21. I want the gas system to be safe

What is this stakeholder priority about?

This priority is about what we do to keep the public, our employees and other people who work on or around our assets safe from the hazards inherent in our business. Failure to supply gas and major uncontrolled release of gas from the high-pressure network, are both potential threats to life and property.

At National Grid, safety is paramount. We continue to pursue our goal of zero harm to the public, our employees, and other people who work on or around our assets from the safety risks associated with our activities. In addition, we have obligations to comply with relevant health and safety legislation, monitored and enforced by the Health and Safety Executive (HSE).

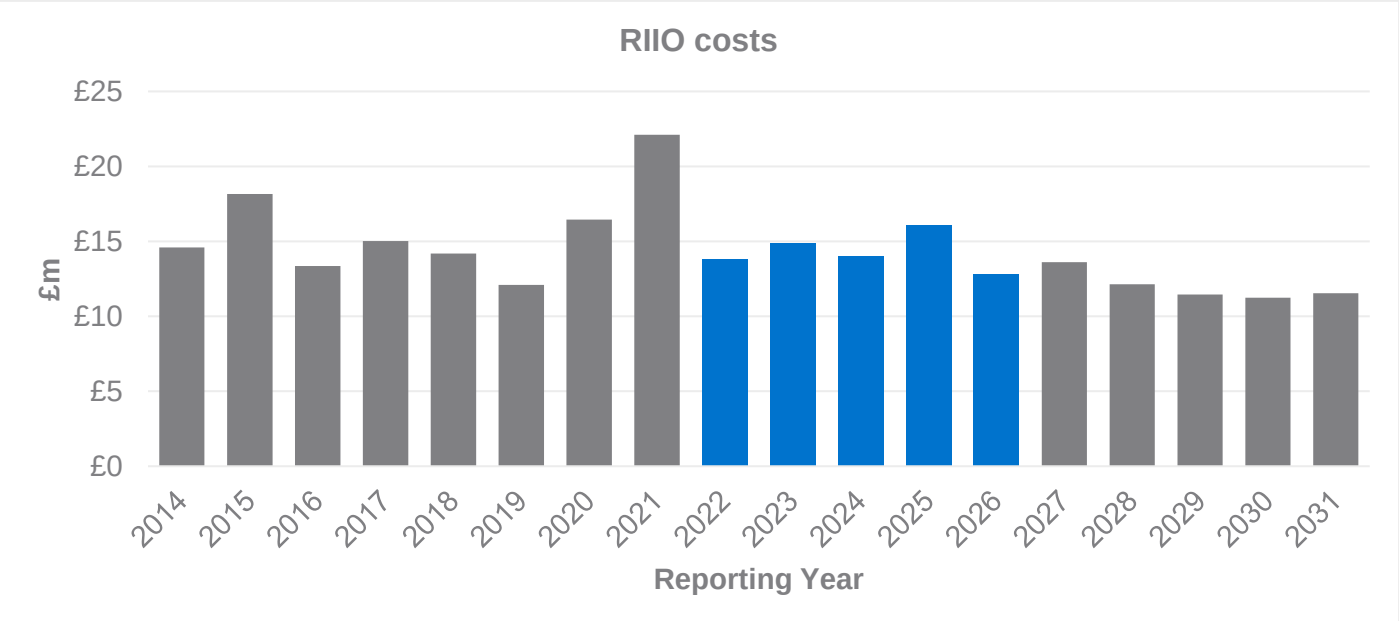
What have you told us?

You have consistently said that safety is a priority as you are aware of the risks to life and disruption to gas supplies associated with our operations and you appreciate the crucial role of the gas transmission system.

During RIIO-2 we will: maintain our world-class level of safety whilst continuing to pursue our goal of zero harm. We will comply with legislation through routine and preventive safety activities to protect the public, our assets and people. Our RIIO-2 plan for safety continues the best practices we implemented in RIIO-1 for compliance with mature legislation. We will spend £14.3m per year on the routine and preventive safety activities described in this priority. This compares to £15.8m per year during RIIO-1.

Please note that our approach to safety is reflected across the whole of our business plan. For each priority with a safety element we've included these costs in the relevant section of the business plan. For example, there are elements of our asset health and cyber resilience programmes that also bring important safety benefits. Our safety culture underpins how we undertake all work.

Figure 21.1 RIIO-1 and RIIO-2 spend profile 'I want the gas system to be safe'



1. What is this stakeholder priority about?

We understand the vital importance of safety. Failure to supply gas (especially to vulnerable consumers), and any major uncontrolled release of gas from the high-pressure network, are both potential threats to life. Consumers who use the gas that we transport, and society generally, expect us to maintain the highest safety standards.

This priority is about our routine and non-routine activities to protect the public, our employees, people who work on or around our assets and the environment from the safety risks associated with the network. Alongside our asset and process-related safety compliance activities, we have included our work on occupational safety, wellbeing and health and driving the right safety culture throughout our organisation.

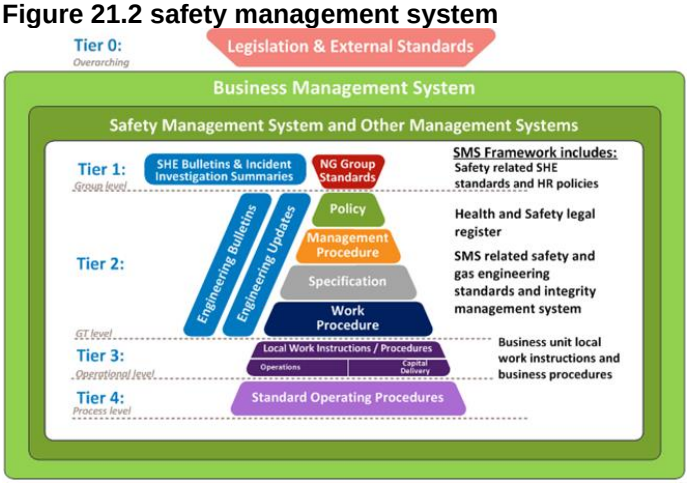
As a gas transporter, and in our role as Network Emergency Co-ordinator (NEC), we must comply with written 'safety cases' accepted by the Health and Safety Executive (HSE). These set out how we manage the safety of the gas network in line with the Gas Safety (Management) Regulations, and how we manage our top tier control of major accident hazards (COMAH) sites, St Fergus and Bacton.

Key safety legislation for our business is predominantly based on 'goal setting' principles. This means we must manage risks down to a level as low as reasonably practical (ALARP). We cannot stand still. The safety standards expected of us are continually increasing as new technologies come on line and best practice evolves. At the same time, population growth is bringing more frequent encroachment on our pipelines and at other potentially hazardous facilities.

2. Our activities and current performance

We have a mature safety management system (SMS), organised to deliver our statutory and regulatory duties. We use it to ensure that we have taken all necessary steps (as far as is reasonably practical) to comply with all relevant safety legislation – primarily the Health and Safety at Work Act and its associated codes of practice and guidance. The SMS is a framework that allows us to consistently identify and control health and safety risks, reduce potential for accidents and incidents, and continually improve performance. The SMS is organised as shown in figure 21.2 below.

Figure 21.2 safety management system



Our key activities associated with the safety priority are summarised in table 21.3 below. Safety considerations underpin everything we do in both office and operational environments, but here we have highlighted just those activities and teams for which safety is the primary relevance.

Table 21.3 summary of safety activities for business planning

Activity	What does this involve?
Strategy, assurance and NEC role	Setting standards and implementing management systems for: • process safety, • occupational safety, wellbeing and health • assurance including audit and benchmarking. Reviewing and updating safety cases. Fulfilling the Network Emergency Co-ordinator role including co-ordination of cross-industry emergency exercises.
Protecting our assets	Regular aerial surveillance of all pipeline routes to highlight any risks to pipeline integrity e.g. from farming or construction activity. Regular line walking of all pipeline routes to identify issues not visible from the air e.g. depth of burial and damaged pipeline marker posts. Talking to land owners and local authorities to raise awareness of the safety issues of working near our assets. Providing a 24/7 emergency response to make safe and repair any pipeline damage including through the use of specialist equipment and strategic spares.
Safety compliance	Compliance with key legislation including the Pressure Systems Safety Regulations and the Pipeline Safety Regulations, for example

Activity	What does this involve?
	through regular pipeline inline inspections and pressure systems testing. Explosive atmospheres management and life-cycle management of safety systems.
Operational property	Maintenance of operational land and buildings. Refurbishment and/or replacement of control/administration buildings to protect the assets inside and provide appropriate welfare arrangements for employees e.g. toilets, mess rooms, flooring, roofing, heating and air conditioning.

Track record and learning in RIIO-1

Our safety performance is reported in our annual regulatory reporting packs[15]. We have met our key target of compliance with all relevant Health and Safety Executive (HSE) legislation. Notable performance across the RIIO-1 period includes:

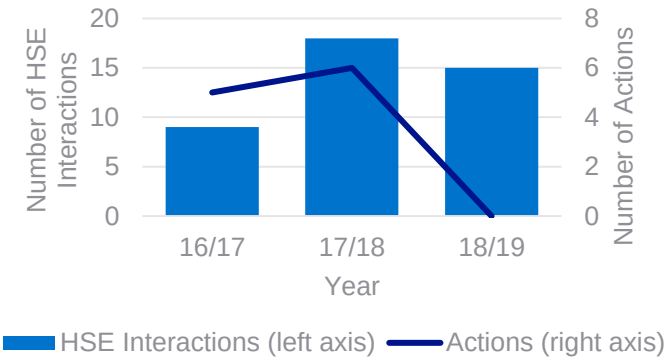
HSE requirements

From a safety perspective, we are regulated by the HSE. To provide assurance that we are complying with key safety legislation and ensure that risks to people from our activities are ALARP, we:

- operate permissioning activities relating to COMAH, Gas Safety (Management) Regulations, Pipeline Safety Regulations and Pressure Systems Safety Regulations
- carry out targeted inspections and investigations
- raise awareness of current safety related issues/trends through planned liaison meetings.

During the RIIO-1 period we have developed a proactive working relationship with the HSE. Over the last two years there has been an increased focus by the HSE testing our compliance to legislation and safety cases (accepted by the HSE). Previously, the HSE has identified potential control weaknesses requiring clarification or action. However, last year no actions were issued illustrating the improved maturity and value of the three lines of defence assurance model in ensuring we meet our licence condition. We continue to work closely with the HSE. Figure 21.4 below shows the number of HSE interactions over the last three years along with the number of actions raised. Also, during the RIIO-1 period we had an inspection for the NEC, which resulted in no actions and 7 recommendations.

Figure 21.4 number of HSE interactions and associated actions



Processes

As mentioned earlier, we have a mature safety management system to manage these safety risks, which we have strengthened throughout RIIO-1 including our overall assurance processes implementing three lines of defence in line with good practice.

We also asked independent experts DNVGL to benchmark our process safety management performance using its International Sustainability Rating System. Our performance was rated in the upper quartile within a comparator group of more than 200 worldwide oil and gas sites. This objective assessment has helped us to be clear on what it means to be 'industry leading'. It has given us a better picture of our strengths and weaknesses and sharpened our focus on areas to improve in the future to manage the inherent risks of our high hazard assets.

Safety innovation

We are committed to drive efficiencies in the activities we undertake and also seek innovative ways to continually improve our safety performance. Through RIIO-1 we have undertaken number of our Network Innovation Allowance (NIA) projects focused on specific safety improvements. We track and report[16] the value for our customers from such innovations.

[15] Annual RRP Reporting Packs: https://www.nationalgridgas.com/about-us/business-planning-riio/how-were-performing

[16] https://www.nationalgrid.com/sites/default/files/documents/National%20Grid%20Gas%20Transmission%20NIA%20Annual%20Summary%202017-18.pdf

Table 21.5 safety innovation projects[17]

Case Study	Benefits	Value
Impact protection slabs	Use of polyethylene (PE) instead of concrete slabs to protect pipelines. Cheaper, safer and quicker to install.	£483k saving to date in purchase and installation of PE slabs.
Vent stack design	Development of 'above ground installation (AGI) safe' software package allows better quantitative risk assessments, resulting in more efficient designs.	£84k saving at Peterborough compressor station.
Safety in PIG trap closures	Failure modes analysed, and new training package developed and implemented.	£10k per year based on avoided failures.

During RIIO-2, we will seek to develop our tools and capabilities in areas such as network emergency simulation, consequences of bio gases and hydrogen blends. There will also be opportunities for collaboration and sharing of best practice (both with GDNs and other gas transporters worldwide), continuing to participate in these groups is vitally important to ensure we learn lessons from all safety incidents. More information on our innovation proposals for RIIO-2 can be found in annex A25.03.

Across our US and UK business we share best practice on safety measures, led by our Chief Engineer. This allows us to apply further insight and best practice to our activities.

Keeping our employees safe

We regret that, over the RIIO-1 period up to 31 March 2019, our operations incurred one employee and 17 contractor lost time injuries (LTIs); such injuries occur against a backdrop of more than 25 million hours worked. Our combined injury frequency rate over the RIIO-1 period up to 31 March 2019 was 0.07. This is good performance within the UK Energy Industry Safety Leaders Group range of 0.04 to 0.25.

3. What are our stakeholders telling us?

We have asked for your views on safety through various channels including workshop events, webinars and direct engagement with the Health and Safety Executive (HSE). You consistently say that safety is a priority. Most of our safety-related activities are driven by compliance with legislation and application of established best practices and so our level of future work is not open to direct influence by customer or consumer preferences.

At our 'shaping the future' engagement events in Autumn 2017, we wanted to find out what is important to you about safety. Feedback included:

"Safety first. Ageing assets have known issues. We should provide assurance we will continue to be safe in future, not just now."

"A major accident has the potential for injury to be caused. Domestic customers should not face any supply security risk."

"Safety delivers now, but increasing attention needed as assets age."

Our conclusion from this is that safety should be a top priority and you expect us to be as safe as possible in all our activities. It will be important during RIIO-2 that we address the issues of our ageing assets, ensuring they are safe now and into the future.

We also participate in industry wide groups in the UK and across Europe. In the UK for example we are part of the UK Onshore Pipeline Operators' Association (UKOPA), where we participate to share knowledge and promote best practice across the industry. UKOPA helps to develop a comprehensive and consistent view of strategic issues that relate to the safe operation and maintenance of onshore pipelines.

We also undertake regular engagement with the other terminal operators at St Fergus and Bacton. These meetings cover topics from operations to safety, including any lessons learnt. We also attend regular HSE forums that allows for best practices to be shared.

4. Our proposals for RIIO-2 and how they will benefit consumers

In our proposals for RIIO-2, we will continue to pursue our goal of zero harm. We will protect the public, our employees and the environment from the safety risks of our transmission system and comply with all

[17] https://www.nationalgridgas.com/insight-and-innovation/transmission-innovation/delivering-value-innovation

legislation that applies. We are committed to continual process improvement.

The gas transmission SMS framework structure is based on the Plan, Do, Check, Act (PDCA) model, which is an iterative process and drives continuous improvement. This will be a key process that will help us maintain our world-class level of safety whilst continuing to pursue our goal of zero harm. We will continue to embed the benefits of safety innovations into business as usual and look for further ways to improve.

Our safety priority maps to Ofgem's output category, 'maintain a safe and resilient network'.

How do our RIIO-2 proposals benefit consumers?

Our attention to safety delivers benefits for industrial and domestic consumers:

Consumer priorities	How does our plan support this?
"I want to use energy as and when I want"	Our commitment to safety-related inspections, maintenance and asset replacement avoids unplanned downtime of network elements, which could disrupt continuity of gas supply. This also affects industry and electricity supply.
"I want you to facilitate delivery of a sustainable energy system"	Our focus on zero-harm ambition through managing down the likelihood of low frequency, high impact incidents protects society from potential disruption and damage to public health, business, transport and the natural environment that could be associated with gas transmission failure events.

5. How will we deliver?

The specific activities we will undertake gives us confidence we have the right propositions in place to pursue our zero harm goal.

Activity	What
Strategy and Assurance-People	Gas transmission teams to carry out our strategy and assurance roles. Central teams who provide support on our corporate health and safety commitments.
Emergency Preparedness	24/7 standby cover, emergency planning and training. Activities associated with our NEC role.
Protecting our Assets	Helicopter and line walking surveys, compliance with safety legislation. Maintain an emergency response and repair service for our pipework systems across Great Britain.

People – developing the skills and behaviours that support safety

We define and maintain safety and technical competencies (STCs) for our operational workforce, and the requirements of each competency and relevant authorisation level. This then informs the nature and frequency of training to maintain a competent, resilient workforce.

Over the last year we have implemented a specialist competence management system (Cognisco) to provide a detailed, comprehensive view of capability and competence across our operational workforce. We reviewed core competencies for each role and discipline and mapped the workforce to those competencies. The results give us both a clear view of current effectiveness and a projected view of training demand to maintain the appropriate levels of expertise and experience.

During RIIO-2, we will exploit this management information further, to manage training schedules more efficiently and support a more flexible, agile workforce. We must also recognise that new requirements and regulatory demands may emerge, bringing additional costs and training challenges.

Our future safety performance is underpinned by the culture of our organisation and the behaviours of our people. We're aiming for a proactive safety culture. We have various targeted campaigns to support staff and managers as they develop positive safety behaviour. We will monitor our progress along the safety culture ladder via annual surveys among our people.

Our costs for strategy and assurance reflect an appropriate allocation to the gas transmission business of the costs of our Safety, Health and Sustainability team which provides efficiencies in scale by supporting our UK gas and electricity businesses. Also included are the direct costs of our dedicated safety and integrity assurance team, which provides:

- independent, risk-based second line assurance for gas transmission, as part of the three lines of defence model to ensure continued safe and compliant operations
- insightful support and guidance to mitigate key safety, environmental and business risks and to drive continual improvements and efficiencies in gas transmission.

Emergency preparedness

The costs include the direct time of individuals, mostly in our Gas System Operator (GSO) Emergency Incident and Framework team, for emergency planning and the independent Network Emergency Co-ordinator responsibilities. This includes provision of incident response training for our own staff and relevant gas distribution network staff, updating the NEC safety case, and co-ordination of both internal and industry-wide emergency exercises across gas market participants including the Department for Business, Energy & Industrial Strategy (BEIS) and the HSE. Further information about how we manage network gas supply emergencies can be found here[18].

Drivers of our emergency preparedness activity in RIIO-2 include:

- the increased operational challenges posed by more diverse supply/demand patterns
- potential changes to the network gas supply emergency framework associated with trends in decentralisation and decarbonisation
- development and adoption of new tools and systems
- the need for emergency planning co-ordination with other gas transmission operators across Europe.

Our planning assumes we maintain the same levels of 24/7 emergency standby across our business and it will require designated gas transmission staff to be trained and on call to respond to asset-related emergency events.

Protecting our assets

Accidental damage to pipelines by third parties is the number one cause of pipeline rupture in Europe. There are well-established industry practices[19] accepted by the HSE to guard against accidental interference, we must have in place the emergency response capability to make safe and repair any suspected or actual damage. Our RIIO-2 plan is based on continued application of these good practices.

We carry out regular visual checks on our entire 7,600 km network. The current best practice and most efficient method is via helicopter patrols, which we undertake fortnightly. We also undertake line-walking to check depth of burial and look for issues that would not be seen from the air. Our policy says that the interval between subsequent line walks should either be every four years or determined by a risk-based approach.

We actively explore alternative methods and new technologies to see if there are advantages in performance, cost or efficiency. For example, we trialled drones to see if they could offer any advantages over line-walking or traditional aerial surveillance. The technology is promising but there are limitations in relation to permitted use, privacy and data protection.

We are obliged to maintain an emergency response and repair service for our pipework systems across Great Britain. We share efficiency with other gas pipeline operators by accessing the same centralised emergency materials and equipment (CEME) scheme operated by the Pipelines Maintenance Centre. There is no other national provider of this niche specialist capability.

6. Risk and uncertainty

We see it as a fundamental part of our business-as-usual responsibility to manage the safety of our operations. We carry the risks, including reputational and financial, of any failure events or lapse in safety performance that could happen under our stewardship.

7. Our proposed costs for RIIO-2

Overall for RIIO-2 we expect expenditure to remain at a similar level to RIIO-1. This is based on assumptions of compliance with the same mature legislation, good practice for compliance remaining in place, a similar workload, stable outsourced costs and the embedding of RIIO-1 efficiencies.

We will spend £14.3m per year on the routine and preventive safety activities described in this chapter. This compares to £15.8m per year during RIIO-1.

The ‘operational properties’ costs account for our improvements to our buildings on our operational sites, ensuring they are fit for purpose to enable our employees and contractors to undertake their work in a safe environment. These are capex costs.

Our costs associated with ‘accidental threats’ are related to our activities protecting our assets, including our regular visual checks of our pipelines such as helicopter patrols.

[18] https://www.nationalgridgas.com/safety-and-emergencies/network-gas-supply-emergencies-ngse

[19] Institution of Gas Engineers and Managers IGEM/TD1 Standard for steel pipelines and associated installations for high pressure gas transmission

Our costs associated with 'corporate health and safety' covers our support staff, who provide support and guidance in relation to our corporate health and safety responsibilities.

Our cost associated to the cost line 'other' covers our teams and activities in relation to our strategy and assurance role. This includes both our gas transmission assurance and integrity teams and our costs associated with our emergency preparedness activities.

Table 21.6 summary safety costs – activity split

Activity spend (£m in 18/19 prices)	2022	2023	2024	2025	2026	Total RIIO-2	Annualised RIIO-2	Annualised RIIO-1
Operational properties	4.2	4.7	3.9	4.6	3.6	21.0	4.2	3.6
Accidental threats	5.8	6.1	5.5	6.0	5.8	29.2	5.8	5.8
Corporate health and safety	0.6	0.6	0.6	0.6	0.6	3.1	0.6	1.1
Other	3.2	3.4	3.9	4.9	2.8	18.2	3.6	5.2
Grand total	**13.8**	**14.8**	**14.0**	**16.1**	**12.8**	**71.5**	**14.3**	**15.8**

Business plan data templates

Our business plan is accompanied by a set of spreadsheet business plan data templates (BPDT) in a format required by Ofgem. The following table shows how our safety activity costs feed into the BPDTs.

Table 21.7 summary of safety costs – BPDT split

RRP Category (£m in 18/19 prices)	2022	2023	2024	2025	2026	Total RIIO-2	Annualised RIIO-2	Annualised RIIO-1
Closely associated indirects	1.9	1.9	1.9	1.9	1.9	9.4	1.9	2.2
Direct costs	8.7	9.0	8.5	10.8	8.7	45.8	9.2	10.1
Load-related	0.2	0.2	0.5	0.2	0.0	1.2	0.2	2.0
Non-operational capex	2.9	3.6	2.9	3.0	2.1	14.7	2.9	1.5
SO Capex	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.1
Grand total	**13.8**	**14.8**	**14.0**	**16.1**	**12.8**	**71.5**	**14.3**	**15.8**