Department for Energy Security & Net Zero

National Emergency Plan 2023

Downstream gas and electricity

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1. Introduction

The Department for Energy, Security and Net Zero (DESNZ) works with the downstream gas and electricity industry, regulators, sector bodies and other stakeholders to improve and maintain the resilience of the energy infrastructure, networks and assets; to reduce vulnerabilities; and to ensure an effective response to actual or potentially disruptive incidents.

The National Emergency Plan for Downstream Gas & Electricity (NEP-DG&E) provides an overview of the national arrangements established between DESNZ, the downstream gas and electricity industry, the Office of Gas and Electricity Markets (Ofgem) and other interested parties for the safe and effective management of both downstream gas and electricity supply emergencies.

An emergency in downstream gas and electricity can be triggered by different events.

For **gas**, this is a potential or actual loss of pressure in the network that presents a safety risk or could lead to gas supply disruptions. Low pressure can be dangerous, potentially resulting in an increased explosion risk in infrastructure and properties. A gas supply emergency can be caused by not having enough gas available from supply sources or storage, or because there is a constraint in the network that causes the gas flow to be restricted to downstream customers or its intended location.

An **electricity** emergency can be caused by an actual or potential sudden, unexpected loss of generation or transmission asset. This could be triggered by a lack of available generation, or by technical faults or physical damage to electricity generation, transmission or distribution infrastructure. Severe weather such as heavy snow or high winds that damage essential infrastructure, or shortages of any critical commodities essential for generation, could also trigger an emergency. Electricity emergencies could also develop more slowly, for example, by not having enough generation available to meet demand.

A gas emergency that restricts gas supply to gas-fired electricity generation plants (either through technical faults or due to emergency demand distribution to protect the gas network), could result in a shortfall of electricity generation leading to an electricity emergency.

A more detailed list of different types of risks that can trigger a gas or electricity emergency can be found in the National Risk Register 2020.

Gas and electricity emergencies are relatively rare. Emergencies can be localised or at a national level. Although Great Britain has a diverse and robust energy supply, the UK Government works closely with industry to minimise the risk of an energy emergency and ensure rigorous measures are in place in the event an emergency does occur.

1.1 Scope

The purpose of this NEP-DG&E is to provide an accurate overview of emergency plans and processes that exist across the GB energy sector including:

- How sector risks are identified, managed and mitigated.

- A summary of the roles and responsibilities of all parties involved in an emergency response, including key interactions and how information should be shared.
- An overview of operational emergency procedures and measures across the gas and electricity sector.
- An outline of key legislation, codes, plans, and procedures relevant to an energy emergency.

Energy policy for Northern Ireland is devolved to the Northern Ireland Assembly. As such, the NEP-DG&E's scope is limited to England, Scotland and Wales.

2. Managing and monitoring risks

DESNZ works closely with industry and across Government to ensure that appropriate preparedness and mitigation measures for the downstream gas and electricity sector risks are in place so that impacts from any network imbalances are minimised.

Further information can be found in the Risk-Preparedness Plan for electricity sector in GB and the UK National Risk Assessment on Security of Gas Supply.

Examples of some the specific risks to the downstream gas and electricity sector are outlined on the following pages.

Table 1: Downstream gas and electricity resilience risks

Risks	Description	Potential Response Triggers	Potential Impact
Network Gas Supply Emergency (NGSE)	There is a potential or actual loss of pressure in the Gas Network which could disrupt the safe supply of gas to consumers without further action.	Network Emergency Coordinator (NEC) declares an NGSE. This is likely to follow the issuing of Gas Margin or Balancing Notifications by the Gas System Operator (GSO), though these measures do not themselves trigger an emergency.	The disconnection of industrial and/or domestic gas consumers in a worst-case scenario. Key impacts to domestic gas customers include disruption to heating and the ability to cook (although this is a last resort). This becomes particularly important for vulnerable customers in the winter period. Key impacts on industrial customers include large power stations being unable to operate, potentially affecting the electricity system and causing disruption (a significant reduction in gas-fired generation could ultimately lead to loss of power to domestic electricity customers). The actions taken here are to avoid the significant safety risk caused by uncontrolled loss of pressure in the gas system and to mitigate the associated longer term public health risk of no heating to domestic gas customers for a considerable period of time. More information: • National Grid Network Gas Emergency T/PM/E/1

Risks	Description	Potential Response Triggers	Potential Impact
Shortfall of Electricity Generation	There is insufficient electricity being generated to meet the demand of consumers, resulting in widespread supply disruption.	The Electricity System Operator (ESO) notifies DESNZ of a shortfall. ESO issues a: • High Risk of Demand Reduction Notice • Demand Control Imminent Notice • Demand Control Instruction The above system warnings are likely to follow the issuing of Capacity Market Notices (CMN) and Electricity Market Notices (EMN) by ESO, though these measures do not themselves trigger an emergency. If the shortfall is expected to be prolonged, ESO would recommend to DESNZ that the Electricity Supply Emergency Code is enacted.	Voltage reduction (e.g., dimming of lights) and/or the disconnection of some industrial and domestic customers. There would likely be GB-wide impacts (rather than localised issues) although Distribution Network Operators (DNOs) would attempt to evenly distribute the impact across their license areas. Key impacts could include disruption to telecommunication services, transport services, loss of heating and loss of the ability to cook. The actions taken here are to avoid the electricity system becoming unbalanced which could ultimately lead to a National Power Outage, if not mitigated. More information: • Risk Preparedness for the Electricity Sector • Operating Code 6 of the Grid Code • Electricity Supply Emergency Code
Excess Electricity Generation	In times of low demand, there may be too much electricity supply, and the Electricity System Operator (ESO) may require generators to reduce their output. This could potentially happen at any time of the day or night, and at any time of the year, however it is more likely during the summer months when demand tends to be lower. If ESO were unable to reduce generation or increase demand this would result in the	The Electricity System Operator (ESO) notifies DESNZ of the negative power margin problem. ESO issues a: • Insufficient Negative Reserve Active Power Margin (NRPAM) system warning. If the issue persisted, then ESO would take Emergency Instructions	ESO to action Emergency Instructions after all other actions taken in the Balancing Mechanism. Instructions as per Balancing Code No 2.9.4. The actions taken here are to avoid the electricity system becoming unbalanced which could ultimately lead to a National Power Outage, if not mitigated.

Risks	Description	Potential Response Triggers	Potential Impact
	operation of the Transmission System outside system security standards.	(as defined in the Grid Code) to alleviate the problem.	
Severe Weather	Severe weather such as high winds, heavy rain, ice accretion or very high temperatures can cause damage to electricity and gas infrastructure, causing localised disruptions. High winds have a greater impact on electricity assets than gas assets. Severe or sustained flooding (e.g., caused by heavy rain or snow) could cause damage to essential gas and electricity infrastructure. Ice accretion can result in overhead lines snapping. Whilst very high temperatures can present a risk, the level of disruption would be minor compared to other severe weather risks.	Met Office issues an Amber or Red Weather warning. Environment Agency (EA), Natural Resources Wales (NRW) or Scottish Environment Protection Agency (SEPA) issues Amber flood warnings.	Localised electricity disruptions typically last a number of days, whilst damaged infrastructure is repaired. Disruptions to domestic gas customers take longer to resolve than disruptions to electricity customers. This is due to the extensive labour required for suitably qualified gas engineers to visit each affected house to safely restore supply. Key impacts include loss of heating and the ability to cook which is particularly important for vulnerable customers in the winter period.
Pandemic	A global outbreak of a disease has the potential to cause significant workforce absence levels across organisations. Absence could be a result of sickness, caring responsibilities or as a result of non-pharmaceutical measures put in place to limit the spread of a disease.	World Health Organisation (WHO) declares outbreak of a pandemic, for example influenza. Cabinet Office Briefing Rooms (COBR) Unit issues a ‘stand up’ cross-government response structure.	Absence levels across critical roles in the gas and electricity sector affect the delivery of critical services, reduce security of energy supplies and, in an emergency, increase the time taken to restore energy to disconnected customers. Absence levels across wider industry result in disruption to the supply chain, causing shortages of critical commodities and leading to a subsequent reduction in the security of energy supplies.

Risks	Description	Potential Response Triggers	Potential Impact
Severe Space Weather	Solar activity directed towards Earth disrupts position, navigation and timing systems, as well as communication systems, electrical infrastructure and electronic systems.	Met Office informs DESNZ of a space weather event forecasted. Met Office issues a major event briefing document which includes warnings for three types of impactive space weather phenomenon - geomagnetic storms (G scale), radio blackouts (R scale) and solar radiation storms (S scale).	Severe space weather could result in localised power disruptions that affect customers for a period of time ranging from hours to days or weeks, should damaged transformers need to be replaced, with the potential for prolonged disruptions to the transmission system. Coastal and rural areas are generally at a higher risk. Wider impacts include aviation disruption, communication loss, and disturbance to (or loss of) satellite systems. More information: • UK Severe Space Weather Preparedness Strategy • Met Office Space Weather Scales
Failure of National Electricity Transmission System	A total failure of the National Electricity Transmission System (NETS), causing a National Power Outage (NPO).	ESO informs DESNZ of incident. Loss of power and communications for an extended period.	A nationwide loss of power, resulting in cascading failures across critical utilities networks (including telecoms, water, gas and sewage), causing significant disruption to the majority of businesses and households, as well as potential loss of life. The electricity network would take at least 7 days to recover, and other sector impacts could last for a number of months. More information: • Electricity System Restoration Standard

Risks	Description	Potential Response Triggers	Potential Impact
Overseas Event	A British Overseas Territory requests assistance for expertise to repair energy infrastructure.	Foreign, Commonwealth and Development Office (FCDO) inform DESNZ of an overseas incident affecting a British Overseas Territory. This could also include international weather services forecast storms impacting British Overseas Territories. DESNZ will take appropriate action, including assessing the situation and providing coordinated policy advice and other support as necessary to local responders, providing the interface between industry and central government. Gas and Electricity Distribution Network Operators will be responsible for the health and welfare of all staff who are involved in the incident response, both in UK and overseas, and will provide expert advice to DESNZ.	Widespread supply disruption affecting a significant majority of the local population. Key impacts include cascade failures across critical utilities networks (including telecoms, water, gas and sewage), causing significant disruption to the majority of businesses and households, as well as potential loss of life.
Cyber Attack/Incident	Operators targeted through cyber-attack, such as malware (malicious software) or ransomware. The cyber-attack/incident targets operational technology and digital infrastructure, causing energy supply disruptions to Gas or Electricity operator(s).	DESNZ will be notified of a cyber incident by the National Cyber Security Centre (NCSC) or directly by the affected operator/organisation of a cyber-attack/incident. Any disruption to supply caused by a cyber-attack/incident, would be notified to DESNZ by the operator.	Key impacts of cyber-attacks on operators are the cost to operators of regaining control of compromised systems, disrupted supply chains, disrupted power supplies, halted industrial processes and compromised safety of systems. The level of disruption depends on the scale of the attack and the sophistication of the actor. Impacts to control systems could

Risks	Description	Potential Response Triggers	Potential Impact
			result in supply disruptions to customers, including businesses and households.

The UK Government has also produced a National Risk Register. This document identifies and assesses the risks that can cause significant human, economic, environmental and infrastructure damage in the UK, including widespread energy disruption.

Key planning assumptions on possible energy disruption and their impacts are set out in this document, and other government departments such as the Home Office and the Department for Levelling Up, Housing and Communities (DLUHC), work closely with the emergency services to ensure they have the appropriate capabilities in place for these planning assumptions.

Continuous improvement

DESNZ continues to work closely with industry and regulators to continually improve and maintain the resilience of energy infrastructure, networks and assets to reduce vulnerabilities and ensure an effective response to actual or potentially disruptive incidents.

The Gas and Electricity sectors regularly conduct testing as part of their safety obligations, including through:

- Internal training and exercises,
- Bilateral tabletop exercises on specific risks,
- Full industry annual exercises with Government participation (including scenarios with loss of supply to customers), and
- Business Continuity Management planning (including pandemic planning and learning from Covid-19).

2.1 Risk Monitoring

DESNZ sets incident reporting thresholds for relevant industry partners (including System Operators, Transmission Owners, Gas Distribution Networks, Distribution Network Operators, Gas Terminals, and Electricity Generators), which are reviewed and shared annually. These include heightened industry reporting thresholds for specific events (such as major sporting or ceremonial events).

2.2 Risk Governance

As the Lead Government Department (LGD) for gas and electricity emergencies, DESNZ is responsible for developing, reviewing, updating and testing the emergency procedures contained in this document. The implementation of the majority of procedures and processes set out in this document is the responsibility of the gas and electricity industry, namely the parties identified in Table 2.

Northern Ireland and Ireland

Energy policy for Northern Ireland is devolved to the Northern Ireland Assembly. The Department for the Economy (Northern Ireland) maintain their own procedures for responding to gas and electricity emergencies. The Risk Preparedness Plan for the electricity sector in Northern Ireland sets out how DESNZ is the Competent Authority under the EU Risk Preparedness Regulation but has delegated some operational tasks regarding risk-preparedness planning and risk management to the Department for the Economy in Northern Ireland.

The UK and the Republic of Ireland have a mature vehicle for co-operation to ensure that the gas emergency operational plans of the jurisdictions work together. This is achieved through the development of protocols between the Transmission System Operators (TSOs) and the modifications to emergency plans identified following joint emergency exercises. The arrangements between National Grid, Gas Networks Ireland (GNI) and GNI's UK business are covered by a tripartite interconnector agreement, which includes provisions on emergencies.

Scotland

Aspects of energy policy are devolved in Scotland, although most regulation, security and resilience measures are reserved. In the event of a major incident in Scotland, the Scottish Government would activate its Scottish Government Resilience Room (SGoRR). When the particular circumstances of an emergency require UK Government support, Cabinet Office will mobilise UK Government plans and DESNZ would lead the response, whilst establishing links with the Scottish Government's corporate arrangements.

Wales

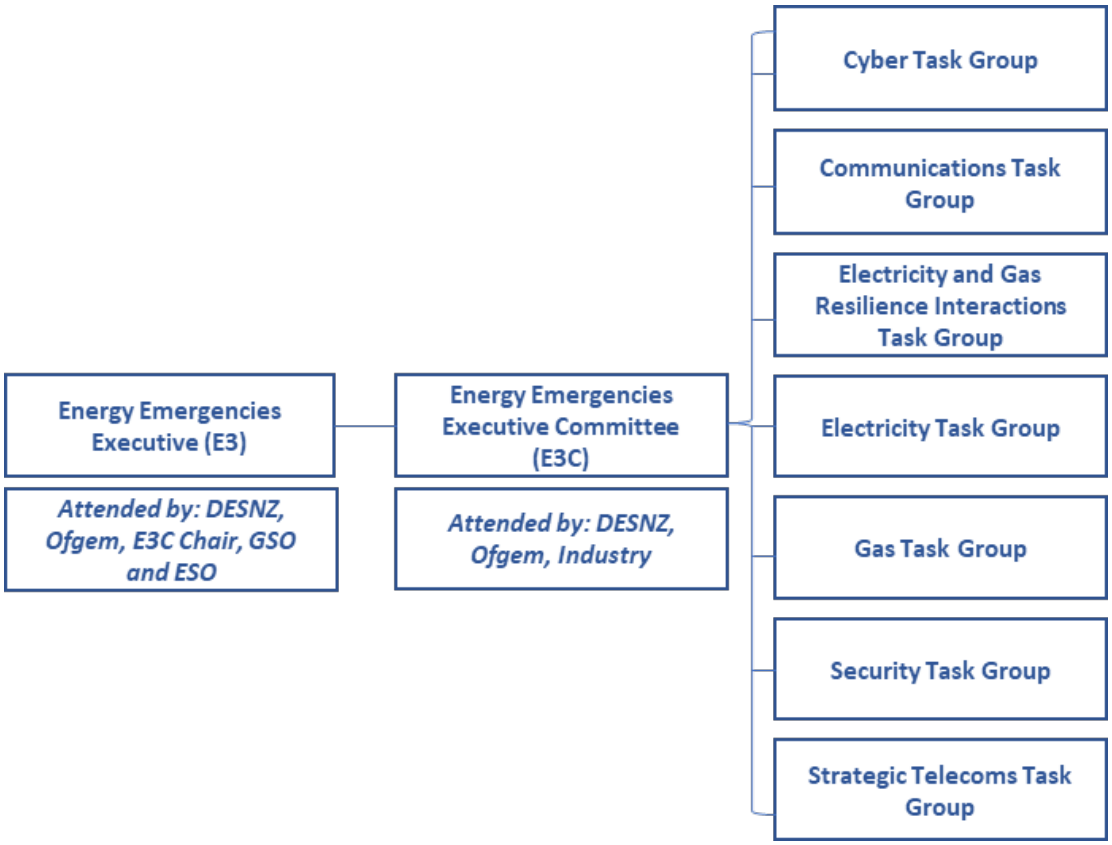
Energy policy is reserved, including the generation, transmission, distribution and supply of electricity, and the manufacture or production of, and the shipping and supply of, gas.

Energy Emergencies Executive Committee

Detailed emergency planning activities are jointly undertaken by industry and Government via an emergency planning body, the Energy Emergencies Executive Committee (E3C) and its associated task groups reporting into the Energy Emergencies Executive (E3).

- E3 has been established with senior representation from DESNZ, Ofgem and GSO and ESO to consider the risks to the supply of gas and/ or electricity to consumers and to identify ways to manage these risks.
- E3C body and subordinate task groups consist of experts drawn from the gas and electricity industries as well as government, agencies, regulators, Trade Associations and industry Bodies.
- E3C will have visibility of the National Emergency Plan to help ensure it incorporates identified best practice in emergency response, learnings from emergency exercises, and amendments to the process resulting from changes in the structure of the industry.

Figure 1. The Energy Emergencies Executive (E3C) governance structure



3. Roles and responsibilities

The parties that will be involved in large-scale gas and electricity emergency responses are detailed below. Each party has a key role to play in ensuring the timely and smooth delivery of emergency measures and procedures.

3.1 Activation

When GSO or ESO activates a response to a major incident, or identifies an emerging incident, the relevant responsible person from across the gas and electricity sector will contact DESNZ. Where DESNZ identifies an actual or potential incident through other routes, DESNZ will alert relevant industry stakeholders.

DESNZ will make an initial evaluation of the incident and decide if it is necessary to 'stand up' a response. The exact type and scale of an emergency will dictate the type of response structure that will be stood up to manage the incident. In any emergency situation there may be close interactions between gas and electricity, with significant consideration given to the different impacts that might affect both networks. This is particularly true of a gas supply emergency, which could impact a number of gas-fired electricity generators, which could in itself then trigger an electricity supply emergency due to a shortfall in electricity generation.

Communication and engagement with both the public and media during an emergency response is a critical function and it is vital that external communications are co-ordinated, consistent, clear and timely. To ensure effective co-ordination of messaging, detailed arrangements have been established between industry partners and DESNZ. Specific responsibilities and the balance of focus between organisations will differ depending on the nature of the incident, although in most incidents it is expected that industry parties will take the lead with communications, amplified via UK Government channels, the UK Government will lead communications in more serious emergencies, as defined in the communications plan.

3.2 Outline of roles in an emergency response

Following the activation of an emergency response, individual organisations will respond and operate according to their agreed internal procedures.

DESNZ is the LGD for energy supply emergencies as set out in the UK Government arrangements for responding to an emergency ('CONOPS'). DESNZ will determine the crisis level and activate an emergency response in accordance with Departmental procedures. DESNZ will, in consultation with industry and wider Government stakeholders, regularly review the crisis level and decide if any changes should be made, notifying all interested parties.

The COBR Unit manages the central government response to acute national emergencies. This includes cross-government coordination of secondary impact management.

The gas and electricity industries, as listed in Figure 2, are responsible for the operational management of an emergency, for notifying DESNZ and for ensuring that appropriate information is provided to the central government response to inform effective strategic decision making as required.

Industry will also interface directly with the local Strategic Coordination Groups (SCGs) on local issues and consequence management. This is often through a utilities sub-group, though arrangements vary across SCGs.

The Resilience & Emergencies Division (RED) of the DLUHC in England, and Devolved Administrations, provide a link to central government for local responders and may facilitate groups or mechanisms to co-ordinate emergencies that may overwhelm the boundaries or resources for

individual Local Resilience Forums (LRF) in Wales and England, or Local Resilience Partnerships (LRP) in Scotland.

Figure 1: Key emergency response partner interactions

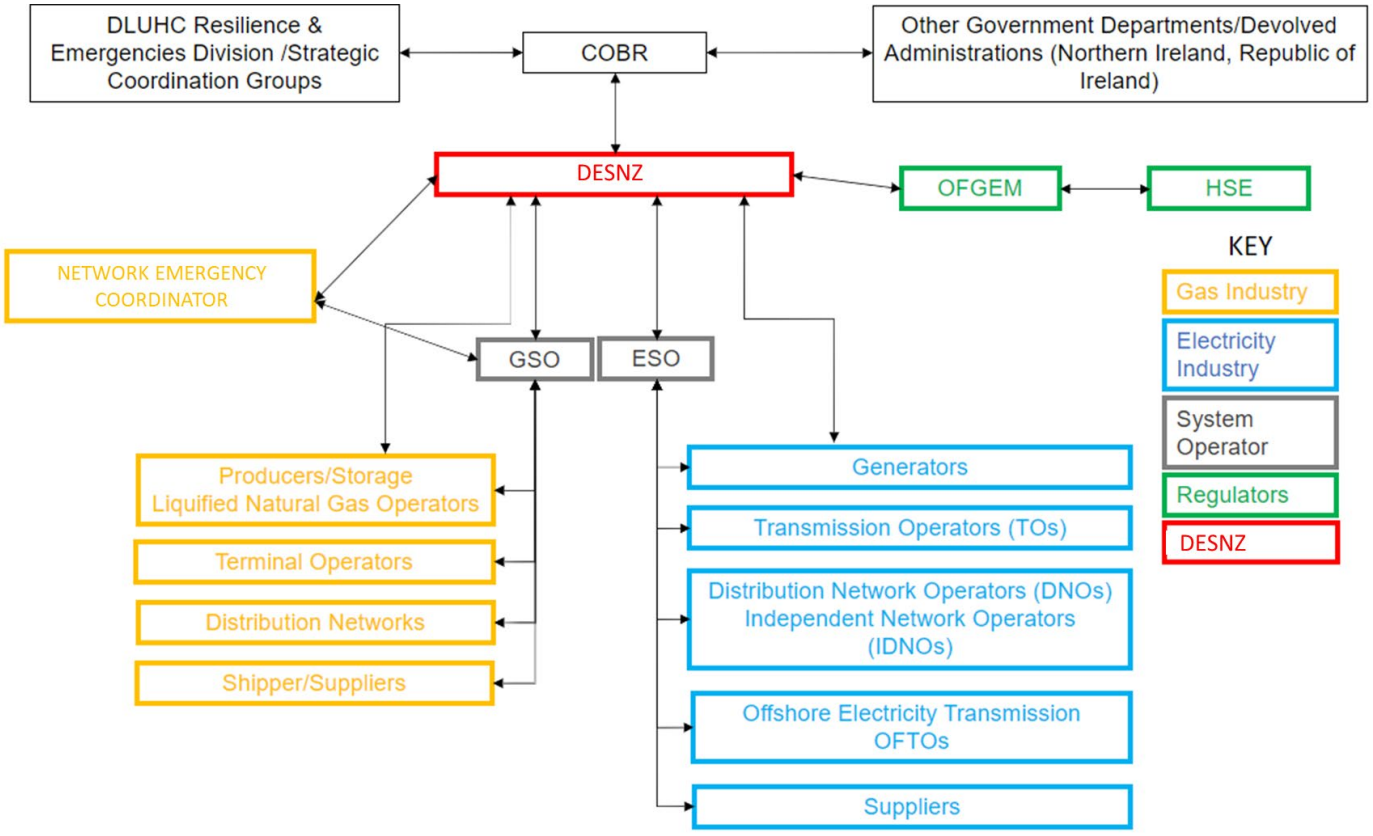


Table 2: Roles and responsibilities of emergency response partners

Government

Organisation	Roles and Responsibilities
Department for Energy Security & Net Zero (DESNZ)	DESNZ is the LGD for energy emergencies under the "Concept of Operations (CONOPs)" – The UK Central Government Arrangements for Responding to an Emergency. DESNZ, as the Competent Authority and LGD, will assist with managing the consequences of any emergencies and supporting the undertakings in managing any supply disruptions. In the event of an emergency DESNZ will: • Exercise its responsibilities set out in CONOPs, including assessing the situation and providing coordinated policy advice. • Provide information as necessary to DLUHC, who are responsible for local responders, with DESNZ providing the interface between industry and central government.

Organisation	Roles and Responsibilities
	The DESNZ response will be run by the Emergency Response Team (ERT) led by a senior official, who has the responsibility for the categorisation of the crisis level and the management of the crisis level communications with other Competent Authorities for gas and electricity emergencies. The DESNZ ERT will, in the event of an actual or potential emergency affecting the gas and/or electricity networks, provide the interface between industry and government. The ERT is responsible for: • Primary liaison and briefing with ministers for COBR; • Liaising with external stakeholders to build situational awareness and analysing the implications for public safety, energy supply, business and wider DESNZ /Government policy; • Co-ordinating lines to take and the wider communications strategy; • Handling Parliamentary interest; • Maintaining an audit trail.
Cabinet Office COBR Unit	Cabinet Office COBR Unit manages the central government response to emergencies.
Department for Levelling Up, Housing & Communities (DLUHC) Resilience & Emergencies Division (RED) and Strategic Coordination Groups (SCGs)	DLUHC RED are responsible for co-ordinating information from multiple Local Resilience Forums/Partnerships (LRF/Ps) and SCGs to generate situational awareness across all areas affected, to identify strategic challenges and to co-ordinate central response with SCGs.
Devolved Administrations	Where an emergency impacts Wales or Scotland, links would be established with the Devolved Administrations' Governments, and the Scottish Government may activate its Scottish Government Resilience Room (SGoRR).
Other Government Departments (OGDs)	OGDs are responsible for assisting with the management of the consequences of any emergencies in their sectors.

Regulators

Organisation	Roles and Responsibilities
Office for Gas and Electricity Markets (Ofgem)	Ofgem, as the independent National Regulatory Authority in GB, is responsible for regulating the gas and electricity markets in England, Wales and Scotland. Ofgem is responsible for ensuring market arrangements are established and maintained, which minimises the possibility of gas or electricity supply disruptions. In an emergency that impacts the operation of the regulated or licenced gas and electricity markets, Ofgem would provide guidance on market operation, industry codes and regulatory arrangements.
Health and Safety Executive (HSE)	The Health and Safety Executive (HSE) is responsible for safety legislation and may grant exemptions to safety regulations in an emergency, if appropriate.

Environment Agencies	The Environment Agency (EA), Scottish Environment Protection Agency (SEPA) and Natural Resources Wales (NRW) are responsible for environmental legislation and may grant exemptions to environmental regulations in an emergency, if appropriate.

Industry

Organisation	Roles and Responsibilities
Network Emergency Coordinator (NEC)	The NEC is an independent role from the GSO **in relation to a gas emergency**, and coordinates actions across the affected parts of the gas network to minimise the possibility of a gas supply emergency developing and, where one does develop, to minimise the consequences. In the event of an emergency the NEC will: • Declare a NGSE. • Authorise the strategy proposed by GSO to resolve the emergency.
Electricity System Operator (ESO)	The ESO is the GB operator of the National Electricity Transmission System (NETS) owned by the Transmission Owners (TOs) and is responsible for coordinating the response to electricity supply emergencies. In the event of an electricity supply emergency, the ESO will: • Develop a response strategy to resolve the situation. • Execute the strategy by co-ordinating actions across industry parties. • Lead public communications for ESO-initiated demand control. • Provide timely and accurate updates to DESNZ.
Gas System Operator (GSO) [Note that this is a distinct role within National Gas Transmission plc (NGT), which is also the asset manager and owner of the National Transmission System]	The GSO is the GB operator of the gas National Transmission System (NTS) and is responsible for coordinating the response to any gas supply emergencies. In the event of a gas supply emergency the GSO will: • Develop a response strategy to resolve the situation • Execute the strategy by co-ordinating actions across industry parties. • Lead public communications • Provide timely and accurate updates to DESNZ.
Electricity Transmission Owners (TOs)	Transmission Owners (TOs) own and maintain the high-voltage electricity transmission networks and manage electricity supply emergencies affecting their own networks. There are three onshore TOs in GB; National Grid Electricity Transmission (NGET) for England & Wales, Scottish Power Transmission (SPEN) for Southern Scotland, and Scottish and Southern Electricity Networks Transmission (SSEN Transmission) for Northern Scotland. In the event of an emergency TOs will: • Co-operate with the ESO and DNOs to manage a national emergency.

Organisation	Roles and Responsibilities
	• For a regional incident, develop a response strategy to resolve the situation. • Co-ordinate response activities across their organisation to resolve the situation and minimise customer impacts. • Provide timely and accurate updates to DESNZ.
Electricity Distribution Network Operators (DNOs)	DNOs own and operate regional electricity networks and manage local electricity supply emergencies affecting their own networks. In the event of an emergency DNOs will: • Co-operate with the ESO and TOs to manage a national emergency. • For a regional incident, develop a response strategy to resolve the situation. • Co-ordinate response activities across their organisation to resolve the situation and minimise customer impacts. This will involve LRF/Ps and SCGs who are multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency and others. • For a regional incident, lead on public communications. • Provide timely and accurate updates to DESNZ and equivalent Gas Networks to understand relevant cross-sector impacts in event of a supply disruption. • To assist vulnerable customers who may need additional support, DNOs are required to maintain a Priority Services Register (PSR).
Gas Distribution Networks (GDNs)	GDNs own and operate the local gas transmission and distribution systems and manage local emergencies affecting their own networks. In the event of an emergency GDNs will: • Co-operate with the GSO and NEC to manage a national emergency. • For a regional incident, develop a response strategy to resolve the situation. • Co-ordinate response activities across their organisation to resolve the situation and minimise customer impacts. This will involve LRF/Ps and SCGs who are multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency and others. • For a regional incident, lead on public communications. • Provide timely and accurate updates to DESNZ and equivalent Electricity Networks to understand relevant cross-sector impacts in event of a supply disruption. • Assist vulnerable customers who may need additional support, GDNs are required to maintain a Priority Services Register (PSR).
Electricity Generators	Electricity generators are responsible for altering their output as required during an emergency, if directed by the ESO, or GSO in relation to gas-fired power stations

Organisation	Roles and Responsibilities
Gas Terminals Storage Operators and Liquified Natural Gas (LNG) Operators	Gas terminals (including LNG) and storage operators are responsible for altering their output as required during an emergency, if directed by the Gas System Operator or the NEC.
Gas Interconnector Operators	Interconnectors operate the gas pipelines that connect GB with continental gas supplies. In an emergency they are responsible for altering their output if directed by the GSO or the NEC.
Electricity Interconnector Operators	Electricity Interconnector Operators manage the High Voltage Direct Current (HVDC) links between GB and Continental/ Irish systems. In an emergency they are responsible for altering their output if directed by the ESO in line with established rules around Emergency Instructions.
Suppliers	Suppliers sell gas and electricity directly to consumers and will be expected to communicate with their customers in an emergency.
Shippers	Shippers have a specific role in the gas industry (no corresponding role in electricity) to buy gas from producers and sell it onto gas suppliers. In an emergency, shippers are required to cooperate fully with GSO to ensure successful implementation of emergency system balancing actions.
Trade Bodies	Trade Associations such as the Energy Networks Association (ENA) can support in the co-ordination and delivery of a national media or communications strategy in the event of a national gas or electricity emergency.

3.2 Gathering data in a response

Developing and maintaining situational awareness across all responders is a key requirement for the effective management and response to an emergency.

Following activation of a response, DESNZ will agree and communicate a reporting rhythm to all relevant stakeholders. The reporting rhythm will set the pace and tempo of the response, taking account of key milestones and events such as meetings and the major actions necessary to support these milestones. The reporting rhythm will identify key timings and deadlines for submission of information or implementation of actions. The reporting rhythm will be reviewed regularly and updated as appropriate.

To fulfil its LGD responsibilities, including maintaining situational awareness in a gas and/or electricity emergency, DESNZ will require information from industry (including specific data sets) on a regular basis. All information will be provided by industry in an appropriate format agreed with DESNZ. Any differing requirements will be communicated with industry as soon as possible and kept under review throughout. This process will enable the information from all providers to be readily assimilated for onward communication, including to COBR and wider government, and to key stakeholders.

Various types of information will be needed across stakeholders in any situation. Some examples of these are listed below.

Table 2: Information sources in a downstream gas and/or electricity emergency

Information	Sources/Stakeholders
Cause of the emergency	Industry
Scale and duration of the emergency	Industry
Timescale for restoration	Industry
Government powers required	Industry/ DESNZ/ HMG
Actions already taken	Industry/ DESNZ/ HMG
Customer issues (including priority users)	Industry
Market issues	Ofgem
Societal impacts (health/transport/essential services)	Other Government Departments (OGDs)
Security issues	HMG
Media interest	Industry/ DESNZ/ HMG
Media lines-to-take	Industry/ DESNZ/ HMG

4. Crisis levels used in a response

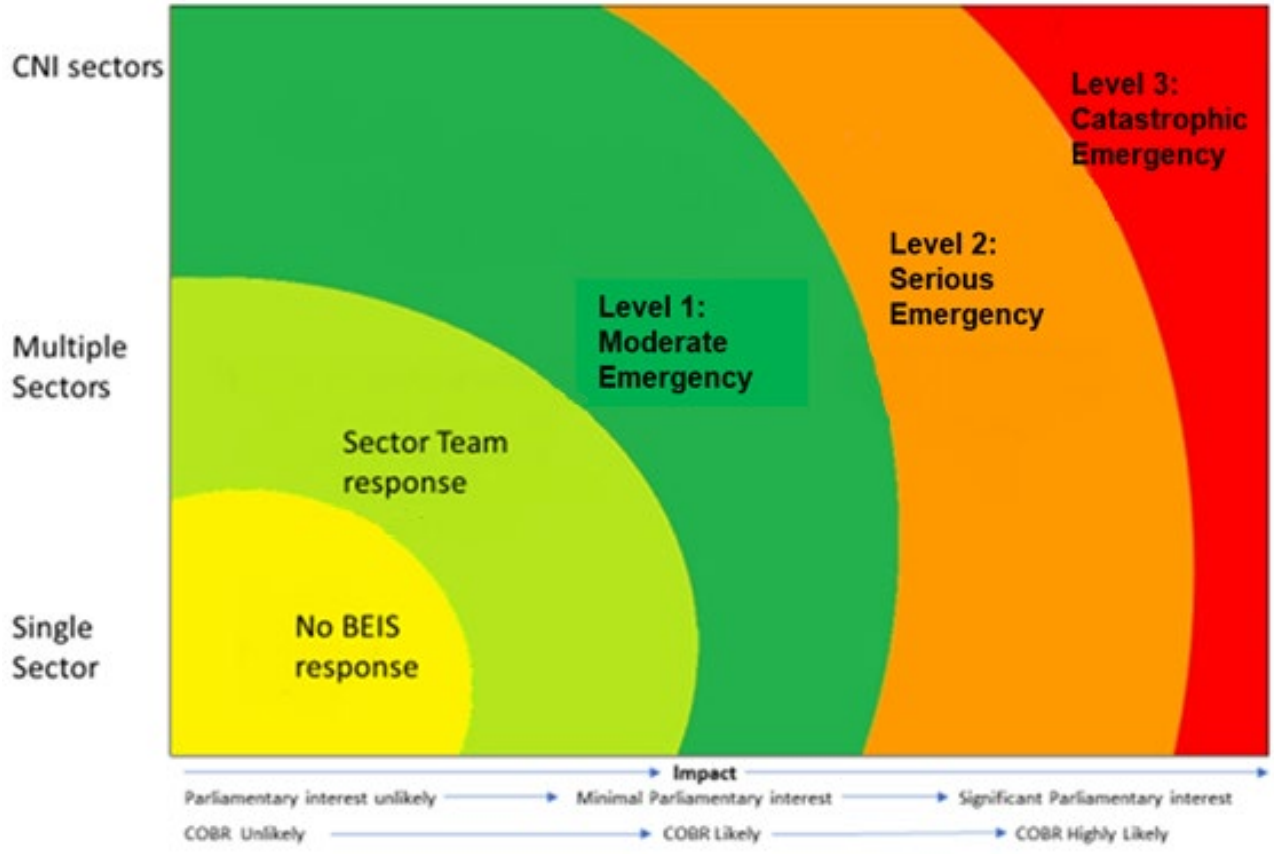
This section provides an overview of the general crisis levels and general procedures used for a gas or electricity emergency event. A detailed list of relevant legislation can be found in Annex A.

More details on the key actions and response plans for a NGSE can be found in Table 4, similar plans for an electricity emergency can be found in Tables 5, 6 and 7.

Crisis levels are intended to ensure that there is a consistent approach to the assessment of an emergency and to confirm that an appropriate level of response is implemented locally and nationally as required.

DESNZ will determine the crisis level following discussions with key industry responders and Other Government Departments and will evaluate the need to activate a central government response, notifying responders accordingly.

Figure 2: DESNZ Crisis Levels



4.1 Public Appeals

Appeals to the public to reduce gas or electricity use are part of existing emergency plans. These are likely to be used when there is a high probability of disruption to supplies to industrial or domestic consumers. Public appeals will need to be tailored to the specific emergency, and the specific appeal will need to consider a range of factors. For example, in a gas emergency, appeals

to reduce demand to help maintain gas pressure and to limit explosion risks would be considered alongside the public health risks of asking consumers to reduce heating.

Public appeals will be initiated by the NEC and ESO respectively, providing advice to the public on how and when they should reduce their energy consumption. Government and the appropriate technical experts from the energy industry will co-ordinate messaging to support a public appeal with additional amplification provided by trusted, consumer-facing organisations.

The ENA will ensure their members are coordinated in their communication of this appeal. All public appeals will be coordinated between GSO and ESO to minimise unintended impacts across the gas and electricity systems.

DESNZ maintains a separate communications plan for gas and electricity emergencies, that is kept under regular review.

5. Overview of gas emergency responses

This section provides an overview of the plans used by industry in the event of a Network Gas Supply Emergency (NGSE), outlines the different stages of a NGSE and details the key actions to be taken between industry and Government.

5.1 Key industry gas emergency plans and requirements

T/PM/E/1 is the industry procedure used for managing a NGSE occurring on the national transmission system. This document is produced and maintained by the Emergency Planning Team, as part of Gas Operations in National Gas Transmission plc. The purpose of this document is to provide a measured, appropriate and coordinated response to a NGSE. It describes the types of NGSE that could be declared by the NEC, the emergency actions that may be authorised, and the communication routes to be used during the emergency.

T/PM/E/2 is the Gas industry framework for dealing with Local Gas Supply Emergencies. The GDNs are jointly responsible for maintaining this document.

The Prevailing View is a digital tool owned and maintained by National Gas that provides a snapshot of the real time data and the associated contextual data that provides a high-level overview of the current status of the National Transmission System.

Gas Safety (Management) Regulations 1996 is legislation that applies to the conveyance of natural gas (methane) through pipes to domestic and other consumers and covers the safe management of gas flow through a network, particularly to domestic consumers, and arrangements for dealing with supply emergencies and gas incidents.

Uniform Network Code (UNC) sets out the rights and responsibilities for licensed gas transporters and gas shippers' systems. The code is the competitive gas industry's contractual framework for the transportation and supply of gas. It has a common set of rules which ensure that competition can take place on equal terms.

5.2 Gas Emergency levels

There are different classifications of a NGSE, and the NEC may declare up to three stages of a NGSE.

The different classifications of a NGSE, the corresponding crisis levels, and the possible actions at each stage of the NGSE that may be implemented by GSO as part of the emergency strategy authorised by the NEC.

Figure 4: Simplified Network Gas Supply Emergency Action Summary

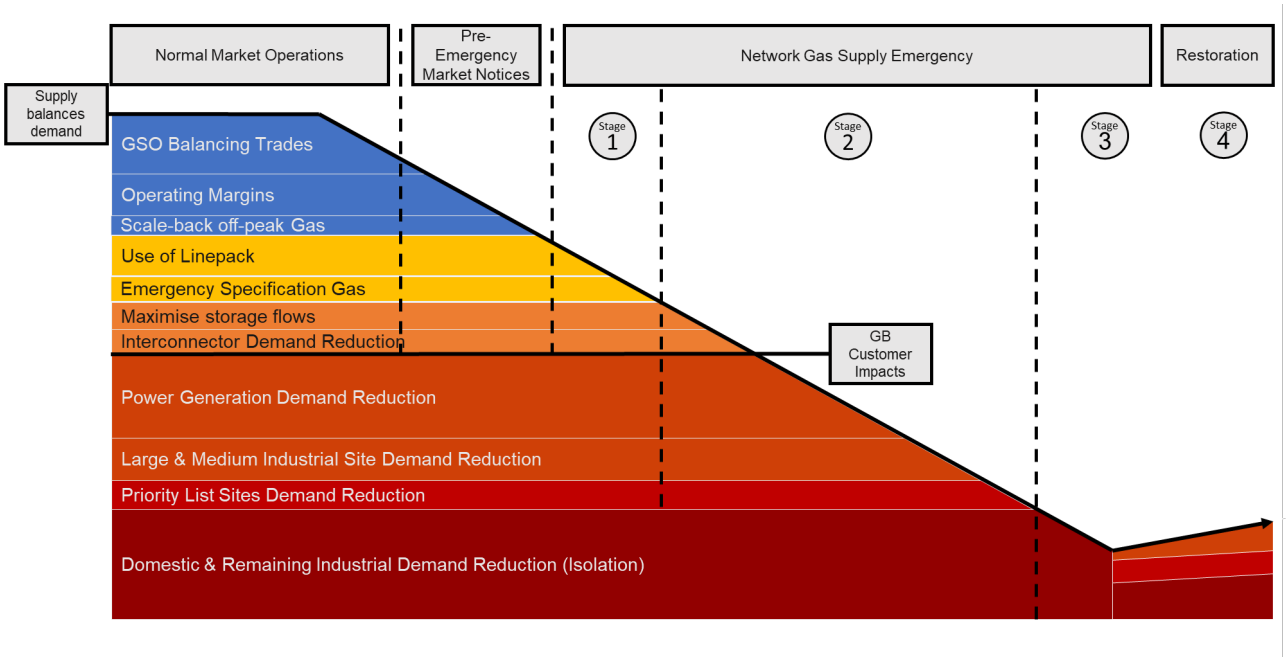


Table 4: Network Gas Supply Emergency Actions

Pre-Emergency Stage In the event of a potential gas supply disruption, a variety of commercial tools can be implemented by GSO before a declaration of a NGSE. In order to ensure whole energy system outcomes are optimised, GSO and ESO will seek consent from DESNZ to share information on their proposed response plans with the sole purpose of identifying opportunities to avoid actions that cause undue stress on one part of the energy system while alternative actions remain available.		
Actions	Owner	Description
Residual Balancer	GSO	The GSO is the residual balancer for the on-the-day commodity market for gas in GB. In this capacity, the GSO assures the system balances within a target range by trading to increase or decrease the system buy-and-sell prices. This incentivises market action.
National Transmission System (NTS) reconfiguration	GSO	GSO can change how gas moves around the network. At this stage GSO adapts the network to make sure that gas is moved to where it is needed, rather than running the network in the most economical way (i.e., prioritising certainty of flow over cost considerations).
Pre-emergency incentive	GSO	If the GSO's residual balancing function is not providing sufficient incentive to balance the market, or a locational constraint is forecast, the GSO can deploy a range of pre-emergency incentives designed to encourage an increase in supply and reduction of demand (or the specific action required).
Contractual limits enforced	GSO	To prevent a NGSE, GSO can enforce contractual agreements to provide only minimum levels of gas in order to decrease overall gas demand.
Utilise Operating Margins	GSO	Operating Margins are commercial contracts made by the GSO with large customers (including power stations) to reduce demand when required in return for payments throughout the year. They are also agreed with storage operators to ensure that any available gas in storage is used.
Scale back of off-peak exit capacity and release of daily firm exit capacity	GSO	This is a reduction in the amount of gas capacity normally provided to network users to help reduce demand. Off-peak capacity is where capacity has been bought on a non-firm basis (i.e. it is cheaper but not guaranteed) and this action allows it to be withdrawn if required. Short-term firm capacity (i.e. guaranteed) is not released as it normally would be.
Issue market warning notices: • Margins Notice • Gas Balancing Notification	GSO	GSO could issue two types of market notices to stimulate market activity: Margins Notice – if there is an indication of a potential supply/demand imbalance for the coming gas day. This is an automatic notification which is triggered when forecast day ahead demand exceeds the expected available supply (although there is an additional separate notification

		to the market when forecast demand is higher than 95% of expected available supply). Gas Balancing Notification – in advance of or during a gas day if a significant supply/demand event is expected which instigates a material risk to the physical end-of-day gas balance.
Impact to customers: Domestic customers will not experience impacts to their gas or electricity supplies as a result of actions taken at the Pre-Emergency Stage.		

Stage 1: Potential Network Gas Supply Emergency

If commercial tools are not sufficient to prevent further supply disruption, there is now a high risk of a gas supply emergency.

The NEC will notify DESNZ shortly before a Stage 1 NGSE is declared.

Stage 1 is initiated when the NEC believes that Stage 1 actions alone will provide sufficient gas to be equal or greater than the identified deficit and can be delivered before the network failure occurs. For the NEC to declare an emergency it is assumed that GSO have taken all commercial and physical actions available.

At Stage 1, the NEC will declare which type of NGSE currently exists. These are:

- Gas Deficit Emergency (GDE) – not enough gas supply for demand.
- Safety Monitor Breach – potential or actual breach of the safety monitor.
- Critical Transportation Constraint (CTC) – enough gas but inadequate pressure.

There are a number of additional tools GSO can deploy to help resolve the issue.

It is expected that information sharing will continue to be conducted between GSO, ESO and DESNZ.

Actions	Owner	Description
Gas Specification range widening/ Emergency specification gas	NEC/GSO	GSO can lower the specification of gas, if still within safe levels, to blend into the system. A risk assessment should be carried out to determine the duration that this gas can be accepted into the network. This is not possible in a Safety Monitor Breach.
National Transmission System Linepack/ total volume of gas in system	GSO	All existing excess linepack (the total volume of gas in the system) within the transmission system should be utilised at this stage.
Distribution Network Utilisation	GSO, Distribution Networks	Distribution Networks may be asked to release any gas storage to reduce the amount of gas taken from the transmission system. GSO can also request certain industrial customers connected at distribution level with specific contractual obligations to cease taking gas.

Instruct shippers and storage operators to amend storage flows (in a Safety Monitor Breach only)	NEC/Shippers/ Storage Operators	The NEC will instruct shippers and storage operators to increase the delivery of storage gas to the transmission system. They will be instructed to undertake demand reduction and to increase supplies to the network to maintain the supply-demand balance.
Public Appeals	NEC, Distribution Networks	In an emergency, this is an appeal to affected members of the public to reduce their gas consumption, targeting domestic and smaller commercial customers. This could be delivered with industry partners but would be initiated by the NEC.
Impact to customers: Domestic customers will not experience impacts to their gas or electricity supplies as a result of actions taken in a Stage 1 NGSE.		

Stage 2: Declaration of a Network Gas Supply Emergency

If the arrangements available in Stage 1 are insufficient to address the supply-demand imbalance, the NEC will declare a Stage 2 NGSE.

A declaration of Stage 1 and 2 could happen simultaneously if the actions within Stage 1 are assessed to not be sufficient at the outset.

The GSO will work with the ESO to maintain system stability on the electricity network, ensuring that actions taken on the gas network do not threaten the integrity of the electricity network. Where opportunities exist to minimise impacts to electricity disruption as a result of any reduction in the availability of gas for electricity generation, these will be pursued to the extent the safe management of the emergency permits.

During a Stage 2 NGSE, it is expected that all industry parties will communicate regularly with both central and local government response mechanisms as to the progress of the response, further anticipated impacts and the status of customer energy disruptions.

Actions	Owner	Description
Maximise gas supplies	GSO, Shippers	Shippers should source as much additional beach gas as they can and arrange for delivery to gas entry facilities.
Maximise gas storage	GSO	GSO can issue direct instructions to any gas storage operator facility to deliver gas to the system. Storage should be run down to the relevant safety monitor level. This step is not applicable in a Safety Monitor Breach emergency.
Suspend National Gas Transmission plc's participation in the on-the-day Commodity Market	GSO	GSO will no longer participate in the gas market. GSO powers are now focussed on directing the movement of gas. This step is not applicable in a Critical Transportation Constraint

		emergency.
Instruct shippers and storage operators to amend storage flows	NEC	NEC will instruct shippers and storage operators to curtail delivery of storage gas to the transmission system. They will be instructed to undertake demand reduction and increase supplies to the network to maintain the supply-demand balance.
Firm Load Shedding	GDN	Large industrial customers are instructed to stop or reduce their consumption of gas. This will only exist when there is no alternative action available in Stage 2 to balance the system. Firm customers would be contacted in order of load size with the largest users of gas first, including gas-fired power stations. Priority customers, such as hospitals, are contacted last if the deficit has not been met by other means. If the customers fail to cooperate with the direction to cease using gas, GSO may take action to physically isolate the site from the transmission network. This would also include ceasing exporting gas via the interconnectors to Europe.
Public Appeals	NEC, Distribution Networks	As a last resort at this stage, there can be further appeals to affected members of the public to reduce their gas consumption - targeting domestic and smaller commercial customers. This could be delivered jointly with the distribution networks but led by the NEC.
Impact to customers: Large industrial gas customers, including gas-fired power stations, will be required to cease taking gas from the NTS. This may result in power cuts to electricity customers when electricity supply isn't sufficient to meet demand. As a final measure, before declaring a Stage 3 NGSE, Category A Priority Customers, such as hospitals, may be taken off gas supply.		

Implications of a Network Gas Supply Emergency on Electricity

A network gas supply emergency could trigger an electricity emergency if gas-fired electricity generators are isolated from gas supply and are unable to generate electricity. If there is long-term impact to the electricity systems or it results in prolonged shortfalls in electricity generation, ESO would look to the UK Government to implement the arrangements and powers described within the Electricity Supply Emergency Code (ESEC).

ESEC outlines the process for ensuring fair rationing of electricity during an electricity supply emergency. This is done using a process known as 'rota load disconnections' which enables an equal distribution of supply to customers, as far as it is reasonably practical to do so. It also ensures that local protected customers maintain electricity supply for as long as possible. The implementation of ESEC requires emergency powers which are available to the Secretary of State for Energy Security and Net Zero through the Energy Act 1976.

Stage 3: Network Gas Supply Emergency

If the arrangements available in Stage 2 are insufficient to address the supply-demand imbalance, the NEC will declare a Stage 3 NGSE.

GSO and ESO will continue to communicate with the purpose of maintaining electricity system stability and ensuring response actions take whole energy system outcomes into account to the extent the circumstances of the emergency allow.

During a Stage 3 NGSE it is expected that all industry parties will communicate regularly with DESNZ as to the progress of the response, further anticipated impacts and the status of customer energy disruptions. As additional support is likely to be required to safeguard domestic customer welfare, gas and electricity distribution operators will work closely with local response forums to identify where additional support is required, giving particular regard to vulnerable customers.

Actions	Owner	Description
Allocation of available gas supply to Gas Distribution Networks	NEC	The NEC will direct the allocation of available gas to Gas Distribution Networks, where there is gas available.
Isolation of system to reduce demand and preserve system pressure	GDNs	If it is not possible to increase allocation to enable an acceptable minimum pressure in the Gas Distribution Networks, the GDNs will activate their isolation plans. GSO is responsible for maintaining the supply-demand balance within their parts of the network and protecting supplies to domestic customers where possible. Distribution Networks will report to DESNZ the number of customers they have needed to disconnect in order to reduce demand by the necessary amount.

Impact to customers: Some domestic gas customers will be disconnected from gas supply. The NEC may choose to maintain gas supply to Category A Priority Customers, where isolation causes a risk to life, and continue to protect their supply whilst domestic customers are isolated.

Stage 4: Restoration

When sufficient gas supplies are available to restore pressure to isolated systems, the NEC initiates the restoration process.

The NEC will develop a strategy to progressively revoke the measures taken during the various stages of the NGSE.

Although restoration can be affected by multiple different factors (i.e., weather conditions, water ingress, availability of suitably qualified gas engineers etc), the below basic principles are followed:

- No restoration of end users will take place until and unless the security of the primary gas system is assured.
- Restoration of supplies to systems may take a long time due to the complexity of the system and the large numbers of consumers involved.
- Where there is sufficient quantity of gas available, the supplies to industrial/ commercial consumers supplied from higher pressure systems may be restored before domestic consumers. On rare occasions, GSO may look to the Secretary of State for Energy Security and Net Zero to provide a steer on which industrial customers should be reconnected first.
- Self-restoration may be considered in this situation, in consultation with the Gas Distribution Networks who are responsible for assessing the risks in line with their health and safety obligations.

Revocation of the NGSE will occur when supply has returned to normal and restoration has been completed, apart from those in sections of the network isolated during Stage 3 (i.e., domestic customers).

Therefore, an NGSE will be declared over before all customers have gas restored.

The different alert or emergency levels will require different levels of action and communication from GSO to Government and across the rest of industry, including industrial and domestic customers and ESO. In most cases, the gas sector will lead communications, amplified by government.

6. Overview of electricity emergency responses

This section provides an overview of the plans used by industry in the event of an electricity emergency and outlines the different scenarios and key actions to be taken between industry and Government.

6.1 Key industry electricity emergency plans

The Grid Code - Details the technical requirements for connecting to and using the NETS. Compliance with the Grid Code is one of the requirements of the Connection and Use of System Code. The ESO maintains and oversees this code.

Distribution Code - Licensed electricity distribution businesses, or DNOs in Great Britain, are obliged under Condition 21 of their licences to maintain a Distribution Code detailing the technical parameters and considerations relating to connection to, and use of, their electrical networks.

Balance and Settlement Code (BSC) - Contains the rules and governance arrangements for electricity balancing and settlement in Great Britain. The code covers the metering of the physical production and the demand for electricity from generators, suppliers, and interconnectors in relation to their contracted positions.

Operating Code No.6 (OC6) - Is the reduction of demand through either voltage control or the disconnection of customers to balance the shortfall of electricity generation. OC6 sets out provisions to permit the reduction of demand in the event of insufficient generation being available to meet demand, or in the event of breakdown or operating problems (such as in respect of System Frequency, System voltage levels or System thermal overloads) on any part of the NETS. This can be implemented when a loss of generation exceeds the ESO's reserve services. It can be for forecast or for sudden shortfalls of generation that are only expected to last a few hours (noting that activation of ESEC could take up to 48 hours).

Electricity Supply Emergency Code - If a prolonged electricity shortfall affects a specific region or the whole country, electricity rationing may be necessary. The ESEC outlines the process for ensuring fair distribution nationally while still protecting those who require special treatment, using a process known as 'Rota Load Disconnection'.

Electricity System Restoration (ESR) - Refers to the technical process that would be implemented by the electricity sector to restore power in the event of a partial or total failure of the NETS. This involves ESO contracting specific electricity generators that are strategically placed across Great Britain to restart the electricity network by establishing power islands. These power sources would be used to restart others, until all power is restored. The Electricity System Restoration Standard (ESRS) will require ESO to have sufficient capability and arrangements in place to restore 100% of Great Britain's electricity demand within 5 days by 31 December 2026, ESO currently assess this could take up to 7 days.

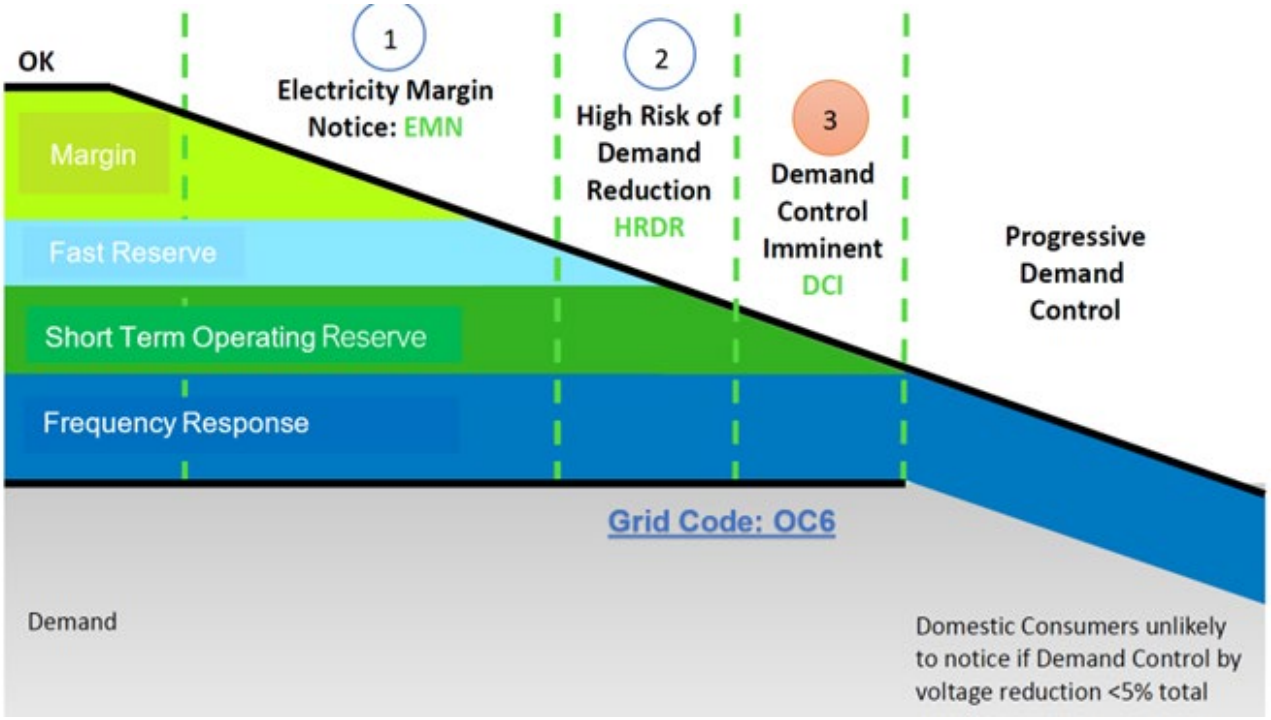


Figure 5: Overview of both the pre-emergency and high risk of emergency notices and when they would be triggered.

6.2 Electricity emergency levels

Whilst both public and employee safety is a fundamental requirement of the electricity networks, unlike the gas networks, there is no equivalent legislation which requires the production of Safety Cases and supporting approaches. However, detailed emergency interface procedures and protocols are set out in the Grid Code and Distribution Code (see Annex A).

The different types of electricity disruptions, the corresponding crisis level, and the possible actions and tools at each stage that may be implemented are outlined below.

Shortfall of Electricity Generation

A shortfall of electricity generation occurs when demand for electricity is higher than supply and industry must take measures to either increase supply or reduce demand to avoid a National Power Outage.

Table 3: Shortfall of Electricity Generation Emergency Actions

Pre-Emergency Stage For a forecast shortfall of electricity generation, there are various actions that the ESO can take in advance disconnecting customers. These include contacting generators for additional capacity or reserve, or generators unavailable, to see if return can be hastened and any outages postponed or shortened. It is expected that information sharing will be conducted between ESO and DESNZ.		
Actions	Owner	Description
Instruction to contracted power stations and businesses to provide extra power through ‘reserve and response’.	ESO	Reserve can be electricity generation that is synchronised to the system and able to provide additional generation capacity or non-synchronised

		generation that can be brought onto the system to provide extra power after a short delay or demand reduction.
Interconnector Pre-Gate Trading	ESO	ESO can initiate trades for volumes through the Interconnectors to import more power or export less power at market prices.
Request maximum power generation capacity	ESO	ESO can request power stations to provide short-term maximum power generation in excess of normal technical and commercial parameters.
Issue market notices: • Electricity Margins Notice (EMN) • Capacity Market Notice (CMN)	ESO	EMN – issued by ESO if there is a risk of a national shortage of electricity capacity within 24 hours or ESO wants the market to provide more spare electricity capacity. The EMN asks power stations to make more generation available for a short period of time to maintain the required margin. CMN – issued automatically if the forecast surplus is below the legislative trigger-level (inadequate system margins of 500 MW or less). CMNs are triggered automatically four hours ahead of real-time. CMNs act as reminders to Capacity Market participants to pay attention to any system notices or instructions that may appear from ESO. Capacity Providers are obliged to deliver in line with their Capacity Market agreements.
Interconnector Emergency Assistance	ESO	The ESO can request Emergency Assistance from the relevant Transmission System Operator (TSO) to import or export more or less power across an interconnector, in line with established rules – this is a commercially agreed arrangement and can be withdrawn.
Impact to Customers: Customers will not experience impacts to their electricity supplies.		

High risk of an Electricity Emergency

In the event that an issued EMN or CMN does not result in the provision of the required capacity, the ESO can issue a hierarchy of notices and system warnings to communicate actions to industry.

It is expected that information sharing will be conducted between ESO, GSO and DESNZ.

Actions	Owner	Description
High Risk of Demand Reduction (HRDR)	ESO	In the event a EMN or CMN does not result in the provision of the required electricity capacity, ESO can issue a HRDR system warning to DNOs and transmission connected customers, highlighting the increased risk of a demand reduction and the location of that potential reduction. Industry participants may be required to prepare their demand reduction arrangements.
Emergency Instruction	ESO	Where there is sufficient notice, the ESO will co-ordinate with connected TSOs and agree implementation of export capacity restrictions in line with agreed operating protocols and market arrangements.
Demand Control Imminent (DCI)	ESO	ESO can issue a DCI system warning when a demand control instruction is expected in the next 30 minutes.
Impact to Customers: Customers will not experience impacts to their electricity supplies.		

Short Term Electricity Emergency

As a last resort the ESO can work with network companies to reduce the amount of demand by decreasing the voltage across distribution networks and then, in subsequent stages, disconnecting portions of demand. The primary purpose of Demand Control is to stabilise the electricity system.

It is expected that information sharing will continue to be conducted between ESO, GSO and DESNZ.

Actions	Owner	Description
Demand Control Instruction, 'OC6'	ESO/DNOs	This instruction, issued by ESO, will contain the level of reduction required to avoid the shortfall and will specify the demand control stages required. This is the reduction of demand through either voltage control or the disconnection of customers, to balance the shortfall of generation. The procedure that Distribution Network Operators must follow is set out in OC6.
Low Frequency Demand Disconnection (LFDD)	n/a	This is an automated procedure used to balance out any quick frequency deviations through the disconnection of a defined amount of demand to balance the electricity system and avoid larger scale disruption.
Impact to Customers: Some customers will experience short duration power disruptions. These disruptions are likely to be spread geographically across GB. There is no prioritisation available – therefore essential services could be affected.		

Long Term Electricity Emergency For a long-term electricity supply shortfall, the ESEC can be implemented by the Secretary of State for Energy Security and Net Zero using Emergency Powers under the Energy Act 1976. It will be expected that information sharing will be conducted between ESO, DNOs and DESNZ to receive reporting on numbers of electricity customers disconnected.		
Actions	Owner	Description
Recommendation to initiate the Electricity Supply Emergency Code (ESEC)	ESO requesting direction from the Secretary of State for Energy Security and Net Zero to implement ESEC.	In the event of an emergency, ESEC enables an equal distribution of electricity supply to customers as far as reasonably practicable, whilst ensuring that pre-designated Protected Sites maintain supplies for as long as possible. The actions described in ESEC are not used to handle sudden shortfalls in generation or to deal with day-to-day repair and recovery of faulty or damaged parts of the transmission and distribution networks. However, long-term and significant damage to the system, or prolonged shortfalls in generation, could result in the ESO and DNOs looking to the UK Government to implement the arrangements and powers described in ESEC. Likewise, if a problem is looming and might be solved or ameliorated by early action, then ESEC or aspects of it can be considered. Once ESO has advised DESNZ that ESEC is needed, the ESEC Implementation Group (comprised of key DESNZ and industry officials) shall meet as soon as possible to discuss ESEC activation.
Restrict Interconnector capability	ESO	The ESO will co-ordinate with connected TSOs and agree implementation of export capacity restrictions in line with agreed operating protocols and market arrangements.
Initiation of the Electricity Supply Emergency Code (ESEC)	Secretary of State for Energy Security and Net Zero (through legislation)	The DESNZ Emergency Response Team (ERT) is responsible for advising Secretary of State of a request to implement ESEC. The implementation of ESEC, through use of emergency powers, enables DESNZ to direct electricity Network Operators to restrict the supply of electricity to sites, on a rotational basis to enable an equal distribution of the available electricity supply to customers (known as 'Rota Load Disconnection'), whilst maintaining electricity supply to pre-designated Protected sites. Those on the Protected Sites List (PSL) will maintain electricity supply for as long as possible during this period. It is important to note that protection only applies when ESEC has been activated and does not give sites complete

		coverage for all possible power disruption events. In the event of electricity supplies being insufficient to meet the needs of all the Protected Sites within their licence area, electricity Network Operators can exercise discretion in allocating the available electricity supplies. Once ESEC has been initiated, the ESEC Implementation Group (comprised of key DESNZ and industry officials) shall meet each day until the group is stood down.
Impact to Customers: Some customers will experience short duration power disruptions – likely in 3-hour blocks over demand peaks (most likely to be between 1600 – 2100 but could occur other times during the day). These disruptions will be spread geographically across GB and rotated throughout the population. Customers will receive up to 24 hours' notice of power disruptions. Protected Sites will maintain their electricity supply.		

Restoration

As the electricity supply situation improves, this will be reflected in the ESEC activation schedules (i.e., lower levels of demand disconnection will be required). When the shortfall is over and supplies of electricity have been fully restored and stabilised, industry will be informed of the formal stand down of ESEC.

As with a gas incident, across the different scenarios there will be a requirement of regular communication and information across from the electricity industry, including ESO to GSO and industrial and domestic customers.

Excess Electricity Generation

An excess of electricity generation occurs when demand for electricity is lower than supply and industry must take measures to either reduce supply or increase demand in order to avoid a National Power Outage.

Table 4: Excess Electricity Generation Emergency Actions

Pre-Emergency Stage

For a forecast excess of electricity generation, there are various actions that the ESO can take in advance of taking Emergency Instructions, including instructing generators to optimise supply in line with demand, optimising reserve holding, trading on interconnectors and only then taking actions obtained through the issuing of the Negative Reserve Active Power Margin (NRAPM) system warning. This warning signals to the market that the system is not flexible enough to match demand during low demand periods.

It is expected that information sharing will be conducted between ESO and DESNZ.

Actions	Owner	Description

Identify and optimise the minimum generation units required to meet system security.	ESO	ESO can model and schedule the generation units to help meet minimum security standards and add flexibility to meet electricity demand.
Interconnector Pre-Gate Trading	ESO	ESO can utilise interconnectors to import less power or export more power at market prices.
Create demand through optimisation of Pumped Storage	ESO	ESO can instruct Pumped Storage units to move water into the upper reservoir which creates demand that will help balance the system. This water is then stored until a period of higher demand when it is then released back into the lower reservoir, which generates energy.
Call-off contracted generators to help increase demand	ESO	ESO can use contracted services to help increase demand.
Issue inadequate NRAPM system warning	ESO	If there is inadequate flexibility in the system to match demand during low demand periods, ESO will issue this warning to generators signed up to the Grid Code. This warning encourages generators to review and ensure generation is in line with intended operating plans. It also informs participants of a risk of Emergency Instructions.
Impact to Customers: Customers will not experience impacts to their electricity supplies.		

Short Term Electricity Emergency

As a last resort the ESO can issue Emergency Instructions to decrease generation and/or for DNOs to disconnect Distributed Energy Resources (DER) such as embedded wind and solar farms. These Emergency Instructions will not be undertaken until the NRAPM warning has been issued.

It is expected that information sharing will continue to be conducted between ESO and DESNZ.

Actions	Owner	Description
Emergency Instructions sent to transmission units and Interconnectors. Balancing Mechanism Units (BMU) are used as units of trade with the Balancing Mechanism (BM). The BM is used to balance supply and demand in each half-hour trading period of every day. The BM is used to either increase or decrease generation (or consumption).	ESO	ESO will instruct generators to maintain negative margin, in line with the inadequate NRAPM warning that has been issued. ESO would also instruct Interconnectors to stop importing electricity to maintain the negative margin. Emergency Instructions sent to Interconnectors cannot change the direction of the flow of the Interconnector, so any importing to GB could only be reduced to 0MW (or set to 'float').
Emergency Instructions sent to DNOs to disconnect Distributed Energy Resources.	ESO	ESO can instruct DNOs to take off generation in their geographical area. Emergency Instructions to DNOs to disconnect embedded generators is a last resort in an emergency situation. It will not be implemented until all other commercially available options have been exhausted.

Impact to Customers: Customers will not experience impacts to their electricity supplies. If the above actions do not alleviate the situation, there would be potential for a partial or total loss of electricity supply to all customers (see table 7 for further information).

Failure of the National Electricity Transmission System

The National Electricity Transmission System (NETS) is the system consisting of (wholly or mainly) of high voltage electric lines owned or operated by transmission licensees within Great Britain. A failure of this system would most likely be caused by the sudden and concurrent loss of multiple transmission network circuits, for example an extreme weather event combined with the malfunction of automated safety systems.

Table 5: Failure of the National Electricity Transmission System (NETS) Emergency Actions

Failure of the National Electricity Transmission System (NETS) A total failure of the NETS would cause a National Power Outage (NPO). On this event occurring, the ESO will initiate Electricity System Restoration (ESR) which restores power through system restoration providers - strategic generators which have small auxiliary generation plants on-site which allow them to self-start. These providers restart their generating units and reconnect local customers to establish power islands which are used to start up others until all power is restored. It is expected that information sharing will be conducted between ESO, DNOs and DESNZ, via resilient Operational Telephony (OPTEL).		
Action	Owner	Description
Initiation of the Electricity System Restoration (ESR) plan	ESO/TO/DNOs/ESR Providers	ESO gathers data to determine the severity of the NETS failure and develops a restoration strategy. ESO declares an NPO and initiates ESR plan. This will involve ESO enacting the relevant Local Joint Restoration Plans (LJRPs). LJRPs are pre-agreed plans between TOs, DNOs and ESR providers. They provide each party with guidance and instructions to facilitate the restoration of the power system.
System Energisation	ESO/DNOs/ESR Providers	As per the LJRPs, ESO instruct ESR providers to start up their units and restore local demand to energise the network. As demand is restored, DNOs will restore power to customers in geographical areas specified within the LJRP. When the electricity system of the geographical area is energised, ESO will instruct the ESR providers and local DNO to carefully match the generation output to the amount of demand in the area. They therefore start the 'block loading' stage (this means they will incrementally increase the electricity load). This will create a 'power island'. At this stage power islands are not connected to each other or the wider network.

Power Island Synchronised	ESO/DNOs	ESO instruct DNOs to link power islands together to build a 'skeletal' network across the country. Power islands are joined together to start energising more sections of the transmission network with low levels of non-contracted generation providers. At this stage ESO will end the LJRP, ending the direct contact between the ESR provider and the DNO. At this stage, ESO will progressively become more involved in the detail of demand restoration and block loading.
Energise whole transmission system	ESO	As the skeletal network is developed power is gradually restored to wider areas of the country as additional sources become available. All demand will be restored.
Impact to Customers: All electricity customers without back-up generation facilities would lose power supply instantly and without warning. Small pockets of customers would begin to be reconnected in the first few hours, with 60% of national demand being restored in the first 48 hours. Power supply will to be rationed fairly across the customer base – likely in 3 hour blocks – until fully restored. 100% of customers will be back online within 7 days.		

Annex A: Key Documents in a Gas and/or Electricity Supply Emergency

The following list summarises statutory provisions, regulations, provisions and procedures relevant to:

Gas supply emergencies:

- Regulation 2017/1938 concerning measures to safeguard security of gas supply (Retained EU legislation)
- Energy Act 1976
- Gas Act 1986
- The Civil Contingencies Act 2004
- Gas Safety (Installation and Use) Regulations 1998
- Gas Safety (Management) Regulations 1996
- Network Emergency Coordinator Safety Case
- T/PM/E1 – National Gas Supply Emergency Arrangements
- GDN/PM/E/2 – Local Gas Supply Emergency Arrangements
- Uniform Network Code
- Upstream Crisis Management Plan
- Gas Coordination Group

Electricity supply emergencies:

- Energy Act 1976
- Electricity Act 1989
- The Civil Contingencies Act 2004
- Fuel Security Code
- Electricity Supply Emergency Code
- Grid Code
- Distribution Code

Any reference to a statutory provision or a regulation does not replace the actual text as written in such provision or regulation. All users should refer to the exact text when relevant and obtain professional opinion in the interpretation of such provision or regulation.

Gas supply emergencies

Regulation 2017/1938 concerning measures to safeguard security of gas supply (Retained EU legislation)
REGULATION (EU) 2017/1938 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (Retained EU legislation). The Regulation sets various requirements to improve security of gas supply. These include amongst other things the preparation and publication of an Emergency Plan.
LOCATION: https://www.legislation.gov.uk/eur/2017/1938/contents

Energy Act 1976
This provides powers to enable the Secretary of State, in limited emergency circumstances, to control the production, distribution and use of energy in the UK. If there is "an actual or threatened emergency affecting fuel or electricity supplies" in the UK then, should the King consider it necessary, an Order in Council under Section 3 of the Energy Act 1976 may be made giving the Secretary of State exceptional powers for "controlling the sources and availability of energy." Such an Order in Council would allow the Secretary of State for Energy Security and Net Zero to issue a direction which has the effect of restricting, prohibiting or maximising the production and supply of energy.
LOCATION: http://www.legislation.gov.uk/ukpga/1976/76

Gas Act 1986
Under section 7B(5)(a)(i) of the Gas Act 1986 the Gas and Electricity Markets Authority (GEMA) can include in gas licences conditions requiring the licence holder to comply with directions given by the Secretary of State in relation to matters specified in the licence. As such, Standard Licence Condition 6 (paras 16-17) of the Gas Transporter Licence requires the licensee to comply with any directions given by the Secretary of State in relation to prioritisation of supply of gas to relevant customers or classes of relevant customers.
LOCATION: https://www.legislation.gov.uk/ukpga/1986/44/contents

The Civil Contingencies Act 2004
The Civil Contingencies Act is part of the Government's effort to increase the UK's resilience to a wide range of disruptive challenges, including energy supply emergencies. The Act gives Government the power to control and direct a wide range of resources and activities. The Civil Contingencies Act powers would only be used after all other emergency powers, such as those available under the Energy Act 1976, had been exhausted.
LOCATION: http://www.legislation.gov.uk/ukpga/2004/36/contents

Gas Safety (Installation and Use) Regulations 1998
These regulations relate to the safe installation and operation of gas equipment downstream of the emergency control valve, including domestic and non-domestic pipework and appliances. The regulations make a requirement for a Gas Safe registered and competent person to undertake work on most equipment.
LOCATION: http://www.legislation.gov.uk/uksi/1998/2451/contents/made

Gas Safety (Management) Regulations 1996
The Gas Safety (Management) Regulations apply to any connected network of pipes used for the conveyance of gas from a gas processing facility, a storage facility or an interconnector, except a connected network of pipes used exclusively for conveying gas to non-domestic

premises. The regulations require the appointment of a Network Emergency Coordinator (NEC) to manage a gas supply emergency.

The Network Emergency Coordinator is required to produce a Safety Case describing the arrangements for managing a gas supply emergency to be accepted by the Health and Safety Executive. The Safety Case describes the arrangements for reducing demand and increasing supply, including the relaxation of gas quality requirements. The Regulations require that relevant persons shall co-operate so far as is necessary with a person conveying gas in a network and with the Network Emergency Coordinator to enable them to comply with the provisions of the Regulations.

LOCATION: http://www.legislation.gov.uk/uksi/1996/551/regulation/7/made

Network Emergency Coordinator Safety Case

The NEC Safety Case describes four stages of a gas supply emergency.

Stage 1 - Potential Emergency

Stage 2 – Actual Emergency, Firm Load Shedding

Stage 3 – Allocation & Isolation

Stage 4 - Restoration

It also describes the arrangements for the provision of information, control of the primary systems (NGGT) and communications with industry.

LOCATION: https://www.nationalgridgas.com/safety-and-emergencies/network-gas-supply-emergencies-ngse

T/PM/E1 – Procedure for Network Gas Supply Emergency

T/PM/E/1 is the procedure used to manage a Network Gas Supply Emergency (NGSE) in accordance with the directions of the Network Emergency Coordinator.

The procedure is owned, maintained and implemented by National Grid as the operator of the primary transportation system, the National Gas Transmission plc.

LOCATION: https://www.nationalgrid.com/gas-transmission/document/136281/download

GDN/PM/E/2 – Local Gas Supply Emergency Arrangements

GDN/PM/E/2 is the procedure used for to manage a Local Gas Supply Emergency (LGSE) and it details the arrangements used during an emergency affecting secondary systems (Gas Distribution Networks) or supplementary systems.

The arrangements for managing a LGSE include:

- Supply Management
- Demand Management
- Isolation of Parts of the Network
- Restoration

There are four different types of LGSE: Minor, Large, Major, and Severe (loss of supply to greater than 50000 consumers).

LOCATION: Not publicly available

Uniform Network Code

The Uniform Network Code (UNC) describes the transportation arrangements for the operation of the commercial regime for the gas industry of Great Britain.

Emergency arrangements are described in Section Q of the UNC.

LOCATION: http://www.gasgovernance.co.uk/UNC

Upstream Crisis Management Plan

The Crisis Management Briefing Pack (CMBP) describes the arrangements for the Upstream Oil & Gas industry for the management of a potential or actual gas supply emergency.

It has two key stages:

- Initial evaluation

- Implementation of the DESNZ Upstream Crisis Management Plan.

The CMBP provides a description of the roles and responsibilities of upstream DESNZ, National Grid and upstream industry, and the processes used as part of the crisis management organisation at each stage of the alert warning system. The legislative powers under which emergencies will be managed are also set out.

LOCATION:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/256238/Upstream_Crisis_Management_Briefing_Pack_November_2013.docx

Electricity Supply Emergencies

Energy Act 1976

This provides powers to enable the Secretary of State, in limited emergency circumstances, to control the production, distribution and use of energy in the UK. If there is “an actual or threatened emergency affecting fuel or electricity supplies” in the UK then, should the King consider it necessary, an Order in Council under Section 3 of the Energy Act 1976 may be made giving the Secretary of State exceptional powers for “controlling the sources and availability of energy.”

Such an Order in Council would allow the Secretary of State for Energy Security and Net Zero to issue a direction which has the effect of restricting, prohibiting or maximising the production and supply of energy.

LOCATION: http://www.legislation.gov.uk/ukpga/1976/76

Electricity Act 1989

Under Section 34 and Section 35 of the Electricity Act 1989, the Secretary of State has the power to issue directions to operators of certain power stations and to electricity transmission companies in relation to operators’ use of fuel stocks.

LOCATION: http://www.legislation.gov.uk/ukpga/1989/29/contents

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LOCATION: http://www.legislation.gov.uk/ukpga/2004/36/contents

Fuel Security Code

The principal objective of this Code is to provide an administrative structure designed to enable compliance with directions issued under Section 34 or 35 of The Electricity Act 1989 by the Secretary of State to be effected with minimum interference with market arrangements.

These sections of the Electricity Act 1989 enable the Secretary of State to direct operators of certain power stations (not less than 10MW generated capacity) as to the level of fuel and other materials which it must keep in stock and to direct the manner in which the power station operator uses such stocks; and operates its power stations. The FSC also describes the arrangements for the recovery of exceptional costs.

LOCATION:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/79194/FuelSecurityCode.pdf

Electricity Supply Emergency Code

The purpose of the Electricity Supply Emergency Code (ESEC) is to describe the steps which the Government could direct industry to take to deal with an electricity supply emergency.

Specifically, ESEC describes the arrangements for the implementation of rota disconnection and for the protection of priority consumers.

LOCATION: https://www.gov.uk/government/publications/electricity-supply-emergency-code

Grid Code

The Grid Code is designed to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity, to facilitate competition in the generation and supply of electricity and to promote the security and efficiency of the electricity system as a whole. National Grid and users of its transmission system are required to comply with the Grid Code. Changes to the Grid Code are subject to approval by Ofgem.

National Grid is the National Electricity Transmission System Operator and is required by its transmission licence to maintain the Grid Code.

LOCATION: https://www.nationalgrideso.com/codes/grid-code?code-documents

System Operator Transmission Owner Code

The System Operator Transmission Ower Code defines the relationship between the transmission system owners and the system operator. Transmission Owners are not signed up to Grid Code as this is their equivalent.

This Code gives National Grid Electricity System Operation the ability to instruct Scottish Transmission Owners to carry out the Electricity System Restoration process in Scotland in the event of a National Power Outage.

National Grid is the National Electricity Transmission System Operator and is required by its transmission licence to maintain the System Operator Transmission Owner Code.

LOCATION: https://www.nationalgrideso.com/document/40726/download

Distribution Code

The Distribution Code covers the technical aspects relating to the connection and use of the distribution licensee's distribution network.

The Distribution Code specifies day-to-day procedures that govern the relationship between the distribution licensee and users of its distribution system for planning and operational purposes in normal and emergency circumstances.

The Distribution Code is also designed to ensure that the distribution licensee can meet its Grid Code compliance obligations.

LOCATION: http://www.dcode.org.uk/assets/files/dcode-pdfs/Distribution%20Code%20v24.pdf

Electricity Safety, Quality and Continuity Regulations (ESQCR)

DESCRIPTION:

The ESQCR specifies the statutory limits of electricity supply voltage and frequency and applies to any generator, distributor, supplier or meter operator, as well as any agent or subcontractor working on their behalf. It covers general adequacy of electrical equipment, a duty of co-operation within the sector and inspection of networks.

The regulations specify safety, quality and continuity aspects of the above including: earthing, substations, underground cables and overhead lines, generation, and supply to other networks.

An amendment in 2006 was made to improve resilience to tree disruptions and include equipment in offshore waters.

Safety aspects are enforced by HSE. Quality and Continuity aspects are enforced by DESNZ.

LOCATION: http://www.legislation.gov.uk/all?title=electricity%20safety%20quality

Balancing and Settlement Code

The Balancing and Settlement Code (BSC) is a legal document which defines the rules and governance for the balancing mechanism and imbalance settlement processes of electricity in Great Britain.

This document sets out (amongst other things) the process that should be followed after a Demand Control Event (DCE) to determine the cost and value of following the Demand Disconnection Event (DDE) Obligations and rules in relation to Market Suspension Threshold.

LOCATION: https://bscdocs.elexon.co.uk/bsc

Annex B: Glossary

CMN	Capacity Market Notice
CNI	Critical National Infrastructure
COBR	Cabinet Office Briefing Rooms
CONOPS	Concept of Operations
CTC	Critical Transportation Constraint
DCI	Demand Control Imminent
DER	Distributed Energy Resources
DESNZ	Department for Energy Security and Net Zero
DLUHC	Department for Levelling Up, Housing and Communities
DNO	Distribution Network Operator
E3	Energy Emergencies Executive
E3C	Energy Emergencies Executive Committee
EA	Environment Agency
EMN	Electricity Market Notice
ENA	Energy Networks Association
ERT	Emergency Response Team
ESEC	Electricity Supply Emergency Code
ESO	Electricity System Operator
ESR	Electricity System Restoration
ESRS	Electricity System Restoration Standard
FSC	Fuel Security Code
GDE	Gas Deficit Emergency
GDN	Gas Distribution Network
GSO	Gas System Operator
HRDR	High Risk of Demand Reduction
HSE	Health & Safety Executive
HVDC	High Voltage Direct Current
LFDD	Low Frequency Demand Disconnection
LGD	Lead Government Department
LGSE	Local Gas Supply Emergency
LJRP	Local Joint Restoration Plans
LNG	Liquefied Natural Gas
LRF	Local Resilience Forum
LRP	Local Resilience Partnerships
NEC	Network Emergency Coordinator
NEP-DG&E	National Emergency Plan – Downstream Gas and Electricity
NETS	National Electricity Transmission System

NGET	National Grid Electricity Transmission
NGSE	Network Gas Supply Emergency
NPO	National Power Outage
NRAPM	Negative Reserve Active Power Margin
NRW	Natural Resources Wales
NTS	National Transmission System
OC6	Operating Code 6
Ofgem	Office of Gas & Electricity Markets
OGD	Other Government Department
PSL	Protected Sites List
PSR	Protected Sites Register
RED	Resilience & Emergencies Division
SCG	Strategic Coordination Group
SEPA	Scottish Environment Protection Agency
SGoRR	Scottish Government Resilience Room
TO	Transmission Owner
UNC	Uniform Network Code
WHO	World Health Organisation