

**NEC Industry Exercise 2022**

**‘Exercise Degree’**

**Post Exercise Report**



Network  
Emergency  
Co-ordinator

- NGSE Strategy
- Gas Transporter Interactions
- Load Shedding
- Gas and Electricity Interactions
- Public Information
- Managing Supply

# We have published the 2022 NEC Industry Post Exercise Report as an interactive document.

This report has been authored by the Office of the NEC. It serves as a record of NEC Industry Exercise Degree.



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For more information on how industry manages Network Gas Supply Emergencies see National Grid's webpages:

[NGSE Webpage](#)

or contact the National Grid Emergency and Incident Framework Team:

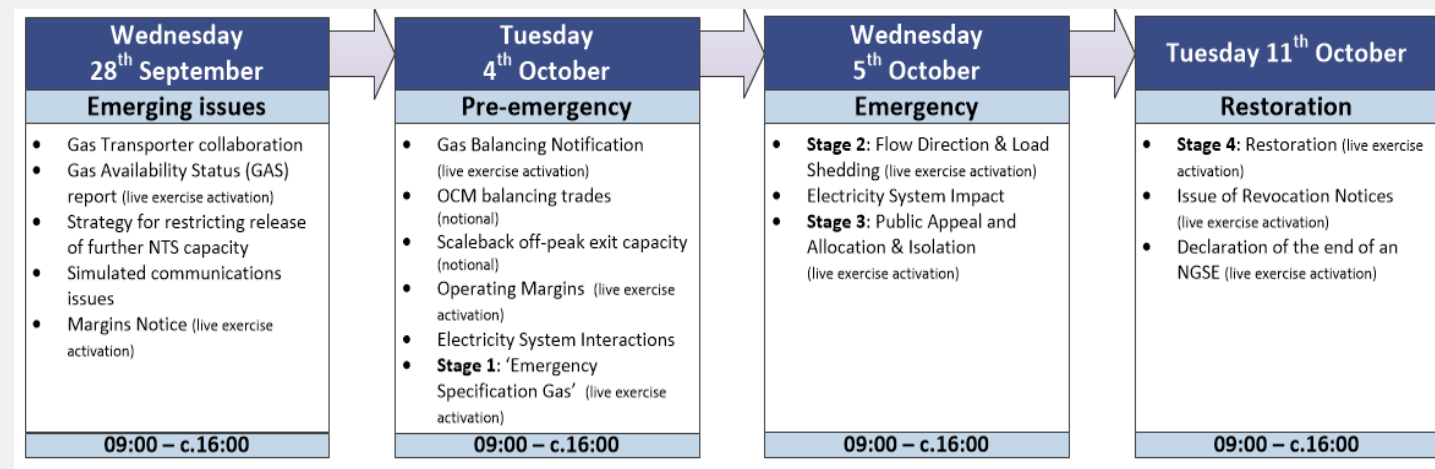
[Gasops.emergencyplanning@nationalgrid.com](mailto:Gasops.emergencyplanning@nationalgrid.com)

# Exercise Scope

The Network Emergency Coordinator (NEC) Safety Case requires the NEC to develop and deliver an annual exercise.

The overriding aim of the exercise is to demonstrate to the NEC that the Gas Industry is prepared and able to meet its obligations in the event of a Network Gas Supply Emergency (NGSE). The NEC is obligated to review the industry exercise to assure the exercise met its objectives; outline any lessons learnt; action areas for development; and publish the results of the review in a report to industry and the Health and Safety Executive (HSE). Full details of the exercise aim and objectives can be found in [Appendix 3](#). This year's exercise objectives were met, though learning points have been identified which are summarised in the [Learning Points](#) section.

Exercise Degree took place over four days as detailed below. This report outlines the key areas of the exercise, along with the identified learning points for industry.



**Scenario overview:** This year's scenario focused on an emerging issue manifesting into an emergency. The scenario looked at a developing shortage of supply arising from a depletion of storage and liquid natural gas (LNG) stocks while European system stress drove interconnector export.

More information on the role of the NEC can be found at [Appendix 2](#).

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# Executive Summary

The overriding aim of the exercise was to demonstrate to the NEC that the Gas Industry is prepared and able to meet its obligations in the event of an Network Gas Supply Emergency (NGSE).

Exercise Degree continued improving levels of participation across the Gas Industry. Over 400 individuals across more than 50 organisations took part, which allowed the opportunity to exercise processes and interactions across the energy sector. This level of participation also allowed for increased realism and provided opportunities for the responders to work through the challenges that can bring.

<b>NGSE Strategy</b>	Holding Exercise Degree over four days allowed the NEC, and the Gas Industry, to work through processes in more detail, taking a more pragmatic approach in order to safeguard life, protect pressure on the gas network and limit implications to wider industry.	<b>Gas Transporter Interactions</b>	The exercise scope was utilised to fully scrutinise the tools available in the NGSE strategy, to find the least impactful route through this emergency framework. This saw the successful delivery of an 'emergency specification' gas risk assessment but created some issues in the communication of the NGSE strategy.
<b>Load Shedding</b>	The load shedding process test on the NTS demonstrated a broadly stable performance with actions already undertaken to liaise with, and educate, customers who were either uncontactable or had long lead times to cease taking gas. The performance in the LDZs is also broadly stable following an improving trend in recent years.	<b>Gas and Electricity Interactions</b>	The exercise achieved a higher level of 'whole energy system thinking', leading to improved knowledge and therefore an enhanced response strategy. The mechanisms for GSO and ESO being able to share information are now better embedded into process. There is an opportunity to explore a different approach to the route through which load shedding instructions are delivered to gas fired power stations.
<b>Public Information</b>	An industry wide media response was tested, which highlighted areas for further enhancements to 'whole energy system' media management. Work is currently being undertaken to modernise the public appeals process.	<b>Managing Supply</b>	The processes for determining supply headroom and load shedding demand on the European interconnectors were both tested successfully.

# NGSE Strategy

**Holding Exercise Degree over four days allowed the NEC, and the Gas Industry, to work through processes in more detail, taking a more pragmatic approach in order to safeguard life, protect pressure on the gas network and limit implications to wider industry.**

This section is an addition for the 2022 report, to reflect that this year's approach to the formation of the NGSE strategy was more pragmatic than previous years. This was delivered through a better understanding of the impact of the NGSE strategy on:

- the desire to avoid depriving domestic consumers of energy until absolutely necessary for their safety
- electricity supplies and the resultant impacts on daily life, as a result of load shedding gas fired power stations
- major industry, as a result of load shedding
- the subsequent impacts on supply chains fundamental to the functioning of Great Britain, being without energy supplies

This approach meant that the activation of demand control (OC6) on the electricity network was delayed, compared to previous years. Instead, the NEC approved the GSO to enter the NGSE framework to utilise early direction actions, in the form of 'emergency specification' gas. The NEC authorised the admission of this additional form of supply before instructing the GSO to exhaust their operating margin contracts which meant power stations, critical to the maintenance of electricity supply, stayed online.

As the scripted gas deficit increased, the NEC authorised the proposed strategy to: enter Stage 2 of an NGSE; suspend GSO's role as residual balancer of the 'on-the-day commodity market' for gas; direct all entry points to maximise supplies (for exercise, there was no further 'headroom' that had not been encouraged onto the NTS commercially); and, deliver the direction for the European interconnectors to cease export from GB\*. These actions balanced the system on Day 2 of the exercise.

On Day 3 of the exercise, the gas day opened to a further scripted supply loss and the GSO continued to work through the load shedding hierarchy. The standard approach to load shedding was challenged by the NEC, driven by the desire to maintain supplies to domestic electricity consumers, given the extreme cold temperatures across the country. This led the NEC to request that avoiding gas fired power stations in the load shedding strategy be explored, for both the NTS and the LDZs, with a view to safeguarding life. This approach was not easy for the response teams in the GDNs to navigate due to an absence of connection details. There is an opportunity to better understand the ability and practicalities of avoiding gas fired power stations in the load shedding strategy.

\*The failure to achieve a competitive price against the European differential was heavily scripted to assure a scenario which would trigger an emergency



# NGSE Strategy

Further scripted escalations led to the requirement for a decision to determine the load shedding strategy for Priority Category A\* gas customers. Again driven by a desire to safeguard life, the NEC undertook a dynamic risk assessment and decided that Priority Category A customers be allowed to continue taking gas. There is an absence of contemporary research to fully understand the risk associated with isolating Priority Category A customers versus the isolation of domestic consumers in their own home. Until this issue is better understood, this will always require a pragmatic approach.

The restoration process was tested during Exercise Degree. It takes time to restore isolated areas of the network, which poses a challenge for the GDNs to determine the quantity of gas they require to conduct this activity. A better understanding, between the GSO and GDNs, on the order of restoration priorities is required. It is well understood that the restoration of domestic gas consumers is the ultimate priority. However, if gas which is proposed to be utilised to do this cannot be consumed promptly, or is not essential to prepare an isolated section of the network for purge and re-light, then there is a case for the GSO to offer this gas to the next layer of priority i.e. gas fired power stations – in order that domestic electricity consumers, or other sites of priority, can be restored without delay.

During Exercise Degree, there was direct communications between the NEC and BEIS. Whilst not the norm, the NEC valued the validation of his stance in safeguarding life by protecting ‘whole energy system’ health by BEIS Gold Command. This allowed BEIS to be more informed, and provide better briefings, in their role as Lead Government Department.

## Learning Points

1. Gas Transporters would benefit from a better understanding of the implications brought by the ESO conducting demand control via OC6 versus a more stable form of demand control in the form of ESEC being invoked.
2. There is an opportunity to better understand the ability and practicalities of avoiding gas fired power stations in the load shedding strategy.
3. There is an opportunity to support the dynamic risk assessment, undertaken in Exercise Degree, with sufficient and reliable research concerning the risks associated with Priority Category A customers losing their supply.
4. There is an opportunity to enhance the response relationship between the NEC and BEIS Gold Command, to improve situational awareness of the NGSE strategy.

\*The categories for priority customer classification have recently changed for the GB Gas Network. [Appendix 6](#) details the new categories in full.

# Gas Transporter Interactions

**The exercise scope was utilised to fully scrutinise the tools available in the NGSE strategy, to find the least impactful route through this emergency framework. This saw the successful delivery of an ‘emergency specification’ gas risk assessment but created some issues in the communication of the NGSE strategy.**

During 2022, the Gas Transporters have approved a process through which risk assessments can be rapidly provided to the NEC in order to support the decision to admit ‘emergency specification’ gas onto the NTS. This process was successfully tested during Exercise Degree. The quality of the assessments, and the speed at which they were presented, enabled the NEC to make an immediate decision to admit the gas. In reality, this increased pace in authorising the admission of additional available supply would have the positive effect of pushing back the ‘time to fail’.

The Transporter collaboration in Exercise Degree was not as optimal as in previous exercises. The pace at which information was shared, and some limitations in the details passed, meant that decisions were delayed causing more gas to be consumed which would reduce the ‘time to fail’. It is accepted that there were exercise factors which contributed to this delay, specifically the use of simulated data over four days of response. The NGSE strategy being more comprehensively explored than in previous exercises meant that all Gas Transporters were required to manage some non-standard information requests, which caused issues. Suggestion was made that a lack of experience in the NEMT Demand Team may have contributed to a sub-optimal performance. This has already been redressed (see Learning Points, overleaf, for completed actions).

At the start of any response, the NEMT requests an understanding of the breakdown of the total end of day demand for each LDZ into demand tranches i.e. large and daily metered industrial; medium non-daily metered industrial; and domestic non daily metered. Because this information provides the end of day position, there is a lack of available detail to confirm the quantity of gas already consumed and, therefore, how much of this demand could realistically be load shed.

It is imperative to the success of the NGSE strategy for this information to be available. Not having this level of detail increases the time it takes to seek strategy authorisation from the NEC, therefore increasing the likelihood of having to progress further into the NGSE framework to balance the system and avoid a loss of pressure.



#### Relevant Working Groups:

- E3 Alignment Group
- Gas Task Group

# Gas Transporter Interactions

The Gas Transporter Interactions learning points have already been fed through from the NEC to the E3 Alignment Group, who have reviewed them and formed actions on their workplan to address areas for improvement into 2023.

Learning Points		Associated E3 Alignment Group actions
5	The Transporter collaboration in Exercise Degree was not as optimal as in previous exercises. The pace at which information was shared, and some limitations in the details passed, meant that decisions were delayed causing more gas to be consumed which would reduce the 'time to fail'.	The GSO shall deliver urgent NEMT Demand Team refresher training focused on the findings from Exercise Degree [ <b>Complete</b> Nov '22].
		The GSO shall bolster the cross team understanding of NEMT Officers by further exercising their interactions across the NEMT [ <b>Complete</b> Nov '22].
		The E3 Alignment Group shall deliver a 'live data' gas deficit emergency exercise to assure Transporters that the pace and quality of collaboration is improved when simulated data is not at play [ <b>Complete</b> Nov '22].
6	It is imperative to the success of the NGSE strategy that detailed information on the forecasted capability of load shedding in the LDZs is available.	The GDNs will share, with the GSO, their planning assumptions involved in removing industrial demand through load shedding in the LDZs. This will involve the GDNs collaborating on, and developing, their daily demand consumption profiles, which are estimates of how gas is being taken by LDZ customers over the course of the day. This will help to inform the strategy for load shedding based on the time of day at which it is actioned.
		The GDNs will share, with each other and the GSO, the planning assumptions for deploying NGSE Stage 3 'isolation' in each LDZ, through a Gas Task Group sponsored Isolation Workshop, due to be delivered by the end of Q1 2023 to confirm planning assumptions and develop opportunities for consistency.
7	Preparation and collaboration is fundamental to a successful response	The E3 Alignment Group will continue to sponsor an annual 'Demand Day' collaborative training workshop for Gas Transporter responders.
		The E3 Alignment Group will continue to operate a protocol during periods of high gas demand, which sees Group members convening for an exceptional meeting when certain triggers are met. This has been further enhanced to include scheduled fortnightly horizon scanning meetings throughout the winter period.



# Load Shedding Performance

The load shedding process test on the NTS demonstrated a broadly stable performance with actions already undertaken to liaise with, and educate, customers who were either uncontactable or had long lead times to cease taking gas. The performance in the LDZs is also broadly stable following an improving trend in recent years.

The GSO conducted the assurance activity of contacting all sites connected to the NTS which have an active gas flow (expanded on [page 10](#)). One exception was the Priority A customer who later confirmed their understanding of the legal obligations and ability to cease taking gas within one hour. The load shedding performance on the NTS is broadly stable compared to previous years. It is imperative that all sites fully understand their legal obligations to load shed, when instructed, and to ensure their correct emergency contact details are held by all Gas Transporters.

This year's load shedding performance in the LDZs, (expanded on [page 11](#)) is stable when compared to the 2021 results, and the last five years show an upward trend in performance. It is acknowledged that the composition of the load shedding tranches will alter as more sites are added to the priority customer list, as a result of the recent redefining of the criteria (see [Appendix 6](#)). Given Priority Category B & C loads should be shed before Stage 3 isolation, it is assessed there is no risk of early progression of the NGSE strategy into Stage 3, but this will be monitored by the E3 Alignment Group.



## Relevant Working Group:

- E3 Alignment Group

## Learning Points

8. Post exercise engagement is required with sites connected to the NTS who were not able to reduce demand within an acceptable timeframe.
9. There continues to be an opportunity to mature the process for how emergency contact details of all network exit connections are obtained and maintained. The obligation is on the site to provide emergency contact details and maintain this record with provision of a telephone number which will be answered promptly.

## What is Load Shedding?

Load shedding is the procedure used by Gas Transporters at Stage 2 of an NGSE, to secure a graduated and controlled reduction in demand on all, or part, of their systems in order to keep the system securely pressurised.

This is achieved by making direct, or indirect, contact with large consumers and legally directing them to stop, or reduce, their consumption of gas, as per the Gas Safety (Management) Regulations 1996.

# Load Shedding Performance - NTS

There are currently 59 sites directly connected to the NTS. During Exercise Degree:

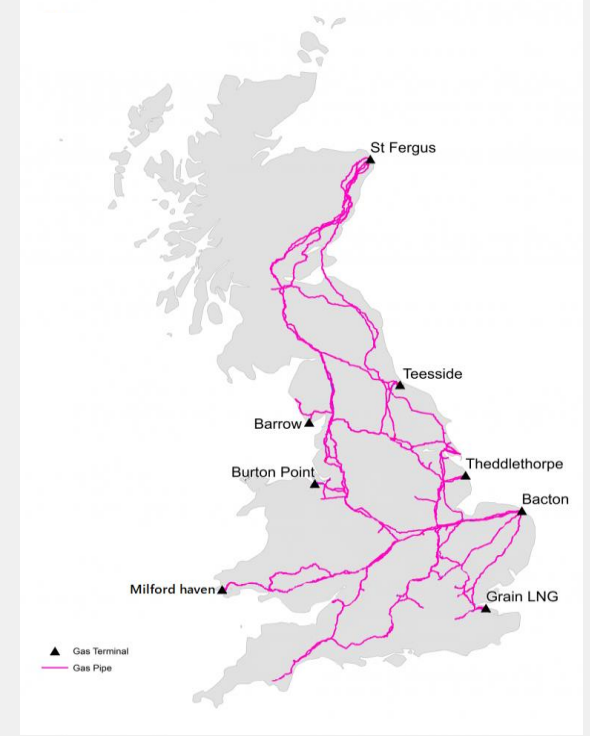
- 55 sites were contacted
- 3 sites were not contacted as they are in the process of being decommissioned
- 1 site was not contacted as they are a Priority Category A Customer (as per the response strategy)

Across the sites where contact was attempted (55):

- 51 sites confirmed they would cease taking gas within 1 hour
- 2 sites stated that they would take between 1-2 hours to cease taking gas
- 1 site stated they would not be in a position to cease taking gas for 12 hours
- 1 site did not respond to contact efforts

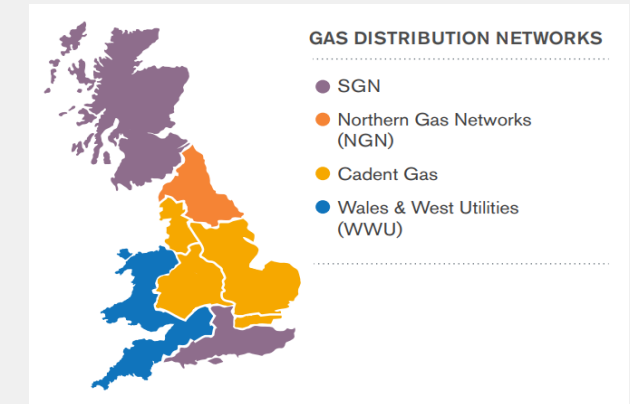
Performance history (last 5 years)	
Exercise Name and Year of delivery:	Percentage of sites who could be contacted and would stop using gas within one hour:
<b>Degree 2022</b>	93%
Celsius 2021	96%
Baltic 2020	94%
Arctic 2019	87%
Zeus 2018	86%

## The National Transmission System



# Load Shedding Performance - LDZs

This year's load shedding performance within the LDZs is stable overall in comparison to an equivalent test in 2021 and 2019. The 2022 results provide an assurance that the GDNs were able to maintain their ability to contact their top 200 sites. The E3 Alignment Group will continue to collaborate to improve load shedding performance and consider if a measure of 'indicative load removed' may be a more representative measure in future exercises.



Exercise Degree 2022 – Performance Breakdown							
GDN	No. of sites attempted to be contacted	No. of sites where contact was made, and site <u>would</u> stop using gas		No. of sites where contact was made, and site would <u>not</u> stop using gas		No. of sites who could <u>not</u> be contacted	
Cadent	1000	920	92%	8	0.8%	72	7.2%
NGN	400	309	77%	38	9.5%	53	13%
SGN	600	508	84%	0	0%	92	15%
WWU	600	585	97%	0	0%	15	2.5%

Performance History (last 5 years)			
Exercise Name and Year of delivery	No of sites attempted to be contacted	No of sites where contact was made, and site would stop using gas	
Degree 2022	2600	2319	90%
Celsius 2021	2600	2362	91%
Baltic 2020 <sup>1</sup>	600	572	95%
Arctic 2019	2751	2400	87%
Zeus 2018	2638	2088	79%

<sup>1</sup>The 2020 assurance activity was scaled down to top 50 sites due to COVID-19

# Gas and Electricity Interactions

The exercise achieved a higher level of ‘whole energy system thinking’, leading to improved knowledge and therefore an enhanced response strategy. The mechanisms for GSO and ESO being able to share information are now better embedded into process. There is an opportunity to explore a different approach to the route through which load shedding instructions are delivered to gas fired power stations.

The interaction between gas and electricity in a gas deficit event continues to mature. There have been improvements to the management of interaction between the two System Operators since Exercise Celsius (2021). Exercise Degree enabled a further opportunity to practise the formation of a strategy which identifies the least impactful route through the gas and electricity response frameworks.

The ‘Gas and Electricity Interactions Principles’ document, authored in 2021, allows the GSO and ESO to share information when ‘whole energy system’ health is at risk. At an early stage in the exercise, BEIS were approached by the GSO seeking approval to activate the Principles document. BEIS agreed that the triggers had been met, and approved the GSO and ESO to share information, as per the procedure defined in the Principles document. This prompt approval provided time for the two System Operators to consider the implications on electricity, should the GSO’s response strategy be deployed.



## Relevant Working Groups:

- EGRI Task Group
- Gas Task Group
- Electricity Task Group

Exercise Degree demonstrated that the ESO have a fundamental role in the timing and process for gas fired power stations being directed to cease taking gas from the NTS, without causing electricity system instability. The ENCC requires to balance demand reduction actions on the electricity system against the loss in generation arising from gas network load shedding. There is therefore a need to review the approach to directing gas fired power stations to cease taking gas, to understand if the ENCC can take a more active role in the communication with the gas fired power stations. It is assessed that direct contact from the ENCC could support the speed and efficiency of achieving a demand saving through the load shedding of gas fired generation whilst ensuring a stable electricity system.

During, and post, exercise there have been conversations around the lack of planned alignment or deconfliction on the locations in which gas and electricity demand disconnections are deployed. Initial assessments have suggested that the complexity of implementing a joined up approach during an NGSE could be limiting to the response strategy. Nevertheless, the EGRI Task Group should further explore this topic.

# Gas and Electricity Interactions

The Gas and Electricity Interactions learning points have been fed through from the NEC to the EGRI Task Group, who have reviewed them and formed actions on their workplan to address areas for improvement through 2023.

	Learning Points	Associated EGRI Task Group activity
10	There has been success in the introduction of a Principles document, and trained responders to enable real time collaboration between the GSO and ESO for the purpose of maintaining 'whole energy system health' and the mitigation of risks to both energy networks. This requires to now be further embedded into the response protocols of the two System Operators.	The introduction of a Principles document to guide the interactions between GSO and ESO was an opportunity of the RIGSSE Task Group. Responsibility now sits with the EGRI Task Group to drive continuous improvement.
11	There is an opportunity to increase the efficiency of load shedding gas fired power stations directly connected to the NTS whilst avoiding electricity system instability. This requires the exploration of an enhanced role for the ENCC in the load shedding process.	The EGRI Task Group already has active opportunity statements on a 'whole energy system' approach to load shedding of gas fired generation. This learning point will be included alongside the consideration of the visibility of generation embedded in the gas LDZs, and the ability to target this source of demand in the gas load shedding hierarchy.
12	It is prudent to explore if there are benefits to a joined up approach to the location in which gas and electricity demand disconnections are deployed.	The EGRI Task Group already has active opportunity statements on the impacts of OC6 and a 'whole energy system' comparative impact assessment. This learning point will be considered alongside these areas.

## EGRI Task Group:

In 2021, the RIGSSE (Review of the Impact of a Gas Supply Shortage on Electricity) Task Group was formed to facilitate Gas Industry, Electricity Industry, Government and regulatory dialogue to review current 'whole energy system' interactions in the event of a gas supply shortage, or restrictions on the ability to transport gas, which impact the electricity network. The 'review' activities of the RIGSSE Task Group came to a close at the end of 2021 with the completion of an opportunities report. The RIGSSE Task Group has now been replaced by a more sustained position in the form of the EGRI (Electricity & Gas Resilience Interactions) Task Group, responsible for driving forward the RIGSSE opportunities which have not already been developed, and to horizon scan for further opportunity areas.



# Public Information

**An industry wide media response was tested, which highlighted areas for further enhancements to ‘whole energy system’ media management. Work is currently being undertaken to modernise the public appeals process.**

Communication Team representatives from all gas and electricity transmission and distribution companies participated in Exercise Degree through a series of Energy Networks Association facilitated conference calls, as per the agreed process. However, there continues to be opportunities for improvement which are captured in the learning points.

Since summer 2022, work has been undertaken across the industry to modernise public appeals. This has focused on the formal appeals which form part of the NGSE strategy, and the provision of prudent advice which energy companies may offer in order to encourage the preservation of energy supplies during times of stress. It is not yet fully understood how effective public messaging will be at achieving a demand reduction. The output of this work was not ready for testing in Exercise Degree but should be complete by the end of the year.

The learning points from this participation have already been delivered to the E3C Communications Task Group (CTG) who will own actions arising on their 2023 workplan. This supports winter preparation activity which has already be deployed.

## Learning Points

13. There remains a requirement to develop information graphics to support the developing bank of prepared media lines, which includes consumer advice which is cognisant of ‘whole energy system’ impact.
14. There remains a need to review and modernise the process for issuing NGSE public appeals, which provide advice on how to conserve gas. This should include the coordination of how this information is issued and by whom, and an understanding as to how the public are likely to respond. ‘Whole energy system’ advice should also be considered.
15. It is still recommended that Communications Teams undertake standalone exercises to improve and refine the outcomes of these learning points, alongside other CTG work scopes, to mature organisational learning outside of the NEC Industry Exercise.



### Relevant Working Group

- Communications Task Group

# Managing Supply

**The processes for determining supply headroom and load shedding demand on the European Interconnectors were both tested successfully.**

In the face of a supply shortage, the GSO is able to request the North Sea Transition Authority (NSTA) to utilise their powers to require terminals to complete a 'Gas Availability Status' (GAS) Report, which provides data on the amount of gas available to flow which has not yet been nominated onto the NTS, i.e. supply 'headroom'. This process was completed at pace and all responses were received within an hour. The GSO has introduced an internal software application to track the returns from the terminals, which supported the efficiency of this process. The GAS Report process includes notification of any 'emergency specification' gas that the terminals may be able to flow. Though the process for risk assessing the admission of 'emergency specification' gas was thoroughly tested, its availability was scripted. The GAS Report process is vital to the formation of the pre-emergency strategy, because it provides information on the limit of how effective trading and supply enhancement incentives are likely to be. It is therefore positive that this process was completed without delay.

The process for reducing demand exported by the two European interconnectors was successfully tested. The failure to achieve a price differential to incentivise these interconnectors to become a supply point for GB was heavily scripted. Outside of the exercise scenario, it is assessed that this price differential would be achieved.



# Summary of Learning Points

The 15 learning points arising from Exercise Degree are detailed below. These will be reviewed and action plans progressed by the relevant industry group. The Office of the NEC shall report progress against the actions to address each learning point through the bi-annual assurance report, and in regular NEC liaison meetings.

## NGSE Strategy (various working groups)

1. Gas Transporters would benefit from a better understanding of the implications brought by the ESO conducting demand control via OC6 versus a more stable form of demand control in the form of ESEC being invoked. ([Gas & Electricity Task Groups](#))
2. There is an opportunity to better understand the ability and practicalities of avoiding gas fired power stations in the load shedding strategy ([E3 Alignment Group](#))
3. There is an opportunity to support the dynamic risk assessment, undertaken in Exercise Degree, with sufficient and reliable research concerning the risks associated with Priority Category A Customers losing their supply ([E3 Alignment Group](#))
4. There is an opportunity to enhance the response relationship between the NEC and BEIS Gold Command, to improve situational awareness of the NGSE strategy ([Office of the NEC](#))

## Gas Transporter Interactions (E3 Alignment Group)

5. The Transporter collaboration in Exercise Degree was not as optimal as in previous exercises. The pace at which information was shared, and some limitations in the details passed, meant that decisions were delayed causing more gas to be consumed which would impact the 'time to fail'.
6. It is imperative to the success of the NGSE strategy that detailed information on the forecasted capability of load shedding in the LDZs is available.
7. Preparation and collaboration is fundamental to a successful response

# Summary of Learning Points

## Load Shedding (E3 Alignment Group)

8. Post exercise engagement is required with sites connected to the NTS who were not able to reduce demand within an acceptable timeframe.
9. There continues to be an opportunity to mature the process for how emergency contact details of all network exit connections are obtained and maintained. The obligation is on the site to provide emergency contact details and maintain this record with provision of a telephone number which will be answered promptly.

## Gas and Electricity Interactions (Electricity and Gas Resilience Interactions Task Group)

10. There has been success in the introduction of a Principles document, and trained responders to enable real time collaboration between the GSO and ESO for the purpose of maintaining 'whole energy system health' and the mitigation of risks to both energy networks. This requires to now be further embedded into the response protocols of the two system operators.
11. There is an opportunity to increase the efficiency of load shedding gas fired power stations directly connected to the NTS whilst avoiding electricity system instability. This requires the exploration of an enhanced role for the ENCC in the load shedding process.
12. It is prudent to explore if there are benefits to a joined up approach to the location in which gas and electricity demand disconnections are deployed.



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NGSE Strategy

Gas Transporter  
Interactions

Load Shedding

Gas and  
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# Summary of Learning Points

## Public Communications (Communications Task group)

13. There remains a requirement to develop information graphics to support the developing bank of prepared media lines, which includes consumer advice which is cognisant of 'whole energy system' impact
14. There remains a need to review and modernise the process for issuing NGSE public appeals, which provide advice on how to conserve gas. This should include the coordination of how this information is issued and by whom, and an understanding as to how the public are likely to respond. 'Whole energy system' advice should also be considered
15. It is still recommended that Communications Teams undertake standalone exercises to improve and refine the outcomes of these learning points, alongside other CTG work scopes, to mature organisational learning outside of the NEC Industry Exercise

## Managing Supply

None



# Progress Since Exercise ‘Celsius’ (2021)

The learning points arising from the 2021 NEC Industry Exercise ‘Celsius’ are set out in the following table, along with a progress statement and completion status.

- Where a learning point marked as **complete** does not mean that it should not be revisited or the learning utilised to inform a similar area, or alternate process, and where this opportunity is already clear a short description is provided.
- Where a learning point is marked as **ongoing** the learning point from this year’s report is referenced to demonstrate that understanding is developing and progress is being made since the original identification of this learning.

Out of the 14 learning points arising from Exercise ‘Celsius’, 6 are considered complete and 8 are ongoing due to the scale of the work scope (see progress statements for further detail).

Learning Points From Exercise Celsius	Progress	Status
<b>Gas and Electricity Interactions</b>		
1. The (GSO to ESO) information sharing dashboard is a fundamental tool in enhancing ‘whole energy system’ situational awareness, but it remains a prototype.	Exercise Degree enabled the successful testing of the processes for information sharing between the GSO and ESO. An IT development project, to embed the GSO to ESO information sharing dashboard into the Electricity National Control Centre’s suite of tools, is now complete. This will allow ESO’s live data to feed the information sharing dashboard. Final testing and deployment of this dashboard will be conducted in December 2022, and a cadence of live data exercises will continue across the duration of Winter 22/23.	<b>Ongoing</b> – owned by the ESO with GSO actively involved in testing and embedding.
2. There is an opportunity for the two System Operators to determine the principles for how they would mitigate impacts to ‘whole energy system’ health.	The ‘Gas and Electricity Interactions Principles’ document is now embedded into the response protocols of the two System Operators, with endorsement from BEIS and Ofgem, and was thoroughly tested during Exercise Degree.	<b>Complete</b> – A cadence of live data exercises and responses to live events will drive continuous improvement.

# Progress Since Exercise 'Celsius' (2021)

Learning Points From Exercise Celsius	Progress	Status
<b>Gas and Electricity Interactions</b>		
3. A dedicated ESO Liaison responder (GSO staff) within the NEMT was trialled and proved to be a vital role in the situational awareness sharing process.	The position of ESO Liaison has developed into a core role within the NEMT and was fully tested in Exercise Degree. When information sharing protocols are triggered, this role is now supported by the addition of an ESO Representative joining the NEMT. This supports the information sharing and understanding between the System Operators, allowing a continuously maturing understanding of the impact of a gas supply shortage on electricity and the determination of a strategy to mitigate 'whole energy system' stress.	<b>Complete</b> – with opportunities for continued development and practice
4. Two independent routes of communication naturally formed during the exercise, namely GSO to BEIS and ESO to BEIS. This disconnect caused some uncertainty with the overall response picture.	Between Exercises Celsius and Degree, the GSO and ESO worked with BEIS to determine a process for tripartite briefings, designed to reduce any disconnect between these three bodies. Pressure testing during Exercise Degree saw some of these issues naturally arise again, despite the mitigation deployed in the form of the tripartite briefing. As the exercise unfolded, responders deployed tactics to ensure all parties remained aligned. These tactics and further considered solutions will be added to the training and task cards for the ESO Liaison role.	<b>Ongoing</b> – continuous improvement is ongoing as this position is embedded into the response
5. There is an opportunity for GDNs and DNOs to collaborate to better understand the behaviour of embedded generation and the impact across both systems of electricity demand control or gas isolation actions being undertaken.	Industry understanding of this topic continues to develop, and the E3C Electricity and Gas Resilience Interactions Task Group continues to monitor the development of opportunities in this space.	<b>Ongoing</b> - responsibility of the EGRI Task Group

# Progress Since Exercise 'Celsius' (2021)

Learning Points From Exercise Celsius	Progress	Status
<b>Gas Transporter Interactions</b>		
6. The Gas Transporters have not been successful in establishing an appropriate pre-emptive process through which a risk assessment can be rapidly provided to the NEC in order to support the decision to admit 'emergency specification gas' into the Network.	A detailed 'emergency specification' gas risk assessment protocol is now in place and was successfully testing during Exercise Degree.	<b>Complete</b> – with further successful testing completed in Exercise Detach - Nov 2022
7. There is an opportunity to expand on the success of sharing of planning assumptions in the determining of emergency pressures, across the strategies involved in an NGSE.	Work continues on this learning point with a particular focus required on load shedding, as per Exercise Degree learning point #6, and NGSE Stage 3 'Isolation' – which the Gas Task Group is facilitating a workshop on in early 2023.	<b>Ongoing</b> – as per Degree learning point #6
8. There is an opportunity to optimise the process for NEMT sharing the declaration of an NGSE once issued by the NEC.	There is now a process for the NEMT Incident Controller to hold a 'time out' briefing for when an NGSE is declared, or changes stage. This has supported NEMT awareness of progression through the NGSE framework, which supports their ability to share this information with their stakeholders.	<b>Complete</b> – with further embedding required
9. Preparation and collaboration is fundamental to a successful response.	The E3 Alignment Group has met quarterly throughout 2022, the deliverables of which included: <ul style="list-style-type: none"> <li>'Demand Day', a collaborative training workshop for the responders in the NEMT Demand Team and the GDN response teams, on 3<sup>rd</sup> and 5<sup>th</sup> May 2022.</li> <li>Exercise Disrupt, a series of industry events which examined and assured preparedness for the restoration of the gas network following an NGSE.</li> <li>Exercise Detach, a gas deficit exercise using live data.</li> </ul>	<b>Complete</b> – continued collaboration is essential

# Progress Since Exercise 'Celsius' (2021)

Learning Points From Exercise Celsius	Progress	Status
<b>Public Communications</b>		
10. There is an opportunity to enhance and mature prepared media lines, information graphics and consumer advice which is cognisant of 'whole energy system' impact.	Work is still ongoing in this area as per Exercise Degree learning point #13	<b>Ongoing</b> – as per Degree learning point #13
11. There is a need to review and modernise the process for issuing public appeals, with a focus on how advice to conserve gas is disseminated, who coordinates the issuing of this information, and to understand how the public are likely to respond	Since summer 2022, work has been undertaken across the industry to modernise public appeals. This has focused on the formal appeals which form part of the NGSE strategy, and the provision of prudent advice which energy companies may offer in order to encourage the preservation of energy supplies during times of stress. It is not yet fully understood how effective public messaging will be at achieving a demand reduction. The output of this work was not ready for testing in Exercise Degree but should be complete by the end of the year.	<b>Ongoing</b> – as per Degree learning point #14
12. It is recommended that Communications Teams undertake standalone exercises to improve and refine the outcomes of learning points 10 and 11, alongside other CTG work scopes, to mature organisational learning outside of the fast pace of the NEC Industry Exercise	Exercise Disrupt was facilitated by the E3 Alignment Group to explore the communications issues arising from the restoration of the gas network following an NGSE. This learning point is repeated for Exercise Degree, as learning point #15.	<b>Ongoing</b> – as per learning point #15

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Executive  
Summary >

Key Areas:

NGSE Strategy

Gas Transporter  
Interactions

Load Shedding

Gas and  
Electricity  
Interactions

Public  
Information

Managing Supply

Learning  
Points>

Progress since  
2021 Ex Celsius>

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# Progress Since Exercise 'Celsius' (2021)

Learning Points From Exercise Celsius	Progress	Status
<b>Load Shedding</b>		
13. The E3 Alignment Group is responsible for continuous improvement in load shedding capability. Though this year's result is positive, it demonstrates a small (the top 200 customers) portion of the load available in the LDZ. The group shall strive for 100% conformance from their industrial customers.	All Transporters have made efforts to improve their capability to contact the largest customers connected to their networks. This includes communication assurance tests and the provision of leaflets which explain the load shedding process. Exercise Degree learning points #8 and #9 look to target further work in this area. It is possible that performance in this area could remain stagnant until the actions recommended in learning point #9 improves the emergency contact information received by the GDNs.	<b>Ongoing</b> – new actions associated with Degree learning point #8 and #9
<b>Managing Supply</b>		
14. Utilising the real time curtailment log, which contributed to the success of tracking load shedding, would be beneficial to the NEMT Supply Team tracking completion of the GAS Report.	A similar software application utilised by the NEMT Shipper Team in load shedding is now available for the NEMT Supply Team to support the process of contacting terminals to request they complete the Gas Availability Status Report.	<b>Complete</b>



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# Appendices

- 1 Exercise Participants
- 2 The NEC
- 3 Exercise Aim and Objectives
- 4 List of Abbreviations and Definitions
- 5 Industry Working Groups
- 6 Priority Customers



# Appendix 1 – Exercise Participants

The GSO estimates that over 400 industry participants took part in Exercise Degree from a range of areas, as illustrated here:

<b>Government and Regulators</b>	<b>National Grid Gas Transmission and Metering (GT&amp;M)</b>	<b>Terminal Operators and LNG Importation Terminals</b>		<b>Storage Facilities</b>	<b>National Transmission System – Directly Connected Sites</b>
Department for Business Energy and Industrial Strategy (BEIS)	GT&M Crisis Management Team (CMT)	<b>TERMINALS:</b>		Aldbrough – Equinor/ SSE Gas Storage	<b>Gas Distribution Network Operators</b>
North Sea Transition Authority (OGA)	<b>Network Emergency Management Team (NEMT)</b>	Easington - Gassco, Langed	St. Fergus - Ancala (Wood), SAGE	Hatfield Moor – Scottish Power	Cadent
Health and Safety Executive (HSE) <i>[Observing]</i>	GT&M Corporate Affairs Response Team (CART)	Easington - Centrica Storage, Rough	St. Fergus - NSMP (PX)	Hilltop – EDF Energy	Northern Gas Networks (NGN)
Office of Gas and Electricity Markets (Ofgem)	National Transmission System (NTS) Silver Command	Easington - Perenco, Dimlington	St. Fergus - Shell	Hole House – EDF Energy	SGN
<b>Network Emergency Coordinator (NEC)</b>	<b>National Grid Electricity System Operator (ESO)</b>	Burton Point - ENI	St. Fergus - National Grid	Holford – UniPer	Wales and West Utilities (WWU)
<b>Energy Networks Association</b>	<b>Electricity System Distribution Network Operators</b>	Bacton - Shell, BBL	Teesside - Antin (Wood), CATS	Hornsea – SSE Gas Storage	<b>Interconnectors</b>
		Bacton - National Grid	Teesside - PX	Humbly Grove – Humbly Grove Energy	BBL – BBL Company
		Bacton - SEAL	Barrow - Spirit Energy	Stublach - Storengy	Irish Interconnector – Gas Networks Ireland (GNI)
		Bacton - Perenco	Somerset Farm	<b>Shippers</b>	Interconnector Limited
		<b>LNG TERMINALS:</b>			
		Milford Haven – South Hook			
		Milford Haven – Dragon			
		Isle of Grain – National Grid			

Exercise  
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## Appendix 2 – The NEC

**The Network Emergency Coordinator (NEC)** is an independent industry role, established under the Gas Safety (Management) Regulations (GS(M)R), whose duty is to co-ordinate the actions across affected points of the gas network to prevent or minimise the consequences of a Network Gas Supply Emergency (NGSE). This is defined as “an emergency endangering persons arising from a loss of pressure in a network, or part thereof”.

The role of the NEC is currently undertaken by National Grid Gas and is independent from any commercial interests of any organisation within the Gas Industry.

Industry participants such as Transporters and Shippers have a legal duty to cooperate with the NEC, who has the powers to direct the defined duty holders. The arrangements and procedures in place to facilitate these powers are tested annually and this report covers the NEC Industry Exercise 2022, namely ‘Exercise Degree’.



# Appendix 3 – Exercise Aim and Objectives

## Aim

The aim of this exercise is to demonstrate that the Gas Industry is prepared and able to meet its obligations in the event of a Network Gas Supply Emergency (NGSE). This will be demonstrated by effective two-way communications processes across the industry and its stakeholders; timely and accurate information being shared between participants; and effective emergency strategies being produced and implemented.

## Objectives

- Test the management of an emerging gas supply shortage, through the use of warning notices and the establishment of proactive communications channels, then gain an understanding of how these are received by industry (post exercise)
- Practice the ability of Gas Transporters, the Electricity System Operator and Electricity Network Operators to communicate in the face of technology failures
- Test the development and delivery of the pre-emergency strategy, through:
  - the simulated activation of all viable commercial and physical tools
  - the capability of the Primary Transporter to form an accurate situational awareness through industry collaboration
- Practice and enhance processes and tools associated with the interactions between gas and electricity organisations in the face of stress on the ‘whole energy system’, supported by active participation from the Electricity System Operator and Electricity Distribution Network Operators
- Test industry’s ability to warn and inform the public through participation of Corporate Affairs’ representatives from the Energy Networks Association, Gas Transporters, the Electricity System Operator and Electricity Network Operators, including changes made to modernise the public appeals process
- Assure the Gas Industry’s capability to restore demand against returning supplies and return to normal operations post NGSE
- Test that recommendations from previous industry emergency exercises have been delivered and are effective
- Validate emergency procedures, specifically, National Grid’s E3; the E3 documents of the Distribution Networks; the E1 Network Gas Supply Emergency Procedure and NEC Safety Case

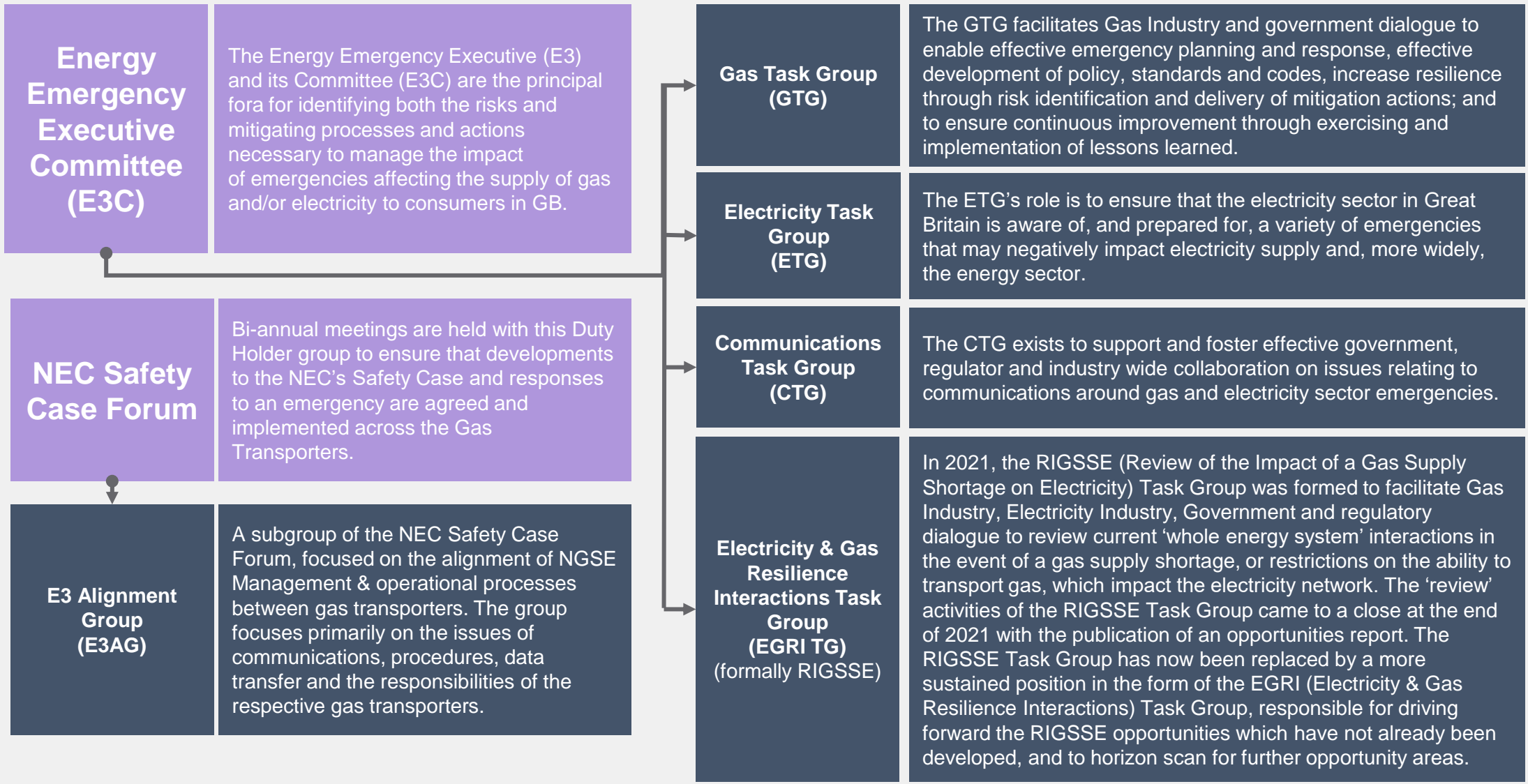


## Appendix 4 – List of Abbreviations and Definitions

<b>BEIS</b>	Department for Business Energy and Industrial Strategy (UK Government)	<b>GSO</b>	Gas System Operator (National Grid Gas)
<b>CTG</b>	Communications Task Group (see <a href="#">App 5 – Industry Working Groups</a> )	<b>GTG</b>	Gas Task Group (see <a href="#">App 5 – Industry Working Groups</a> )
<b>DNO</b>	Distribution Network Operator (Electricity) ( <a href="#">See ENA website – Who’s My Network Operator</a> )	<b>HSE</b>	Health and Safety Executive (UK Government)
<b>E3C</b>	Energy Emergency Executive Committee ( <a href="#">App 5 – Industry Working Groups</a> )	<b>LDZ</b>	Local Distribution Zone within Gas Distribution Networks
<b>EGRI</b>	Electricity & Gas Resilience Interactions Task Group see ( <a href="#">App 5 – Industry Working Groups</a> )	<b>MCM</b>	Million Cubic Metres (Gas unit of measurement for NTS)
<b>ENA</b>	Energy Networks Association ( <a href="#">See ENA website</a> )	<b>MN</b>	Gas Margins Notice ( <a href="#">See NG Website</a> )
<b>ENCC</b>	Electricity National Control Centre (National Grid)	<b>NEC</b>	Network Emergency Co-ordinator ( <a href="#">see App 2 - The NEC</a> )
<b>ESO</b>	National Grid Electricity System Operator	<b>NEMT</b>	Network Emergency Management Team (National Grid - GSO)
<b>GBN</b>	Gas Balancing Notification ( <a href="#">See NG Website</a> )	<b>NGSE</b>	Network Gas Supply Emergency ( <a href="#">See NG website</a> )
<b>GDN</b>	Gas Distribution Network ( <a href="#">See ENA website – Who’s My Network Operator</a> )	<b>NTS</b>	National Transmission System (National Grid)
<b>GS(M)R</b>	Gas Safety (Management) Regulations 1996	<b>NTSA</b>	North Sea Transition Authority (UK Government) ( <a href="#">See NTSA website</a> )
<b>GNCC</b>	Gas National Control Centre (National Grid Gas)	<b>RIGSSE</b>	Review of the Impact of a Gas Supply Shortage on Electricity – Task Group (see <a href="#">App 5 – Industry Working Groups</a> )
<b>Emergency Specification gas</b>	GS(M)R makes provision to widen the standard gas quality specification to ‘prevent a supply emergency’	<b>GAS Report</b>	Gas Available Status Report which enables the GSO to better request information, via the OGA GAS Portal, to understand gas availability from the offshore and onshore sector
<b>Embedded generation</b>	Generation (including that fired by gas) which is connected to electricity distribution systems	<b>OC6</b>	Electricity Operating Code No. 6 details the demand control strategy in the event of insufficient active power generation being available to meet electricity demand ( <a href="#">See NG ESO website</a> )
<b>ESEC</b>	The Electricity Emergency Supply Code (ESEC) describes steps which the UK Government could take to deal with an electricity supply emergency (see .Gov.UK <a href="#">website</a> )		



# Appendix 5 – Industry Working Groups



# Appendix 6 – Priority Customers

On 7th October 2022, the Secretary of State for Business, Energy and Industrial Strategy (BEIS) approved the revised criteria for Priority Customers, under the Gas Transporters Standard Licence Conditions. These customers will be the last to be instructed to cease taking gas, where this is necessary for safety reasons.

As a result, in accordance with condition 6, paragraphs 16 and 17 of the GTSLC, the BEIS Secretary of State is directing gas transporters to base their priority lists on the following classes of relevant customers:

- **Category A:** Relevant customers where a failure in the supply to their premises could put lives at risk.
- **Category B:** Relevant customers for which the sudden loss of gas causes or threatens to cause serious damage, for an unacceptably prolonged period, to human welfare, the environment or the security of the United Kingdom that cannot be reasonably mitigated.
- **Category C:** Relevant customers taking over 2 million therms per annum for which the sudden loss of gas would result in repair or replacement costs amounting to 10% or more of the Site Fixed Tangible Asset Value.

The assessment of whether a site satisfies the criteria contained in Categories A and C rests with the gas transporter. BEIS will regularly conduct the assessment for Category B applications, in consultation with relevant Lead Government Departments.

**N**etwork  
**E**mergency  
**C**o-ordinator

