user needs;
- a network capability target report setting out user requirements for network capability that NGGT will deliver by the end of the RIIO-GT2 price control period. It should also set out NGGT's longer-term forecast of the levels of physical capability the NTS must provide to efficiently service user needs; and
- a baseline obligated capacities report setting out the results of its assessment of the appropriateness of the current levels of baseline obligated entry and exit capacities including any proposals for revisions to baseline capacities.

2.12 NGGT's Business Plan and CECS should align investment with the delivery of the network capability targets and longer term needs of the network.

3. The Compressor Emissions Compliance Strategy

This chapter outlines the topics that should be covered within the CECS, as a minimum standard of the submission. It also summarises the timeline for delivery of the CECS and Ofgem's approach to assessing NGGT's submission.

CECS development principles

3.1 The CECS submission should follow the same approach as other investments in the Business Plan, specifically adhering to the principles of the Business Plan Guidance and the investment decision pack guidance.

3.2 Where NGGT applies the FES to understand the changing flows on the network, we would expect to see an assessment of the needs case for replacing compressor units that do not meet emissions legislation. We expect this assessment to include consideration of the impacts of derogation or decommissioning options. Furthermore, we would expect to see an in-depth analysis of how the current capability needs of the network have been weighed up against potential future flexibility requirements.

3.3 All proposed investments should be supported by options assessment with stress testing of solution. This assessment should also include any potential commercial solutions that could reduce the need for physical capability at a site.

3.4 Any assumptions made about the future of the network or legislation should be consistent with those used in other areas of NGGT's Business Plan. These should be consistent with scenarios presented for asset health and the outcomes of the network capability review. Future scenarios should consider developments beyond the RIIO-2 price control period, and assess the options across the NTS for different routes of decarbonisation of the GB energy system and different user needs. Any assumptions made based upon a specific decarbonisation route (or lack thereof) should be linked to existing publications.

3.5 Where there is significant uncertainty around the need for a compressor due to either decreasing flows or other changes in flows, NGGT should consider no/low-regret investment options (for example, derogation of units, where possible, or market-based solutions to meet capacity needs, if appropriate).

Contents of the CECS document

3.6 This section aims to provide guidance on the contents of NGGT's CECS submission. It is not an exhaustive list but sets out our minimum expectations for the submission.

Compressor utilisation and emissions

3.7 Summary of current state of emissions compliance across the NTS, showing site by site which units are compliant with which sets of regulations, and which are currently under derogation or are set to be decommissioned.

3.8 Summary of how the NTS will look at the end of RIIO-2, showing units which have been replaced or abated, have ongoing works, will be derogated or will be decommissioned.

3.9 Summary of how the compressor fleet will look by the MCP compliance date of 01/01/2030.

Options analysis for each site

3.10 An overall counterfactual case demonstrating the impact on the NTS if no action is taken to make compressor units compliant, and instead compressors are run on derogations. This should also include evaluation of the risk of non-compliance with relevant legal requirements due to operational factors, such as VSD maintenance, outages, etc.

3.11 Candidate BAT options to meet relevant legislative requirements should be detailed for each site. This will form the list of all possible compliant investment options that NGGT can consider during the RIIO-2 price control.

3.12 Summary of planned innovation projects for the remainder of the RIIO-1 price control and the RIIO-2 price control which may produce new BAT candidate options.

RIIO-1 reflections

3.13 Summary of changes to solutions at sites included in the RIIO-1 2018 re-opener submission, with rationale given for changes in solutions.

RIIO-2 priority sites

3.14 Priority sites for action during RIIO-2, including:

- Compressor plant proposed for replacement or upgrade investment
- Compressor plant expected to utilise available derogations within IED and MCPD
- Compressor plant expected to cease operation

3.15 Historical and current compressor utilisation and emissions, showing annual and 5-year average annual runtimes. Units which are still in the process of commissioning or have had significant downtime due to repairs should be highlighted.

3.16 It should be acknowledged that historic compressor runtime influences the compliance options open for a combustion plant. It may be possible for an existing unabated plant to continue to operate under a 500-hour derogation. If a plant is anticipated to operate in excess of those hours then, in NGGT's situation, the unabated plant will need to be upgraded, as it cannot meet the emissions limits set out in the relevant legislation due to the gap between its current emissions and the new requirements.

3.17 Future operation plan for each compressor site. This should cover the role each site will play in the running of the network and any changes in the requirements of a site due to future supply and demand scenarios. NGGT's Network Capability Assessment should be used to demonstrate potential interactions between sites in terms of redundancy and sites that provide flexible capability to the network should be highlighted. The potential for commercial solutions to replace the need for physical capability at a site should also be explored.

3.18 Preliminary BAT assessment and results for each high priority site where possible.

3.19 Clear demonstration of how compressor upgrade, replacement or decommissioning work will impact NGGT's NARM outputs for RIIO-2.[9]

3.20 Reliability, Availability and Maintainability (RAM) levels for the proposed site solutions based on forecasts - including extreme flow scenarios - as separate examples.

Beyond RIIO-2

3.21 High-level initial assessment and results for sites that will require action after RIIO-2. This should specify the total level of capability required for each site and the input power ratings of the units which will deliver this capability. The level of certainty for the requirements at each site should be given, along with any potential drivers of changes to the solution at a site. Cost estimates for delivering the required level of capability at each site should also be included.

Delivery plan

3.22 For sites to be completed during RIIO-2, delivery plan and timelines for each high-priority site should be submitted, showing milestones and deadlines. For sites to be completed after RIIO-2, key mid-project milestones targeted for delivery by 2026 should be submitted.

3.23 A clear demonstration that the plan set out in the CECS is deliverable in terms of timelines for procurement, operation of the compressor fleet during outages, parallel asset health works and any other potential bottlenecks foreseen by NGGT.

Stakeholders

3.24 Stakeholder engagement plan detailing timing of engagement stages and methods of engagement with different stakeholder groups.

Appendices

3.25 Supplementary CBA and engineering justification paper for any works proposed should be submitted using Ofgem's templates and following the associated guidance. CBAs and engineering justifications should be given for both site-by-site works and also for any zonal/cluster analysis put forward.

3.26 Appendix setting out key assumptions, dependencies, uncertainties and risks affecting the assessment of solutions at each high priority site.

3.27 Appendix containing list of reference material for the setting of BAT.

3.28 Board level assurance statement certifying that the analysis and proposed solutions will provide an economically optimal solution that will deliver highest consumer value and

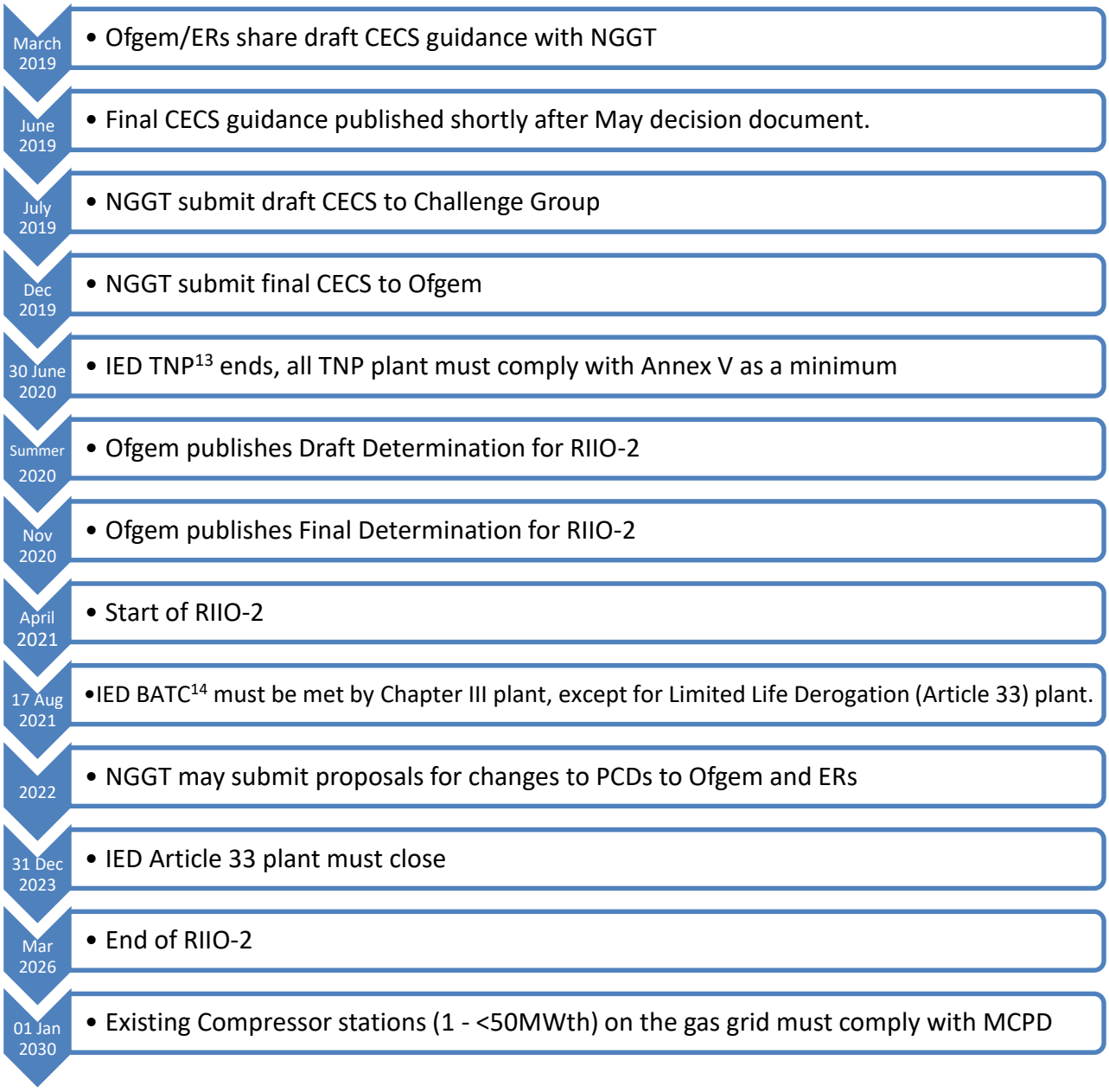
[9] NARM - Network Asset Risk Measure - is the primary measure for defining the output targets and setting allowances associated with asset resilience.

reflects all information that might have been reasonably available at the time of submission.

Timeline

3.29 Figure 1 sets out the timeline for delivery of CECS and subsequent regulatory milestones.

Figure 1. CECS delivery timeline



[10] A transitional national plan (TNP) sets a ceiling for the maximum total annual emissions for all of the plants covered by the plan in accordance with the rules specified in the IED.
[11] The BAT Conclusions (BATC) is a document containing the parts of a BAT reference document laying down the conclusions on best available techniques.

Assessment of the CECS

3.30 Ofgem's assessment of the CECS will be independent of the assessment carried out by the ERs, and will primarily focus on the needs case for any proposed works. For the avoidance of doubt, a CECS that puts forward a compliant set of solutions for each compressor site but fails to justify expenditure will not be sufficient for Ofgem to grant the requested funding.

3.31 Ofgem's approach to assessing NGGT's CECS is likely to consider, amongst other things, the following:

- Whether the proposed strategy represents an optimal compressor investment and system operation plan that will meet relevant industrial emissions legislation by 2023 and 2030. This should be demonstrated through the analysis of all potential options, including:
    - Different operating strategies;
    - Different types of compressor investment;
    - Interactions between different sites; and
    - Commercial solution alternatives.
- Whether the analysis underpinning the CECS is supported by the following:
    - Detailed needs assessment;
    - Incorporation of the Network Capability Targets for proposals of any compressor replacement, refurbishment and/or decommissioning work;
    - Scenario analysis and stress tests; and
    - Impacts on NARMs.
- Whether proposals are backed by robust evidence and justification, and demonstrate value for money for existing and future consumers.
- The value that consumers will receive from proposed compressor and associated equipment investment.
- Evidence of due consideration given to whole system solutions. This means that CECS should look not just across the regulated gas and electricity sectors for solutions, but may investigate opportunities in any area as long as it can demonstrate net benefits from doing so for existing and future consumers of their network sector.

4. Next steps

4.1 We expect NGGT to develop its CECS in reference to this guidance document. We expect NGGT to use its CECS to inform its Business Plan proposals.

4.2 As part of Draft Determination for the RIIO-2 price control period in June 2020 we will set out the outcome of our assessment. This will include proposals for price control deliverables (solutions) at each compressor site, and appropriate funding for the delivery of those solutions.

Appendix 1: Guidance from the Environmental Regulators for the development of NGGT's CECS

Background to relevant environmental legislation

5.1 There are three main Directives that influence NGGT's operations. These are:

- The Industrial Emissions Directive (IED) encompasses 7 previous Directives including the Large Combustion Plant (LCP) and Integrated Pollution Prevention and Control (IPPC) Directives.
- Medium Combustion Plant Directive (MCPD), and
- Ambient Air Quality Directive

5.2 The IED and MCPD are implemented via transposing regulations (Environmental Permitting Regulations in England and Wales, Pollution Prevention and Control Regulations in Scotland. EPR and PPC require prescribed facilities, such as NGGT's compressor stations, to hold a permit to operate. The permit sets out the emissions limits and operating conditions that an installation is required to function within using Best Available Techniques ("BAT"). Within the IED, there are a number of related requirements depending on the scale of the combustion plant. Table 1 below outlines the applicable Directives and their effect on NGGT's gas compressors.

Table 1: ERs' summary of relevant combustion emissions control legislation

Legislation	Scope	Implications for NGGT gas compressors
Industrial Emissions Directive	Chapter II activities	All NGGT's gas compressors (with the exception of Lockerly) operate on sites where the combined total thermal input of all the combustion plant is greater than 50MWth in total across the installation. These installations must be designed and operated to Best Available Techniques (BAT) to prevent and minimise emissions to all environmental media (air, water, noise, land, waste product and raw material utilisation). These are described in Chapter II of the IED and require an EPR/PPC permit A Chapter II activity installation can also have individual plant covered by Chapter III provisions with smaller (sub 50MWth) plant needing to comply with the MCPD. BAT for Chapter II installation can utilise to the LCP BAT reference document as a performance benchmark however the BAT-AELs are not strictly applicable for plant under 50MWth.
	Chapter III plant	Annex V of Chapter III of the IED sets out the legally binding minimum emissions limits and operating requirements (e.g.

Legislation	Scope	Implications for NGGT gas compressors
		monitoring) for individual combustion plants greater than 50MWth (LCPs) must meet. It also sets out options for operators, such as NGGT, to derogate from those emissions limits depending on operating hours of the plant or entering a time-limited exemption. NGGT have chosen to utilise two of those options. The Limited Life Derogation ("LLD") which limits a plants operation to a total of 17,500 hours from 1 January 2016 to 31 December 2023. Plant operated less than 500 hours per year are not set emission limits under Annex V. Chapter III plant are also required to meet the LCP BAT conclusions, which set out more stringent emission standards than the emission limits set out in Annex V. These were published in the EC Official Journal on 17th Aug 2017 and apply to all new plants from that date. Existing plant must comply within four years of the publication date. The BREF not only sets out statutory and indicative emission levels but also other operating standards that significantly influence the design and operation of a LCP, the most notable of these being energy efficiency. Different emission levels may apply depending on plant operating hours.
Medium Combustion Plant Directive		The Medium Combustion Plant Directive sets out the minimum emission limits that an individual combustion plant must meet. It applies to all 1-50MWth combustion activities. Plants between 5 and 50MW must normally meet these requirements by 2025, however gas compressors used for the transmission of gas on a network is exempt until 2030. As with Chapter III, there is a derogation for plants operated less than 500 hours.
Ambient Air Quality Directive	All IED activities	The Ambient Air Quality Directive sets out the standards for certain air quality pollutants that must be met. This has a direct influence on IED activities as it states that a permitted activity must ensure that its operations do not breach relevant environmental quality standards. This requirement could result in a gas compressor operating to tighter emission limits than those set out in relevant LCP and MCP legislation.

5.3 The implementation of these Directives sets out clear criteria that combustion plant, such as NGGT's gas compressors, must meet in the future. This has greatest

significance for older units (e.g. Rolls Royce RB211s and Avons) that NGGT has in its fleet as these must either be upgraded, placed into an operating hour derogation, or cease operation, as they cannot meet the emissions limits specified in the above Directives.

5.4 There are a number of factors that could affect compressor utilisation and emissions, and should be considered by NGGT when preparing its CECS:

- Compressor demand varies by the location of compressor sites on the NTS. The entry of gas into the UK NTS is influenced by the price of gas from the UKCS, continental Europe via interconnectors and LNG input. This has meant that over the years the gas flows in different parts of the network have changed significantly.

- Changes in demand can affect compressor utilisation, where seasonality and/or adjustments in gas consumers can increase or decrease the need for supply. This has an effect on the number of operating hours that a plant may utilise and in turn influences any decision to derogate or cease operation.

- The type of compression plant utilised affects emissions. NGGT have made significant investment in placing low emission technologies (Electric VSD and low NOx gas turbines) at sites that have a high number of operating hours. The expectation of the ERs is that these plants will be used in preference to the older unabated gas turbines.

- Plant or stations may be subject to outages that could result in compression being provided by stations up or down stream of the affected facility. This could result in higher emissions if an older unabated plant is utilised to cover such situations. The ERs understand that these issues do arise as with any operational plant that essentially standby arrangements need to be put in place.

5.5 The operating permit for each gas compressor station requires that NGGT must review its operations on an annual basis and submit this to the ERs for approval. This document is called the "NGGT Network Review".

5.6 The ERs consider NGGT's implementation of BAT across the NTS on a whole-network - regional and individual installation - basis as outlined in the Network Review. This is different from normal IPPC and IED activities where BAT is typically assessed solely on a site-by-site basis. This allows NGGT to focus on the high operation plants with the greatest combustion related emissions to drive its upgrade programme. This pragmatic approach mitigates the need to replace all low-operation, potentially non-compliant compressor plant across the network, allowing NGGT to manage its assets more efficiently and protecting consumers from high up-front costs of replacement. It also allows the ERs to assess that the right hierarchy of compressors have been utilised to distribute gas across the UK NTS (e.g. Electric VSD and abated low NOx turbines opposed to unabated aging turbines).

5.7 Between 2008 and 2018, the NGGT Network Review has delivered a number of projects decreasing overall NOx emissions by two-thirds across the compressor fleet whilst maintaining a similar number of operating hours. The projects include installation of low-NOx technologies, limiting operating hours for sites opting to utilise older unabated gas turbines and installation of electric drives.

ERs' Priorities for 2021-2026 and Beyond

5.8 The CECS primarily focuses on how NGGT will deliver the required upgrades or operational changes to meet the requirements of BAT within the environmental

legislation already highlighted. This does not mean that combustion gas emissions will be the sole focus of the ERs, as other environmental aspects associated with the operation of gas compressors will be assessed at a site level when NGGT applies to vary the installation's permit to operate. Aspects such as energy efficiency, venting and noise will be covered at this stage of the assessment process to ensure that BAT is being implemented.

5.9 Energy efficiency is one area where the network approach and implementation of relevant requirements at a site ("installation") and individual combustion plant level overlap. As part of the installation's BAT demonstration, NGGT must show that each compressor, or combination of compressors, is appropriately sized across the range of anticipated duty of the station in the UK NTS to ensure that fuel is utilised efficiently. The NGGT's CECS will have to outline the proposed configuration of each site and its role in meeting UK NTS demand. It will also clearly have to indicate which plant are utilising an appropriate available derogation or opting for decommissioning.

5.10 The following table provides the main dates for compliance that affect NGGT's gas compressors from the different directives.

Table 2: Combustion emissions legislation timescales applicable to NGGT.

Date	Legislation	Requirement
31st July 2021	IED Chapter II	Existing LCP that are not subject to IED's Chapter III Limited Life or Emergency Use Derogations must meet the emissions requirements set out in the LCP BAT Conclusions.
31st December 2023	IED Chapter III LCP	Limited Life Derogation comes to end and plant will either have to operate under 500-hour emergency use derogation, meet Chapter III and LCP BAT Conclusions "New" plant emissions requirements or cease operations.
1st January 2030	MCPD	Derogation for gas compression plants operating on a national transmission system ceases and all MCP scale (1-50MW) plant must meet the emission limits as set out in the MCPD, operate under a 500-hour operating hour derogation or cease operations.

5.11 The key dates summarised in Table 2 are minimum legal requirements that NGGT must meet. However, the overarching requirement for a Chapter II IED activity to operate to BAT could result in a smaller MCP scale plant being upgraded before these deadlines. This aspect could apply in situations where the site's overall compression requirement results in a MCP being anticipated to utilise high operating hours.

5.12 When considering NGGT's CECS, the relevant ER's priorities will include (but not be limited to):

- Each individual plant (LCP and MCP) must meet the relevant legislative requirements in terms of combustion emissions. This could be through upgrading the gas compressor turbine, entering into a derogation or ceasing operation.
- At a site level, the Chapter II IED installation is designed and operated to meet the anticipated demand from the UK NTS by demonstrating that appropriate sizes of compressors and turbines are being proposed.

- Related to the above, the CECS should give a consideration as to whether other compression stations that utilise low emission technologies can provide lead or supplemental compression.
- Where individual plant is not being proposed to be upgraded, or can already meet the relevant emissions standards, a clear statement as to the compliance route for such plant must be given.

Evaluation criteria of Best Available Techniques

5.13 The IED requires that an installation is designed and operated using BAT such that emissions are prevented/minimised and that resources are utilised efficiently. In determining BAT, an operator must demonstrate that it has taken into account all the potential pollutants and receiving environmental receptors potentially impacted by the operation of the installation. Crucially, it must undertake an options appraisal to show that the appropriate "technique" is the "best available" taking into account the environmental impacts as well as its capital and operating costs.

5.14 NGGT have developed a BAT appraisal tool that can consider candidate technologies and assess them against the varied criteria associated with the assessment. This tool has taken into account the requirements of relevant UK ER guidance on the assessment of BAT. The critical element in determining BAT for compression plant is whether it can meet the required emissions limits, and operate in an efficient manner to optimise fuel consumption and minimise venting of methane gas. Other environmental media (e.g. noise) are considered during the BAT assessment stages.

5.15 There are a number of options open to NGGT in terms of achieving the emissions limits and other requirements. These are set out in the LCP BAT reference document and the legally-binding LCP BAT Conclusions[12]. For MCP, these documents are reference points for BAT and should be considered as part of the appraisal of smaller plant.

5.16 It should be noted that neither of the BAT Reference or conclusions documents cover the operation of electric variable speed drive compressors as their operation does not involve the direct combustion of fuel. As part of the CECS submission, NGGT will be required to outline the various guidance that it has taken into consideration to develop its strategy.

Annual Network Review

5.17 The combustion performance of the NGGT-operated UK NTS is currently assessed by the ERs on an annual basis through the NGGT Network Review, the submission of which is a requirement of each compressor station's permit. The Network Review considers the operation of each site by compressor engine type to evaluate if BAT is being utilised.

5.18 There is a clear expectation from the ER's that NGGT should utilise low emissions technology compressors over the older unabated ones available on the system. The Network Review establishes annual run hours for each compressor type by assessing the historical run hours across a 5-year period. The proposal is structured to ensure that a hierarchy is maintained for BAT units, which is then accepted or amended by ERs. For a number of sites utilising older unabated compressors, the Network Review

[12] http://eippcb.jrc.ec.europa.eu/reference/

also limits the number of operating hours that NGGT can use within any given calendar year.

5.19 Finally, the Network Review considers sites where further investment in low emissions technology is required to reduce overall combustion emissions from the UK NTS. This hierarchical approach in the past has focused on sites with high operating hours that utilise unabated gas compressors. The introduction of the IED and MCPD timescales, combined with the clarity they provide in terms of operating hours for the application of emissions limits, means that a clear roadmap for achieving compliance and associated upgrade of combustion plant is now set out.

5.20 The ER's appreciate that significant investment may be necessary to deliver the IED and MCPD requirements up until 2030 and may also involve a phased upgrade of individual plant to ensure that NGGT's obligations to operate the UK NTS continue to be met. It is for these reasons that now is an appropriate moment to seek a long-term investment strategy from NGGT for the delivery of IED and MCPD requirements through the CECS. The Network Review will continue to look at the operation of the UK NTS to ensure that the available compressor fleet are operated utilising the emissions reduction hierarchy.

ERs' Assessment Considerations

5.21 The ERs will assess the CECS to determine that all new, upgraded and existing plant comply with relevant environmental legislative requirements. This will focus on meeting the emission limits set out in Directives, BAT reference documents and ultimately the utilisation of BAT. Where derogations from such emission limits are being proposed, the ERs will consult with Ofgem as to whether the basis for such a compliance route is viable.

5.22 The ERs have a minimum of three months to determine any application by NGGT to change its permit conditions unless the change can be considered "substantial". In such circumstances, there are two 28-day consultation periods in addition to the three-month period that need to be factored in the determination timescale. It is only once the permit variation application has been received and determined satisfactorily will any proposal be fully agreed by the ER.

5.23 The ERs accept that to provide better certainty to NGGT and other stakeholders that any proposal will be able to progress to the permit determination stage, it is necessary to engage extensively during the pre-application phase. NGGT's CECS submission is a critical step in this process as it will need to assure the ERs and Ofgem that the appropriate cost-effective solution to achieving compliance with the relevant environmental legislative requirements has been arrived at.