

# Delivering the future gas transmission system

National Grid Gas Transmission's  
business plan 2021–26  
Executive Summary



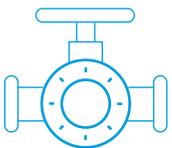
# Who we are and what we do

**We are National Grid Gas Transmission (NGGT) and we are proud to own, manage and operate the high pressure gas national transmission system (NTS) in Great Britain (GB). Our network is a gas superhighway that connects our nation; we balance supply and demand on a day-to-day basis to make gas available when and where it's needed. We develop, maintain, and operate an economic and efficient network and we facilitate competition in the supply of gas in GB to keep energy costs to consumers as low as possible.**

We are at the heart of the energy system as the combined gas transmission system operator (TSO), undertaking both the gas transmission owner and system operator roles. Today, natural gas delivers three times as much energy as electricity; it keeps 80 per cent of the UK's 28 million homes<sup>1</sup> warm and comfortable, generates electricity and fuels industrial and manufacturing processes. Failure to supply natural gas (especially to vulnerable consumers), and any major uncontrolled release of gas from the high-pressure network, are potential threats to life and property.

Our network includes pipes and compressor stations. We connect production to the distribution systems, as well as to large, directly connected consumers. In GB, gas enters the transmission system through importation, reception terminals, storage facilities and interconnectors. From our Gas National Control Centre (GNCC), we meet changing customer needs by optimising the physical configuration of assets and using commercial tools.

## Our gas transmission network comprises of approximately:



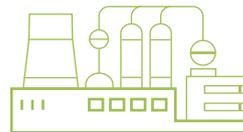
**7,660km**

of high pressure pipeline



**600**

above ground installations



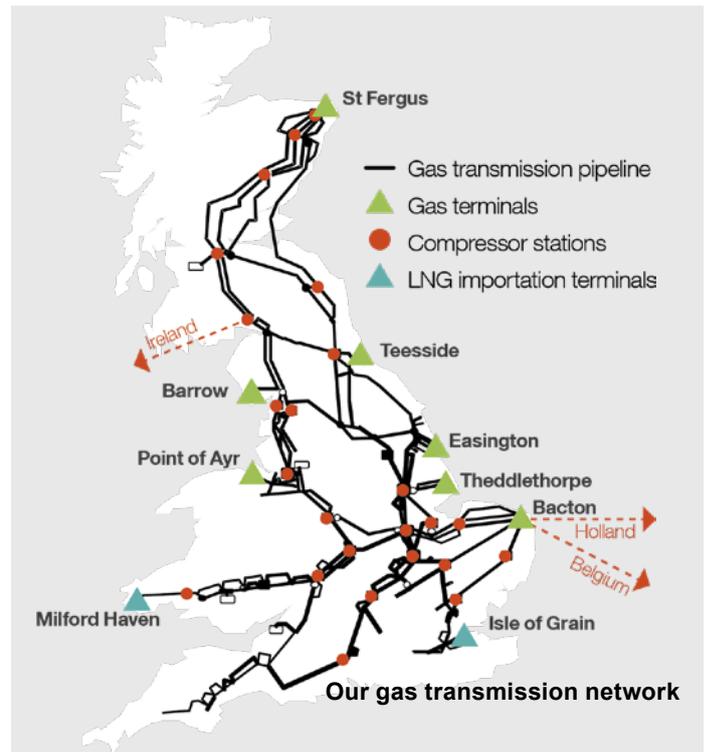
**24**

compressor sites

Compressor stations located along the network play a vital role in keeping large quantities of gas flowing through the system to areas of demand. The network must be kept constantly in balance and meet customer requirements, which is achieved by buying, selling and using stored gas.

## Part of a leading FTSE 100<sup>TM</sup> company with a social purpose

We are part of National Grid plc. We support the highest standards of governance required by the London and New York stock exchanges. We are committed to being a responsible business. We believe we should be a force for positive social and environmental change, so we act responsibly in everything we do, and in the way we do it. This belief is fundamental to the way we work at National Grid.



<sup>1</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/820843/Energy\\_Consumption\\_in\\_the\\_UK\\_ECUK\\_MASTER\\_COPY.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820843/Energy_Consumption_in_the_UK_ECUK_MASTER_COPY.pdf)

# A message from our Chair

**Welcome to the December 2019 National Grid Gas Transmission business plan for the period from 1 April 2021 to 31 March 2026. This is the third iteration of our plan, which we have developed through detailed conversations with our broad range of stakeholders and with considerable effort on their part for which we are very grateful. The plan reflects stakeholder priorities which include maintaining a safe, resilient and reliable gas network during this period of transition to a sustainable energy future whilst keeping bills low.**

Our lives today rely on natural gas, which we transmit across the country whether from North to South, or from East to West. 80% of homes depend on gas for heating, as do many businesses and public buildings. Gas is also crucial for many large-scale industrial processes including electricity generation, producing 40% of the electricity we use.

Our futures depend on tackling climate change. The UK has challenged itself to achieve net zero by 2050, and we have committed to this target for our own work. We recognise that natural gas has an important role to play in supporting the transition to a low carbon future, providing reliability and flexibility to support growth in renewable generation and providing options for decarbonising commercial vehicles and industry. Gas can also help to decarbonise heat, the biggest source of UK carbon emissions, at the lowest cost and with the least disruption to consumers. This is true for both natural gas and other forms of gas such as hydrogen and biomethane.

Over time there will be changes in gas usage as we move to net zero. However, during the period of this plan, we don't envisage substantial change to the network or what is required of it. Instead it will be a period of developing options and understanding choices for the future, and hence we are contributing to innovation projects with other organisations, such as investigating the future of hydrogen, testing the capability of the network to transport hydrogen, and enabling broader use of biomethane. Working collaboratively to develop whole system solutions and driving innovation is an integral part of our RIIO-2 plan. We will also make progress on reducing the emissions from our own business.

Consumer and stakeholder priorities drive this plan. This is critical as the investment decisions we make have lasting impacts on cost, risk and the level of network capability we provide. To summarise what we have learnt from our engagement, consumers and stakeholders want a safe, reliable and resilient network that can support the changing energy system of the future, whilst keeping bills low. Stakeholders were also clear that they don't just care about what we deliver, but how we deliver it. This plan therefore reflects those requirements. It includes significant activity to protect the health of our assets, renew the operational technology and protect the network from cyber threats. We have identified some projects which require further development or finalised costs before we commit to them. We will protect consumers from costs associated with uncertainty and continue to engage collaboratively with stakeholders to determine final solutions.

Our stakeholders also want an affordable energy bill, so we have challenged our costs extensively and worked hard to come up with new ways of doing things. Our plan delivers all the outputs stakeholders need, at a cost of £8.85 (excluding inflation) on the annual domestic consumer bill.

How we will deliver is embedded in our purpose, vision and values which underpin all our activities. Our people are exceptionally proud of the service they provide. The skills they deploy are key to keeping the system safe, reliable and resilient and we are committed to ensuring we invest in training and development to ensure they can do their job today and as it evolves to meet the opportunities the net zero ambition offers.

**Thank you to all those who have contributed to the development of this plan, together we will keep finding better ways to bring energy to life in the UK and ensure that we have a sustainable, affordable future.**



**Nicola Shaw**  
Chair of National Grid  
Gas Transmission

# 80%

Today, 80 per cent of homes rely on natural gas for heating, as do many businesses, commercial properties and public buildings, including schools and hospitals.

## Executive summary

# 1. Key messages

## In building our business plan:

- We have extensively listened to our stakeholders to develop a plan that meets their needs, and embraced the new enhanced engagement arrangements for RIIO-2.
- We have worked to define and determine the network capability stakeholders need, testing this against the Energy Networks Association's Common RIIO-2 Scenario and the full range of Electricity System Operator produced Future Energy Scenarios.
- We are proposing £553m per year of investment (39 per cent higher than RIIO-1) to maintain a safe, reliable and resilient transmission system.
- We have challenged ourselves to ensure our proposals deliver at the lowest cost and create optionality as we develop the lowest cost pathway to net zero. We have an efficiency ambition of 8 per cent on total costs, which includes an 11 per cent operating expenditure efficiency ambition.
- We are committed to a whole energy system approach, having worked with other network companies and government to identify a programme of work needed to test and prove hydrogen conversion options, which are critical to developing the pathway to net zero.
- We give evidence for why adjustments are required to Ofgem's proposed financial framework to make sure our plan is sustainably financeable across a range of credible energy scenarios.
- Our plan delivers all the outputs stakeholders need, while reducing our portion of the average annual domestic consumer bill to £8.85 (excluding inflation).
- We have tested the acceptability of our plan with consumers, finding that 88 per cent of domestic and 82 per cent of non-domestic consumers find the average impact of our RIIO-2 plan acceptable.



**8%**  
Efficiency ambition  
on our total costs

**£8.85**  
Cost of this plan  
on the average  
annual domestic  
consumer bill

## Executive summary

## 2. We have given stakeholders a stronger voice

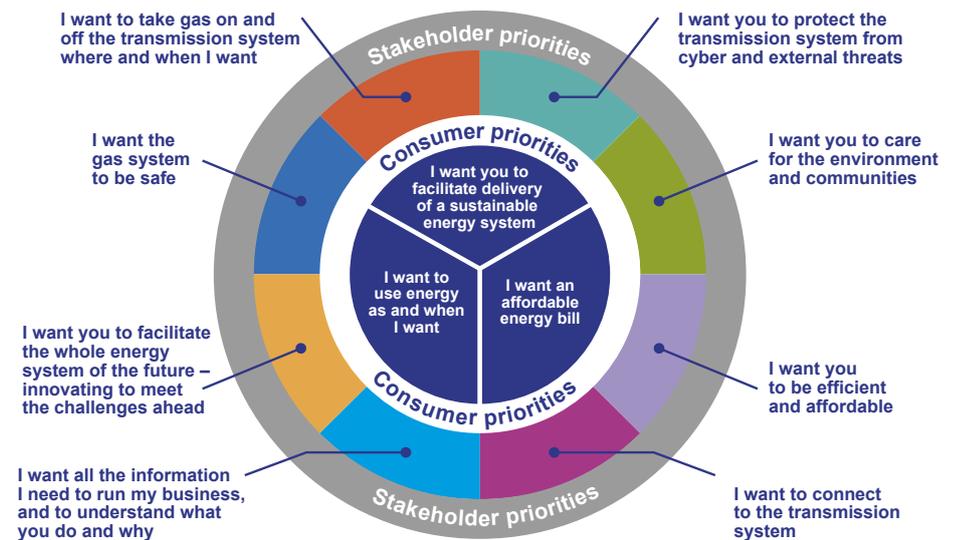
This plan has been shaped by the priorities of our stakeholders and consumers; it is ambitious, innovative and will be challenging to deliver. We will work towards its goals with stakeholders, so that our actions are transparent, and we can deliver effectively on our commitments.

We have built our plan by listening and incorporating feedback from our stakeholders and consumers. Over the last two years, we have carried out our most extensive ever listening exercise to understand their priorities and future requirements. We have engaged with more than 800 stakeholders, 13,000-plus domestic and non-domestic consumers. Together with National Grid Electricity Transmission (NGET), we were the first network to establish the independent stakeholder user group and its members have been challenging and reviewing how we engage in developing our business plan. We have provided more information about our emerging business plan ideas to our stakeholders than ever before, including a consultation in February 2019<sup>2</sup> and publication of our full draft plan in July 2019<sup>3</sup>.

We've built our business plan around what stakeholders have said. Consumers have told us their three main priorities:

1. "I want an affordable energy bill" – our network and facilitation of the market allow our customers to supply gas where and to whom they want, helping keep wholesale costs low to the ultimate benefit of consumers.

**Figure 2.01** our eight stakeholder priorities are underpinned by three consumer priorities



2. "I want to use energy as and when I want" – consumers expect us to provide a highly reliable service.
3. "I want you to facilitate delivery of a sustainable energy system" – consumers want us to support the energy system transition, whilst minimising disruption to their lives and our impact on the environment.

Throughout our consumer engagement programme, we identified that the environment, particularly as we move towards a decarbonised energy system, is very important to consumers. We therefore amended our third priority to better reflect this. It was previously "I want you to minimise disruption to my life".

Against a backdrop of an uncertain energy landscape, we are mindful that there is a careful balance to be achieved in delivering these priorities for current and future consumers. We will make critical decisions regarding replacing, maintaining or decommissioning our assets, as well as driving forward innovation to ensure the best fit for the future solutions.

Stakeholder views have made a genuine difference to our business plan as we explain throughout this document. The independent stakeholder user group has also made sure we take account of stakeholder views. In the next section, we summarise how our plan delivers against the stakeholder priorities.

<sup>2</sup> <https://www.nationalgridgas.com/document/125911/download>

<sup>3</sup> <https://www.nationalgridgas.com/document/127856/download>

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# 3. Delivering stakeholder priorities

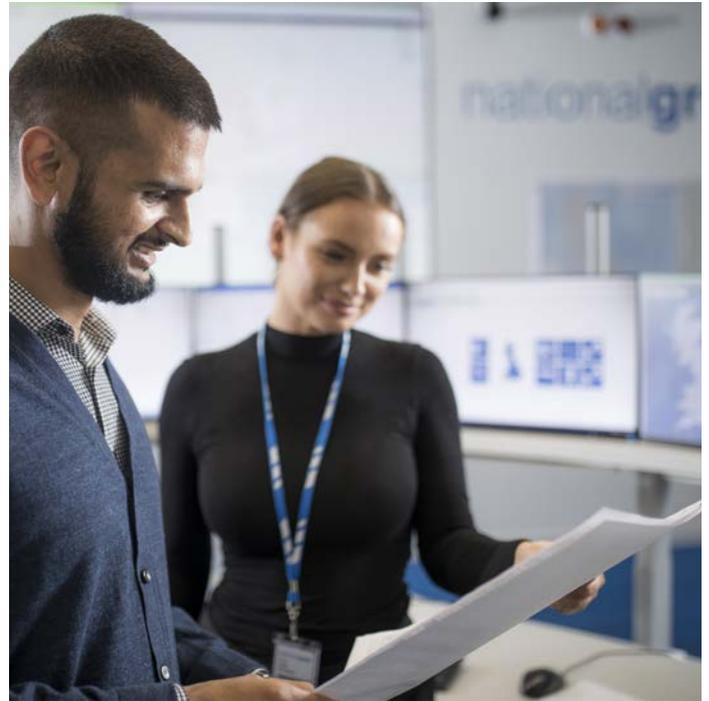
**We are proposing to spend £553m per year (excluding pass-through costs, real price effects and non-baseline funded uncertainty mechanisms).**

£553m includes £520m of baseline funding and £33m where we are requesting baseline funding, which is subject to an uncertainty mechanism. We have also reduced our costs due to further refinement and efficiencies across our plan.

We have excluded costs associated with other uncertainty mechanisms which we have not requested as baseline funding in our plan.

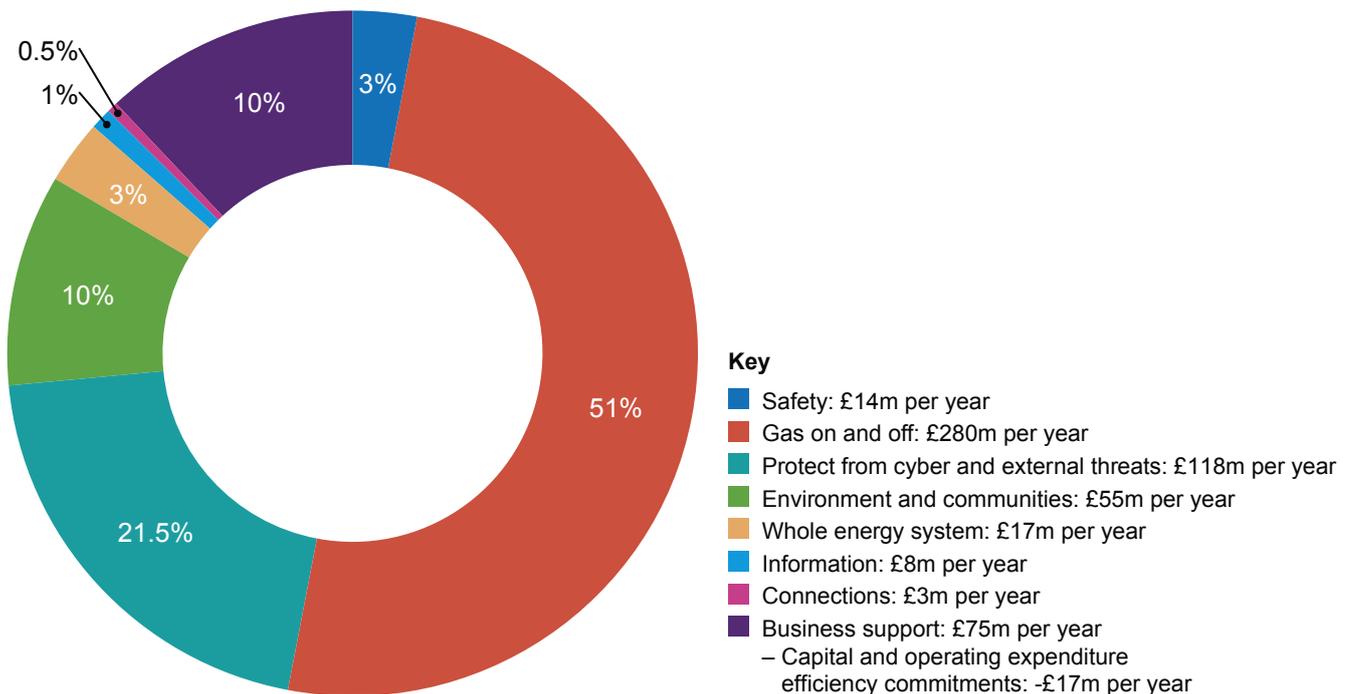
We have only included more certain costs in the baseline funding we are requesting. Our baseline costs are high-cost confidence (a RIIO-2 regulatory term) because:

- we continue to use native competition (82 per cent of all external expenditure in RIIO-1 followed this process),
- we have challenged the vast majority of our costs against our past track record,
- we have benchmarked our costs,
- we are proposing uncertainty mechanisms to facilitate more certainty in scope and cost of specific activities, and as certainty in the pathway to net zero becomes clearer.



**£553m**  
Average annual cost in RIIO-2

**Figure 3.01** our proposed spend by stakeholder priority



## Executive summary

We have presented what we plan to do against each stakeholder priority, organised into Ofgem's three output categories.

The costs shown below have had the efficiencies from our stretching UK efficiency programme applied and include our baseline costs and the uncertainty mechanisms we have included in our baseline.

## Maintain a safe and resilient network



### I want the gas system to be safe

Forecast cost **£14m per year**  
(RIIO-1 forecast **£17m per year**)

#### Key changes from RIIO-1

We have made efficiencies in our systems and people-related safety costs.

#### Commitment

- We will maintain our first-class level of safety whilst continuing to pursue the highest level of safety culture maturity to protect the public, our assets and people.

#### Consumer benefits

"I want to use energy as and when I want" – our commitment to safety-related inspections, maintenance and asset replacement avoids disruption to continuity of gas supply.

"I want you to facilitate delivery of a sustainable energy system" – our focus on safety protects society from potential disruption and damage to public health, business, transport and the natural environment.



### I want to take gas on and off the transmission system where and when I want

Forecast cost **£280m per year**  
(RIIO-1 forecast **£207m per year**)

#### Key changes from RIIO-1

Increased expenditure required to maintain the health of our ageing assets.

#### Commitment

- Invest in our asset health programme to comply with legislation and our Safety Case, whilst maintaining our current level of reliability, resilience and availability, supported by an annual process to assess network capability.
- 76 per cent of our asset health spend will be delivered through Ofgem's defined Network Asset Risk Metric.
- Redevelop the Bacton terminal using a price control deliverable (PCD) and uncertainty mechanism (UM) to adjust allowances once final design and costs are known.
- Address subsidence at King's Lynn using a PCD and UM to adjust allowances once final design and costs are known.
- Undertake residual balancing, maintenance and constraint management subject to an ODI.
- Take a risk-based approach to environmental resilience, specifically to manage the risks with pipeline watercourse crossings.
- Invest to develop the capabilities of our people and systems; to allow us to plan, maintain and operate our network and markets in the most cost-efficient way.

#### Consumer benefits

"I want to use energy as and when I want" – enabling a wide range of supplies ensures gas is reliably available.

"I want you to facilitate delivery of a sustainable energy system" – stakeholders have told us it is in consumers' interests to keep future energy options open and we will deliver by determining and delivering the network capability our stakeholders need.

"I want an affordable energy bill" – network reliability enables access to the lowest cost gas supplies, reducing the wholesale cost energy consumers incur.



### I want you to protect the transmission system from cyber and external threats

Forecast cost **£118m per year**; **£83m** of which is cyber-driven asset health operational technology (OT), **£9m** of which is business IT security plan, **£26m** of which is physical security (RIIO-1 forecast per year **£36m**; **£2m** OT, **£9m** business IT security plan, **£25m** physical security)

#### Key changes from RIIO-1

Significant increase in cyber resilience expenditure driven by age and obsolescence of existing OT, growing level of cyber threat and new legislative requirements.

#### Commitment

- Deliver a risk-based strategic long-term programme to replace key OT used for the safety and control of critical systems at high use, high criticality sites using PCDs.
- Our business IT security plan will implement a suite of initiatives to improve cyber resilience across our enterprise IT environment and implement new capabilities in line with Network Information Systems (NIS) Regulations.
- Deliver new physical security upgrade solutions where government has determined it to be in the national interest.
- Regularly review our programme and utilise UMs to flex our delivery if circumstances change, e.g. change in level of threat or criticality of sites.

#### Consumer benefits

"I want to use energy as and when I want" – our investments improve the safety and resilience of the network to ride through and recover from malicious events that threaten to disrupt continuity of GB energy supplies.

## Executive summary

### Deliver an environmentally sustainable network



#### I want you to care for the environment and communities

Forecast cost **£55m** per year  
(RIIO-1 forecast **£43m** per year)

##### Key changes from RIIO-1

Increased expenditure for compressor emissions compliance programme to reduce our carbon footprint and NOx emissions. Increased commitment to reduce our overall carbon footprint in other activities.

##### Commitment

- Comply with emissions legislation through replacing two compressors at our Wormington site with more efficient ones, that will reduce NOx emissions from 2026 (via a PCD), to meet stakeholder network capability requirements.
- Deliver a programme of works for emissions legislation compliance by 2030, we'll continue to work on solutions at three more sites using UMs.
- Increase our focus on reducing all methane emissions through monitoring leaks on the network, and working on ways to reduce them, supported by a greenhouse gas ODI.
- Reduce the carbon footprint of our business by replacing 100 per cent of our operational vehicles with alternative fuel vehicles where there is a market alternative in 2019, installing solar panels on our sites, ensuring the energy we use in our office buildings is from renewable sources and reducing carbon in construction projects.
- Address 80 redundant assets, asset groups or sites measured by a PCD, enhancing the natural environment around these.
- Deliver benefits to wider society, including committing 0.3 per cent of the value of major projects spend to support community initiatives and ensuring new construction projects protect and promote biodiversity.

##### Consumer benefits

"I want you to facilitate delivery of a sustainable energy system" – cutting greenhouse gas emissions reduces our impact on climate change, with clear benefits for society including improved air quality. Improving biodiversity and enhancing the environment when we have demolished a site, brings positive benefits to nature and communities.

"I want an affordable energy bill" – responsible demolition protects future consumers from the costs of disposing assets they may not have benefited from, whilst promoting environmental net gain activities.



#### I want you to facilitate the whole energy system of the future – innovating to meet the challenges ahead

Forecast cost **£17m** per year  
(RIIO-1 forecast **£13m** per year)

##### Key changes from RIIO-1

Taking a leading role in the decarbonisation of heat for gas transmission.

##### Commitment

- Lead the development of options associated with gas transmission to facilitate the decarbonisation of heat, industry and transport, specifically hydrogen, supported by a UM.
- Lead the development of the gas markets framework by collaborating with others to enable the pathway to net zero.
- Collaborate across industry on a hydrogen workplan and on innovative solutions.
- Invest in skilled people and IT systems so we can lead regulatory change, anticipate future regulatory developments, and understand how these might affect stakeholders and our network.

##### Consumer benefits

"I want you to facilitate delivery of a sustainable energy system" – defining the solutions for decarbonising heat, providing costs and implications for consumers will support a pathway that minimises disruption.

"I want an affordable energy bill" – whole energy system collaboration offers networks the potential to respond to changing needs and reduce consumer costs in the most effective way. Focusing on delivering and embedding innovation to deliver the energy transition ensures the most effective long-term solutions are taken forward.

For more information on our price control deliverables (PCDs), uncertainty mechanisms (UMs) and output delivery incentives (ODIs), please see annexes A3.01 to A3.03 respectively.

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Meet the needs of consumers and network users



**I want to connect to the transmission system**

Forecast cost **£3m per year** (RIIO-1 forecast £4m per year)

**Key changes from RIIO-1**

We will be more responsive to the needs of our customers.

**Commitment**

- Continue to support the liquidity of the energy market by providing an efficient process for connection and capacity applications.
- Actively promote connection opportunities to new customers including biomethane entry customers and gas-powered vehicle refuelling station exit customers.
- Be more responsive to the needs of customers, incentivised through an ODI.
- Optimise use of the existing system by substituting capacity where possible rather than building new capacity, informed by robust options analysis.

**Consumer benefits**

“I want to use energy as and when I want” – making it easier for new sources to connect ensures diverse domestic and international sources of gas can access our network efficiently.

“I want you to facilitate delivery of a sustainable energy system” – actively promoting new low carbon connection opportunities assists decarbonisation with minimal disruption to consumers.

“I want an affordable energy bill” – where possible, we provide capacity without building new assets, facilitating liquidity in the competitive wholesale energy markets which keeps costs low for consumers.



**I want you to be efficient and affordable\***

**Key changes from RIIO-1**

Building on our RIIO-1 learnings to drive an enhanced efficiency ambition in RIIO-2.

**Commitment**

- Sustain a £30m per year operational cost efficiency from our RIIO-1 efficiency programme.
- Deliver a further £6m per year operational cost efficiency across RIIO-2.
- Deliver a further £11m per year efficiency on our direct capital investments across RIIO-2.
- Continue to benchmark, market test and use native competition throughout RIIO-2.

**Consumer benefits**

“I want an affordable energy bill” – embedding efficiencies, focusing on the most efficient and effective solutions and reducing returns from day one of the new price control will keep costs down for consumers.

UMs ensure spend is directed to maximum consumer benefit, even when circumstances change.

Facilitation of the wholesale market has a positive impact on the wholesale energy cost for consumers.

Balancing costs between current and future consumers ensures fairness.



**I want all the information I need**

Forecast cost **£8m per year** (RIIO-1 forecast £8m per year)

**Key changes from RIIO-1**

Enhancing our capability to share information.

**Commitment**

- Implement best practice open data sharing and governance across the energy industry, working with network companies to build a whole system view.
- Retain our quality of demand forecast ODI.
- Invest in our people and IT systems, taking advantage of technology to develop new capabilities allowing us to share information in better ways.
- Be more transparent by continuing to provide regulatory reporting, continuing to update our business plan with stakeholders, retaining the independent stakeholder user group and ensuring our leadership team’s remuneration is clearly aligned with delivering outputs for stakeholders.

**Consumer benefits**

“I want an affordable energy bill” – our information and insights provide value for consumers by ensuring that the gas market runs smoothly and promotes competition in the wholesale market, keeping wholesale costs low.

**Figure 3.02** our consumer value proposition

Our plan provides significant value to consumers; delivering a safe, reliable and resilient network for homes, businesses and communities both today and into the future, and playing our part in decarbonising Britain’s energy system. The consumer value proposition focuses on those parts of our plan (these could be commitments, outputs or incentives) that go beyond minimum requirements and beyond the functions typically undertaken by an energy network company as business as usual. We have monetised five items:

1.	Gas on and off	– Resilience solution at Blackrod
2.	Protect from cyber and external threats	– Security innovation application
3.	Environment and communities	– Business carbon footprint reduction through construction
4.	Environment and communities	– Natural environment improvements
5.	Environment and communities	– Community initiatives.

For more information please see annex A10.05.

**\*Business support costs to deliver stakeholder priorities: forecast cost £75m per year (RIIO-1 cost per year £73m)  
Capital and operating expenditure efficiency commitments: -£17m per year**

**Pass-through costs such as licence fees and tax: forecast cost £192m per year (RIIO-1 cost per year £201m)**

## Executive summary

# 4. The cost of our business plan

### Context

To achieve the outcomes stakeholders need, our proposals forecast an average annual cost in RIIO-2 at £553m. This is an increase from £399m per year in RIIO-1. We have worked extensively to ensure our plan is fully justified and deliverable, and we believe it represents the minimum total cost to meet stakeholder needs.

We are mindful that, to meet our commitments, we must get the balance right between network capability and the cost to consumers today and into the future. Within the changing energy landscape, we are managing an ageing network with many assets at or beyond the end of their design life. The decisions we make today have lasting impacts on cost, risk and the level of network capability we offer to stakeholders. Our plan has been developed through an iterative process to understand the impacts of different options on our customers and consumers. We are proposing investment to maintain, replace or decommission our assets, as well as deferring decisions to keep options open until the future becomes clearer. Our RIIO-2 plan will reduce network capability in the future due to decisions we are proposing now and we have worked closely with stakeholders to ensure the trade-offs are understood and the plan meets their needs.

### RIIO-2 expenditure

For the majority of our baseline cost (£520m) we have high confidence on the volume and cost of work to deliver our stakeholder commitments. We have therefore included those costs which are primarily related to delivering network reliability and resilience into our baseline cost. Where there is more uncertainty around either the scope or cost of work required to meet stakeholder requirements, in particular around future network capability, we have utilised uncertainty mechanisms. Stakeholders have supported this approach as it protects consumers and customers from paying for outputs they might not require or paying a price that is currently unclear. The section below outlines the major cost areas to deliver our stakeholder commitments, how we have utilised uncertainty mechanisms and our efficiency commitments underpinning the business plan.

### Key cost drivers included in our baseline cost

1. Managing an ageing network with many assets at the end of their design life

Across our network, we're experiencing more condition-related issues. We have started to

deal with these issues in RIIO-1 by investing more than £100m over our asset health allowances to maintain the safety, resilience and reliability of our network. For RIIO-2, we have provided evidence that we will need to increase our spending to both meet our legislative obligations and Safety Case, whilst maintaining the health of our assets, network capability and reliability. Our commitments are underpinned by Ofgem's Network Asset Risk Metric covering 76 per cent of our asset health spend. For the remainder of our costs, we have either proposed price control deliverables or uncertainty mechanisms that will adjust allowances once the final design and cost are known. For work on our compressor fleet, we have aligned our proposed investments to meet current and future network capability stakeholder needs. As we move forward, our asset decisions will continue to be assessed using this approach and we will iterate and report annually on the required capability of the network.

2. Protecting the transmission network from rising cyber security threats

Our operational technology assets used for safety and control at our compressor sites are at the end of their design life and are not capable of supporting the enhanced cyber resilience required by new legislation.

We have optimised our cyber plan as part of a compressor site strategy that takes account of needs arising from network capability, asset health, emissions and cyber threats. Our plan for RIIO-2 is to fully replace systems at high use/high critical sites and deploy a RIIO-1 innovation solution as a lower cost cyber resilience mitigation at other sites. This risk-based approach will continue into RIIO-3. We are working with the Department for Business, Energy & Industrial Strategy (BEIS) and Ofgem in their joint role as NIS Competent Authority, and with the Health and Safety Executive (HSE) to confirm the confidential detail of our plan to protect against these threats.

3. Meeting environmental and community commitments

We have 28 compressor units that are subject to the Medium Combustion Plant Directive (MCPD) which require compliance by 1 January 2030. We need to make decisions now to ensure we can meet this deadline whilst maintaining capability during any construction works.

## Executive summary

# 4. The cost of our business plan

Based on the network capability stakeholders have currently indicated that they need, we are proposing two new compressor units (at Wormington) in RIIO-2. We will utilise an uncertainty mechanism to test the solutions at a further three sites (St. Fergus, Peterborough and King's Lynn). For the remaining compressor units, we are exploring whether decommissioning or derogation is the most appropriate solution. This will be supported by an annual process to assess network capability. In addition, we will deliver commitments to address redundant assets, support communities and enhance the environment.

### Our costs are fully justified and our plan is deliverable

Our plan is ambitious and the detailed planning we have done confirm it is deliverable. The planned increase in work on the network has required us to think very differently about how we manage our maintenance and construction activities, whilst ensuring we can deliver the service our customers need. We have considered our plan over a ten-year period to accommodate network outages in RIIO-2 and RIIO-3, to minimise network disruption, costs and constraints for our customers. We have proposed clear commitments in the form of price control deliverables to ensure that our activities have clearly defined outputs, against which we can be measured. We are confident our business plan is underpinned by solid foundations. We have extensively listened to our stakeholders and triangulated the outcome of these discussions to build a plan that meets their needs. We accompany our plan with engineering justification papers, cost benefit analysis and external benchmarking to evidence that our plans is robust.

We use native competition to extract value from our supply chain, with 82 per cent of all external expenditure during RIIO-1 going through a competitive process. For asset health, all of our capital expenditure over £100k during RIIO-1 was subject to competitive tendering. We will continue to develop these processes to extract as much value as possible from the supply chain into RIIO-2.

### Protecting consumers against uncertainty

Uncertainty mechanisms are designed to allocate risk to whoever is best placed to manage it. We have protected consumers by proposing uncertainty mechanisms for less certain costs to ensure if customer or consumers' needs change so do our allowances.

We have two types of uncertainty mechanisms to deal with the types of uncertainty we are managing.

Where the uncertainty relates to the likely cost of doing the work, but not the need for the work, we have included an estimate of the cost in our baseline. We propose the cost would be set in RIIO-2 once we have finalised the detailed design and have tender-backed prices. Where there is uncertainty around the need for the work and the cost, we have not included the costs in the baseline but have provided estimates for transparency purposes. We propose the RIIO-2 framework would only provide allowances for this work if the output is needed in RIIO-2. How these mechanisms have been used in our business plan is described in the section below.

- Uncertainty mechanisms included in our baseline**  
 For asset health works we have forecast the costs to address issues at both our Bacton terminal and King's Lynn site. We have proposed to include these costs in baseline at £33m per year. However, due to a need to finalise the scope and cost for the solution, we propose to adjust the cost at a defined period once we have fully tendered outcomes for these sites within RIIO-2.
- Uncertainty mechanisms not included in our baseline**  
 Further uncertain mechanisms have not been included in our baseline, but may be necessary. They protect consumers from either the cost uncertainty in our proposal or where we need to undertake further work to ensure our proposals meet the needs of the customer requirements, external legislation, future network capability needs or as certainty in the pathway to net zero becomes clearer.

For our emissions driven investment for compressors and associated works at St Fergus, Peterborough and King's Lynn, we propose to use our new annual network capability process to firm up the requirements at these sites. Once the full design and solutions are known, we will use a reopener window to agree the solution and associated costs. For transparency, we have included an estimate of the likely costs in our plan and the trigger points required to ensure we can deliver the network capability in a timely manner.

For external threats, whether physical or cyber, uncertainty mechanisms allow us to adjust our plans should we be asked by the external competent authorities to do more to ensure we can deliver a highly reliable and resilient service. Where our scope or costs are not yet sufficiently well defined, we have provided an estimate of likely costs. We will use the uncertainty mechanism reopener windows to request adjustments to our RIIO-2 allowance when the details are fully defined.

## Executive summary

# 4. The cost of our business plan

### We have challenged ourselves to be more efficient

To deliver our proposals as cost-effectively as possible, we have challenged ourselves to make sure our costs are as low as they can be. We have embedded the benefits of successful recent innovations, undertaken benchmarking analysis and made stretching efficiency improvement commitments. This has resulted in our plan being £47m lower each year than it otherwise would have been, representing an **8 per cent efficiency ambition** on our total costs.

- **Sustain operational cost efficiencies from RIIO-1**

Having undertaken our stretching UK efficiency programme, we have moved to our new structure in readiness for RIIO-2. Doing so ahead of the next price control means we can be transparent with our stakeholders about our costs going forward and reduce our RIIO-2 plan by £30m per year. We've used available benchmarking data and other analysis to show that our costs are efficient as we start RIIO-2.

- **Deliver further operating expenditure efficiency ambition**

We are making an ambitious commitment to further reduce our operating costs by £6m per year. Representing a 1.1 per cent per year operating productivity target. This is nearly three times the government's forecast of UK productivity growth and consistent with our ambition to be innovative and keep striving for efficiencies. Our underlying operating expenditure will be 11 per cent lower than today.

- **Deliver capital expenditure efficiency ambition**

We are also building in the benefits of our past successful engineering and asset management innovations and a further 4 per cent efficiency on our direct capital investments, saving £11m per year.

### We positively impact wholesale energy costs

We are conscious that the cost of our activities isn't the only thing that has an impact on consumer bills. By facilitating the effective functioning of the gas market, we have a positive impact on the wholesale energy cost in a way that benefits consumers. This impact was supported by a recent study by professional services firm EY. This concluded that, even with perfect foresight and without taking account of an unexpected short-term shock, failure to maintain the existing capability of the NTS could have significant impacts on GB consumers, for instance by adding up to £877m per year to gas and electricity costs by 2035.

Given the potential impact of system constraints, we have proposed to retain the constraint management incentive as part of our plan. This is because it encourages us to act in both the short and long-term interests of consumers, by encouraging us to minimise the likelihood of, and cost to manage, any system constraints.

We have also proposed to maintain the demand forecasting incentive, as providing accurate demand forecasts helps the market function efficiently. Accurate forecasts will become increasingly important in RIIO-2 as the energy landscape becomes more challenging due to increased volatility and uncertainty, reflecting greater use of renewable energy sources, and shifting supply and demand patterns.

### Financial framework

We have developed our business plan to deliver on our consumer and stakeholder priorities and provide value for money. Part of this is ensuring that our plan balances the needs of investors with the needs of consumers today and into the future. Getting an appropriate financial framework which is transparent, robust and reflects the risks and long-term nature of the investments is vital in ensuring networks are able to fund future infrastructure efficiently and sustainably.

An appropriate return is important to the resilience of the energy sector as a whole, but nowhere is it more pronounced than in transmission, where the uncertainty and complexity of investment required, and the scale and pace of market disruption is markedly higher than in other sectors. We have seen growth in the cyber threat to our assets and the risk of political intervention in our operations over the last few years. These are risks we as a network company are best placed to manage because our customers and consumers do not have the ability to mitigate.

Our stakeholders want us to take a leading role in ensuring a healthier and greener, net zero future for the UK, whilst maintaining energy security at the lowest possible cost for consumers. The scale of this challenge is significant, requiring substantial investment. It is therefore vital that we have a progressive regulatory framework which encourages long-term investment and provides an adequate financial reward for the risks we take in leading the change.

Within our plan, we provide evidence that Ofgem's proposed financial framework, including the use of 4.3 per cent cost of equity, does not enable us to maintain current financial resilience and reduces our ability to take risks and innovate in a critical period of whole system change.

Ofgem's proposed framework reduces our bill impact in the short term but will increase total energy bills in the medium and long term. We set out an alternative, sustainable financial framework which reduces our impact on consumer bills in the short, medium and long term, yet still incentivises investment at a time when it will be critical for the UK in achieving a net zero future.

Executive summary

# 5. Our impact on energy bills

The RIIO-2 regulatory framework determines the revenues we recover, paid for directly by our customers who pass the charges through to end consumers. We considered the impact of our plan to both our customers and consumers (domestic and non-domestic).

## Non-domestic consumer and customer bill impact

The effect of our plan on charges will depend on our customers' location, the type of contract they have and their energy use. To understand their bill impacts for RIIO-2, our customers and non-domestic consumers asked for visibility of our forecast revenue trends. This allows them to calculate their own specific bill impacts based on their individual circumstances. The table below shows our forecast revenue, after deduction of directly connected customer revenues.

**Table 5.01** RIIO-2 forecast revenues

Year £m 2018–19 price base	2021/22	2022/23	2023/24	2024/25	2025/26	RIIO-2 average	RIIO-1 average
Our revenue	935	935	999	990	978	967	919

### Domestic bills

On average across RIIO-1 to date, our charges to domestic consumers account for £9.05 per year. Under our proposed package, the average RIIO-2 consumer bill is expected to be £8.85 per year, before inflation, an average reduction of 20p per year. This change is influenced by seven main drivers:

- Framework changes (the transition to a new Consumer Prices Index (CPIH) which accelerates cashflow): +40p, and regulatory asset lives and depreciation proposals: +20p.
- Total expenditure associated with our plan: +70p.
- Impact of previous price controls: +25p.
- Financial package (changes to allowed equity return, cost of debt allowances and gearing): -85p.
- Demand projections (we use the medium Typical Domestic Consumption Values as published by Ofgem): -75p.
- Adjustments from pass-through and incentive income: -15p.

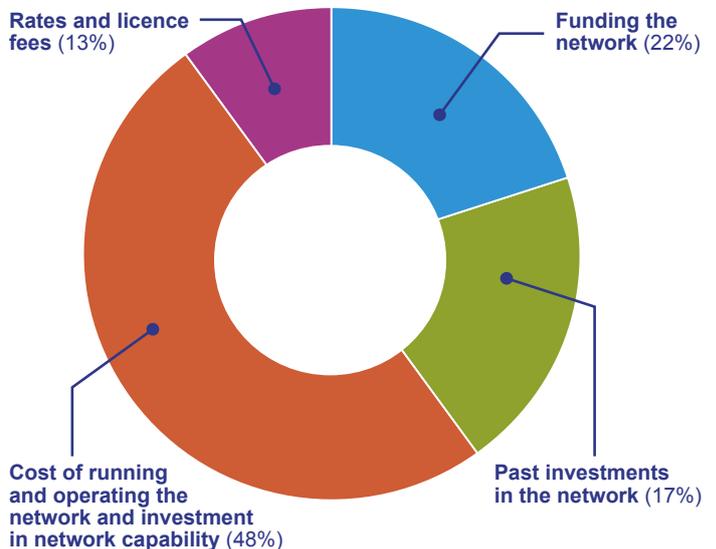
If we apply Ofgem's financial framework, the bill would be £8.35 per year, a reduction of 70p per year.

Following the publication of our July draft business plan, we tested the acceptability of our plan with consumers. 88 per cent of domestic and 82 per cent of non-domestic consumers said that the average impact of our RIIO-2 plan was acceptable. Consumers were asked "What is the maximum acceptable change in your transmission bill by 2026?", the average response was to pay a further £11 (therefore double today's bill impact) for domestic consumers and a 7 per cent increase for non-domestic consumers. For those who did not find our plan acceptable, reasons mainly related to financial considerations including objections to paying a higher bill and energy companies making too much profit.

Acceptability was largely driven by perceived affordability of the transmission bill, as well as the need to maintain high levels of reliability for non-domestic consumers. The high level of acceptability is subject to limits to changes to the overall energy bill.

**Figure 5.02**

An indication of how our portion of the domestic bill breaks down



**Funding the network:** upfront spend comes with an associated cost of raising funds, this is similar to the interest paid on a loan.

**Past investments in the network:** the cost of past investments in the gas networks is spread so consumers pay over the life of the assets. This portion relates to cost in prior regulatory periods.

**Cost of running and operating the network and investment in network capability:** the cost of work to deliver network capability within the current regulatory period is spread so consumers pay over the life of the assets. This also covers the day-to-day costs of running and operating a safe and reliable network.

**Rates and licence fees:** the obligatory charges that we have to pay in order to operate.

**Note:** We do not have a margin included in our costs. The price control is set up to fund the right level of cost to deliver what our stakeholders need. Our accounting profit is generated from performance against the set price control and the return required for our equity investors to take on the risk of the network.

## Executive summary

# 5. Our impact on energy bills

### Balancing costs between current and future consumers

Within our RIIO-2 business plan, we are focused on ensuring consumers are protected against uncertainty over the future net zero pathway. We have used the full range of Future Energy Scenarios, published by the Electricity System Operator (ESO), to determine the network capability needed long term and to ensure that the decisions we make now will be fit for purpose in all scenarios. We have then stated our plan against the agreed ENA Common RIIO-2 Energy Scenario.

Based on stakeholder feedback to our draft July business plan, we have proposed appropriate uncertainty mechanisms for our compressor investments and terminals, described earlier in our summary. These allow us to adjust our plan as certainty in the net zero pathway becomes clearer and should actual demand requirements change. We have also explored with our stakeholders the most appropriate way to balance costs between current and future consumers given future uncertainties, changes to the mix of our investment and changes to economic parameters. We have reflected this in our plan in the following ways:

- Our proposed asset investments in RIIO-2 have an average technical asset life of 25 years, which is different to the current regulatory asset life of 45 years. For these new investments we are proposing to align the regulatory asset to the technical asset life of 25 years.
- Ofgem proposes a move to a new consumer prices index (CPIH) metric for indexing our revenues, which will increase bills for today's consumers but lead to lower costs to consumers in the future. We are supportive of this change, which reflects the replacement of RPI as a national statistic. The impact of this change should be neutral to consumers and investors, and not be used as a tool to reduce the cost of equity for the transmission business, continuing to reflect the risks and long-term nature of our investments.
- To manage and recognise the uncertainty driven by the future transition to a net zero carbon economy, we are proposing to accelerate regulatory depreciation for RIIO-2 additions to the Regulatory Asset Value (RAV). This is intended to match revenue with use of our assets and manage the potential risk of higher charges to future consumers given the uncertainty linked to the energy transition.

Through our engagement activity, domestic consumers have a strong preference for the cost of asset decommissioning and new gas equipment to be borne by current consumers. They hold this view on the understanding that this would mean that gas bills today will go up, but gas bills in the future will go down. They cited fairness as a driver for this view. In contrast, non-domestic consumers and customers expressed concerns about a potential shift of greater costs to current consumers and customers. In particular, they were concerned about the impact that any reduction in the depreciation period could have, given that this would shift more costs on to current consumers and customers. We appreciate the affordability concerns of non-domestic consumers and customers, and the trade-off between these views is challenging. On the basis of intergenerational fairness, we have listened to the views of domestic consumers and proceeded with our proposals to protect future consumers against uncertainty over the future net zero pathway recognising that we have built in defined uncertainty mechanisms that will allow for changes and would minimise impacts into the future.



## Executive summary

# 6. What's changed

This is the third iteration of our business plan, and the second version we have published. We have made several changes to reflect feedback from our stakeholders, the independent stakeholder user group, the independent RIIO-2 Challenge Group and updates to Ofgem's business plan guidance.

### What's changed

The main changes we have made to our business plan since July are:

- The average annual cost we presented in our July draft plan was £599m (excluding pass-through costs, potential customer triggered network reinforcement and real price effects). We are proposing to spend £553m per year (excluding pass-through costs, real price effects and non-baseline funded uncertainty mechanisms).
- We have completed further work to ensure our plan is underpinned by the network capability stakeholders need. We link the capability of our network to our business plan proposals through a robust process which evaluates the range of potential energy futures, the level of physical capability on our network, and factors which impact the delivery of this capability. To support the development of our plan, we have developed some high-level compressor fleet strategy principles. We have also proposed the introduction of an annual process to assess network capability and reflect any changes as they arise.
- We have focused on ensuring our proposals are joined up across the key activities of asset health, compressor emissions and protection from cyber threats.

- We have worked extensively to ensure our plan is fully justified and deliverable, and it represents the minimum total cost to meet stakeholder needs. We have strengthened the justification underlying our proposals, including an explanation of all considered options and enhancing the supporting engineering justification papers and cost benefit analyses. We have undertaken a complete review of our unit costs demonstrating where these relate to outturn costs in RIIO-1.
- We have explored with stakeholders our role in meeting the government's net zero commitment, enhancing our proposals to reflect this. We have included more uncertainty mechanisms to adapt to different routes to achieving net zero and propose a 'net zero reopener' uncertainty mechanism.
- We have explained more clearly how our RIIO-1 performance benefits consumers in our RIIO-2 plan.
- We have included more information on competition, covering early, late and native competition.
- As requested by Ofgem and the RIIO-2 Challenge Group, we are using a financial package with a cost of equity of 4.3 per cent (subject to CPIH) to test our plan. We are also testing our preferred package with a cost of equity of 6.5 per cent (subject to CPIH), which is consistent with our July plan.
- We have produced our consumer value proposition (CVP), explaining where our plan provides value for consumers above Ofgem's minimum requirements.
- We have included more information on price control deliverables, and our proposed package of output delivery incentives that stretch our performance in areas where additional consumer value can be attained.
- We have triangulated the output of our stakeholder engagement and applied the conclusions to our proposals, including the results of the independent acceptability testing of our business plan.



## Executive summary

# 7. Assuring our final business plan

The Board of National Grid Gas has been fully involved in developing this submission and has provided review and challenge to ensure the evidence and assurance demonstrate that the plan is of a high quality. The Board has been actively involved in defining the nature and approach of the assurance undertaken on the plan and in reviewing the findings of the assurance programme. We summarise the assurance processes we have undertaken and the statements we feel confident to make as a result of this. Further details of the assurance approach are provided in annex A7.01.

## Our plan uses accurate, high-quality information

We have undertaken a programme to make sure that our Board members have the information and confidence they need to assess the quality of the plan.

We have a strong control and assurance culture, built on the tough rules that apply to us such as the London Stock Exchange listing rules, and the UK's corporate governance code. Our RIIO-2 assurance plan builds on these strong existing assurance systems.

We have performed a full risk assessment of our RIIO-2 business plan and designed an assurance plan appropriate and proportionate to the level of risk. We have developed our assurance plan using the three lines of assurance model utilising; business unit management, internal independent teams and external or internal audit.

We have mapped supporting evidence and assurance work results to the statements below to give the Board confidence to make them.

We have engaged an external expert consultancy to independently review and advise us on our risk assessment and planned assurance approach. They have also reviewed the execution of our assurance programme and given views to the Board on the validity of the statements below based on the evidence reviewed.

## Our assurance statements

The following assurance statements are made by the Board with reference to this document only ("the Company's Business Plan"), as submitted to Ofgem on 9 December 2019:

- The Board owns the overall strategy and direction of the Company's Business Plan.
- The Board is of the opinion that the Company's Business Plan is accurate and based on high quality data. The Board has reached this conclusion through implementing an overall strategy for data assurance and governance that has sought to deliver a business plan that is accurate and based on high quality data.
- The Board has challenged and satisfied itself that, in the opinion of the Board, expenditure forecasts included in the Company's Business Plan are robust and efficient.
- The Board has challenged and satisfied itself that, in the opinion of the Board, the Company's Business Plan is ambitious.
- In the opinion of the Board, the Company's Business Plan represents good value for money for existing and future gas consumers as a consequence of it being a robust, efficient and ambitious plan.
- The Board has sought to implement a strategy to satisfy itself that the Company's Business Plan achieves stakeholders trust and confidence, and is of the opinion that this is achieved as a result of the high levels of transparency and engagement with stakeholders during its development.
- For details of the level of assurance given over the financeability of the business plan and key definitions in relation to these statements see annex A7.01.

## Our National Grid Gas Transmission Board members



*Nicola Shaw*  
Nicola Shaw  
Chair



*Phil Sheppard*  
Phil Sheppard  
Director Gas  
Transmission



*Chris Bennett*  
Chris Bennett  
Director  
Regulation



*Alan Foster*  
Alan Foster  
Chief Financial  
Officer



*Fintan Slye*  
Fintan Slye  
Director System  
Operator



*Cathryn Ross*  
Cathryn Ross  
Sufficiently  
Independent  
Director



*Clive Elphick*  
Dr Clive Elphick  
Sufficiently  
Independent  
Director



*Alexandra Lewis*  
Alexandra Lewis  
Treasurer

## Executive summary

# 8. Mapping our business plan to Ofgem and Citizens Advice

We have built our business plan around the key stakeholder priorities and the table below shows how our plan maps to Ofgem's minimum business plan requirements (references in bold). Annex A8.01 shows how our plan maps to all of the business plan

guidance. Our business plan is supported by various annexes including cost-benefit analysis and engineering justification papers, these reports explain in detail the need for and the benefits of the investment we are proposing in each area.

No.	Ofgem business plan guidance reference	Business plan narrative	Annexes or additional information
1	 Track record	Track record in chapter 9 ( <b>2.3</b> ). Each of our stakeholder priority chapters includes track record in section 2 – our activities and current performance.	Our annual RRP reports.
2	 Business plan commitment	Chapter 7 – Assuring our final business plan ( <b>2.4</b> ).	Annex A7.01 assurance report. Annex A7.02 irregular submission assurance report.
3	 Giving consumers a stronger voice	Chapter 10 – creating a stakeholder-led plan. Each of our stakeholder priority chapters includes section 3 – what have stakeholders told us?	Annex A10.01 independent stakeholder user group set-up report ( <b>2.6</b> ). Annex A10.02 gas RIIO-2 stakeholder engagement strategy ( <b>2.7, 2.8</b> ). Annex A10.03 stakeholder engagement report ( <b>2.6</b> ). There are also engagement logs per stakeholder priority chapter.
4	 Meet the needs of consumers and network users	Chapter 3 summarises our key commitments, the associated consumer benefits and our consumer value proposition. Each of our stakeholder chapters includes section 4 – our proposals for RIIO-2 and how they will benefit consumers.	Annexes A3.01–A3.03 to describe our output delivery incentives, price control deliverables and uncertainty mechanisms annexes ( <b>2.12</b> ). Annex 10.05 consumer value proposition.
		Chapter 12 – network capability.	Annex A12.02-A12.05 network capability reports.
		Chapter 20 – Our plan is efficient and affordable, providing value for money and chapter 21 – our plan is deliverable ( <b>2.13, 2.20, 2.21</b> ).	Annex A21.02 sustainable workforce strategy.
		Chapter 18 – I want all the information I need to run my business, and to understand what you do and why. Chapter 19 – I want to connect to the transmission system.	Annex A19.01 non-customer funded diversions.
5	 Maintain a safe and resilient network	Chapter 13 – I want the gas transmission system to be safe. Chapter 14 – I want to take gas on and off the transmission system where and when I want ( <b>2.18–2.19</b> ).	
		Chapter 15 – I want you to protect the transmission system from cyber and external threats ( <b>2.22–2.31</b> ).	Annex A15.02 business IT security plan. Annex A15.07 cyber resilience plan.
6	 Deliver an environmentally sustainable network	Chapter 16 – I want you to care about the environment and communities ( <b>2.32–2.35</b> ).	Annexes A16.01 Environmental action plan (EAP).
7	 Enabling whole system solutions	Chapter 17 – I want you to facilitate the whole system of the future – innovating to meet the challenges ahead ( <b>2.48–2.52</b> ).	
8	 Uncertainty	Chapter 20 – Our plan is efficient and affordable, providing value for money ( <b>2.63–2.64</b> ). Each of our stakeholder chapters includes section 6 – risks and uncertainty.	Annex A3.02 uncertainty mechanisms. Annex A22.02 RPEs and ongoing efficiency ( <b>2.61</b> ).

## Executive summary

No.	Ofgem business plan guidance reference	Business plan narrative	Annexes or additional information
9	 Innovation	Chapter 17 – I want you to facilitate the whole system of the future – innovating to meet the challenges ahead (2.68–2.71 and 2.74–2.75). Each of our stakeholder priority chapters includes innovation.	Annex 17.03 Innovation strategy.
10	 Competition	Chapter 20 – our plan is efficient and affordable, providing value for money (2.78–2.82, 2.84–2.86, 2.88–2.89).	A20.16 Native competition plan.
11	 A consistent view of the future	Chapter 11 – the changing energy landscape (3.1–3.5). This chapter also includes net zero (3.6–3.9).	
12	 Cost information	Chapter 20 – our plan is efficient and affordable, providing value for money and chapter 22 – we can finance our plan (3.10–3.16). Each of our stakeholder chapters includes section 7 – our proposed costs.	All annexes associated with chapters 20 and 22 and as per annex A8.01. Business plan data templates and investment decision pack, which includes our engineering justification papers and cost benefit analyses (3.21).
13	 Financial cost	Chapter 22 – we can finance our plan (3.23, 3.26–3.28).	Annexes A22.01 finance, A22.02 real price effects and ongoing efficiency.

## How our plan aligns with Citizens Advice five principles

Citizens Advice is the official representative for energy consumers in Great Britain and it has designed five principles that we must meet for

RIO-2 to really deliver for consumers. This chart summarises how our plan maps to the five principles.

No.	Citizens Advice principle	How our plan aligns with the principle
1	Profits are lower than the previous price control, to more accurately reflect the relative low risk for investors in this sector.	We are proposing a lower base return in the RIO-2 period, lowering profits from RIO-1. Our proposals reflect the risks associated with our business, whilst maintaining financeability.
2	The value of any unspent funding for infrastructure projects is returned to consumers promptly and in full.	We are proposing many measurable outputs (PCDs) in our business plan. If we don't deliver an output and there's no good reason, we will return the money to consumers.
3	Industry business plans and regulatory decisions are directly informed by consumer (including future consumer) feedback and research.	We have built our business plan around our stakeholders' eight priorities and our consumers' three priorities. We will involve our stakeholders, including consumer representatives, in annual updates so it continues to meet consumers' needs.
4	Companies are required to publish complete information on their performance, financial structures, gearing and ownership.	We report a lot of information on our performance to financial markets and our regulator. In future, we will clearly show the link between what we deliver for consumers and our financial rewards. The independent stakeholder user group will challenge us on the quality of our annual reports.
5	Innovation funding and incentives support consumers in the transition to a low-carbon future, particularly those consumers in vulnerable circumstances.	We will focus on innovation in a number of areas to reduce carbon emissions. We are also focusing our innovation on reducing costs for consumers in the medium term, such as applying new digital technologies to our network.