

## 27 - I want to connect to the transmission system

### What is this stakeholder priority about?

This priority is about what we do to connect, modify or disconnect new and existing sources of gas supply and demand as customers' requirements change. Our connections service is essential to the effective working of the competitive wholesale energy market. It is an enabler for decarbonisation of the gas and electricity systems and it

can support the connection of new biomethane sources.

### What have you told us?

You have told us you want it to be quicker and cheaper to connect and for us to be more transparent in our processes. You want our connections service to enable decarbonisation, decentralisation and future energy systems transition.

### During RIIO-2 we will:

- continue to support the liquidity of the energy market by providing an efficient process for connection and capacity applications
- make best use of the existing network and put a simpler process in place to substitute unused capacity
- deliver more capacity where necessary, informed by robust options analysis
- embed the improvements resulting from our Customer Low Cost Connections (CLoCC) project into business as usual, enabling standard connections for less than £1m in under 12 months
- support the UK Clean Growth strategy, decarbonising the energy systems, helping them to transition and exploring new ways to meet the requirements of a changing customer base.
- be more responsive to the needs of customers, improving our customer satisfaction scores

Our proposed spending in RIIO-2 is £12m of base revenue to run the connections and capacity processes, including customer service improvements, through enhanced digital tools. Figure 27.1 also shows our indicative capex forecast of █████ in the RIIO-2 period for south Wales network reinforcement triggered by a new customer requirement. This is not to be included in our base revenue. Our cost recovery would be subject to an uncertainty mechanism if the customer progresses with this scheme. The impact on customer charges would be determined by prevailing code and charging rules, not by the RIIO framework.

### 1. What is this stakeholder priority about?

Our network connects supplies from nine gas importation facilities to nearly 100 offtakes for distribution networks, power stations and interconnectors, as well as eight storage sites. Four of the importation terminals provided over 80% of total GB gas supply in 2017/18.

This stakeholder priority is about what we do to connect, modify or disconnect new and existing sources of gas supply and demand as customers' requirements change. As well as the physical connections, we manage the processes customers use to reserve capacity to flow gas onto or off the network. If there isn't enough existing network capability, load-related reinforcement of the network may be necessary to provide additional capacity.

Sometimes, we also divert parts of our network to make way for other national and local infrastructure developments – for example road, rail and housing developments. The costs are met by the relevant developers.

### 2. Our activities and current performance

Our connections performance is a current RIIO-1 output measure monitored by Ofgem. We publish quarterly reports about our connections performance on our website<sup>107</sup>.

#### Connections and capacity processes

Our connection obligations are set out in the uniform network code (UNC). It's the number and type of connection and capacity applications we receive that drives our volume of work, rather than the volume of connected supply or demand. The level of connection activity is inherently uncertain and dependent upon changing customer and energy market requirements.

The costs of our connections, diversions and capacity reservation work are paid by the relevant customers

on a cost pass through (no-profit) basis. If firm customer commitments trigger deeper network reinforcement, our costs for the work would be met by a separate revenue driver<sup>108</sup> mechanism agreed with Ofgem.

#### Facilitating energy markets and decarbonisation

Our connections service provides essential 'liquidity' for the competitive wholesale gas market to work effectively, allowing market participants to bring the cheapest sources of gas supply into the GB market through different entry points. Most of our exit direct connections to date have been for gas-fuelled power stations and these help the electricity market to operate competitively.

Our connections service is a key enabler for decarbonisation, decentralisation and future energy systems transition. For example, we have facilitated the almost complete switch from coal to gas as the fuel of choice for flexible electricity generation; the carbon intensity of electricity generated from gas is roughly half that of electricity from coal<sup>109</sup>. Looking ahead, we are ready to make new gas projects possible including biomethane and shale gas entry connections and compressed natural gas vehicle refuelling exit connections.

#### Innovation through project customer low cost connections (CLOCC)

You told us that our costs and timescales can be a blocker to connecting to our network, particularly for smaller, non-traditional gas producers and consumers. In response, we initiated CLOCC<sup>110</sup> a gas national innovation competition (NIC) project undertaken alongside three small and medium-sized enterprises (SMEs).

CLOCC fundamentally challenged every aspect of our connection process, aiming to provide new connection options suitable for the needs of our

<sup>107</sup>

<https://www.nationalgridgas.com/connections/applying-connection>

<sup>108</sup> Special Conditions 5F/5G of the gas transporter licence by which NGGT allowed revenue may be adjusted for provision of incremental entry/exit capacity.

<sup>109</sup>

[https://www.parliament.uk/documents/post/postpn\\_383-carbon-footprint-electricity-generation.pdf](https://www.parliament.uk/documents/post/postpn_383-carbon-footprint-electricity-generation.pdf)

<sup>110</sup> <http://projectclocc.com/>

changing customer base. The project concluded in 2018 having met its goals of enabling small and medium connections for less than £1m and in less than 12 months from initial enquiry to ‘gas on’.

We’ve made key improvements in the following three areas:

1. **A new online gas connection application portal.** It allows potential customers to identify candidate connection points through a map-based interface and to be provided with capacity availability and immediate cost estimates. There’s 24/7 access to check and track application progress.
2. New pre-approved and pre-appraised **standard design connections.** Suitability of above ground installation (AGI) sites for accommodating standardised connections has been pre-screened and implemented in the software platform.
3. **Improved commercial terms,** implemented through code modifications where necessary. Upfront application fees are reduced from £109k to £13k for simple connections and we’ve created a quicker route through capacity reservation for pre-screened, green light connection locations.

### Optimising use of the existing system

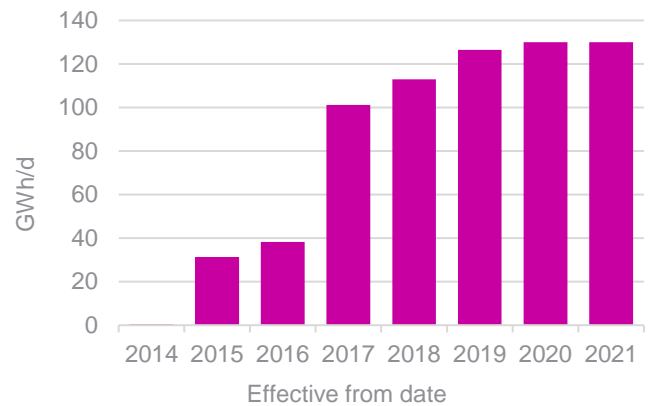
As we moved into the RIIO-1 period there was significant uncertainty regarding the supply and demand mix covering storage, liquefied natural gas (LNG) imports and potential new CCGT power stations. Given the uncertainty about load-related investment, the regulatory framework included uncertainty mechanisms to adjust our base revenue when circumstances change. Our RIIO-1 base revenue did include the Avonmouth pipeline output (designed to help manage the consequences of the Avonmouth LNG storage facility closure). Through working collaboratively with key stakeholders, we determined this was not required and we returned the relevant allowance of £215m (2017/18 prices) to consumers.

When we assess applications we decide on the most efficient way to meet customers’ needs. Where we can, we meet customer capacity requirements by substituting capacity from one point on the system to another, and this ensures we make best use of the existing system. It avoids the cost and time that could be involved in deeper system reinforcement to provide more capacity.

During the RIIO-1 period (up to 2018) we managed all changing customer requirements without needing investment in incremental capacity. We have

accommodated the equivalent of several large power stations through substitution.

**Figure 27.2 cumulative use of substitution to meet entry and exit requirements during RIIO-1**



### New incremental capacity

However, substitution will not always provide a solution to meeting customer capacity requirements – there are areas of the network where physical system reinforcement would be required. On 15 March 2019 we published notice, in accordance with the uniform network code, that a planning and advanced reservation of capacity agreement (PARCA) application in south Wales had progressed to Phase 2. Network entry capacity has been reserved for 163GWh/d of funded incremental obligated entry capacity at Milford Haven aggregated system entry point. The indicative registration date is 1 January 2026.

If this scheme proceeds, we expect physical reinforcement of the network in south Wales will be necessary and this gives rise to the spike in costs in figure 27.1. This might include upgrading existing pipelines or building new ones, installing new compressor units/sites, modifying Above Ground Installations or a combination of all these. The capital costs of the options we are exploring range from [redacted] straddling the RIIO-1, 2 and 3 periods. We are now undertaking detailed desktop studies and cost benefit assessments to narrow down the options and costs. By March 2020 we’ll produce a strategic options report as the basis for stakeholder consultation about any land use planning approval (Development Consent Order) that may be required.

### Diversions

We work with various third parties building projects like road, rail or housing developments that are close to our gas network infrastructure. Where necessary, we divert our pipelines so that their projects can go ahead without compromising the safety of the gas transmission system.

We co-ordinate our work with third party developers and other affected utilities to minimise the costs and operational impact of these diversions. So far in the RIIO-1 period we have diverted pipelines at a cost of £23m but this doesn't impose a net cost on transmission system customers because it is funded by the relevant third-party developer on a cost pass through basis.

### 3. What are our stakeholders telling us?

The primary stakeholders for this topic are our customers – people and entities who pay us for the products and services we provide. This includes gas distribution networks, shippers and directly-connected customers including gas storage sites and gas-fuelled power stations. We have established relationships with them through various forums spanning operational matters, code changes, connection applications and management of the various industry commercial agreements involved.

Through changes we have made during RIIO-1 to become more customer-focused we are listening more intently than ever before to our customers' needs (see customer journey and customer satisfaction sections below). Key initiatives like Project CLoCC have involved additional close engagement and collaboration, resulting in positive changes to our working practices.

In light of the business as usual engagement focus we determined that, for the preparation of our RIIO-2 business plan, it was not appropriate to instigate any special, new or different enhanced engagement. Our stakeholder user group supported this approach, noting that the ongoing costs of our connection service are only a small proportion of our overall operating expenditure, that no significant changes are being proposed, and bearing in mind the in-flight commitments we have made to be more responsive to our customers.

#### Customer journeys

We interact with customers through the complete lifecycle of their projects from initial enquiry, application, commissioning, operation and disconnection to decommissioning. Our customer journey work has been focused on transforming the experience customers have through their lifecycle with National Grid. Our ambition is to meet and exceed our customers' expectations so, to do this, we

have engaged with our customers to understand their pain points, thoughts and views on the service we provide.

Typical feedback we have received is that customers value that we are listening and would like us to keep making improvements:

*“You have taken steps to increase customer engagement, and have improved the connections process, but could do more in terms of explaining the connection and capacity process.”* [REDACTED]

*“Transparency should be the umbrella over this priority.”* [REDACTED]

Our focus on improving customer experience has delivered (amongst other things):

- a central set of customer experience principles and standards – generated through customer insight to drive consistent best practice performance – from capability to journey redesign
- a customer experience governance board and Net Promoter Score<sup>111</sup> programme to drive cultural changes at all levels of our organisation
- the development of a customer relationship management system that, moving forward, will enable a consistent experience, drive efficiency and support our goal of delivering a personalised customer experience.

#### Easier to connect

Customers told us connections take too long and progress is not always transparent. We also heard that our existing technical specifications and connection costs present barriers for new entrants – particularly those developing smaller-scale 'green gas' projects. Examples of stakeholder feedback included:

*“Workshops involving potential connectors should continue...Getting together with, and providing an open environment to, customers and experts to seek ideas to address certain barriers. Such as dealing with varying gas quality and thermal value as supply sources change.”* [REDACTED]

<sup>111</sup> NPS is an index ranging from -100 to +100 that measures the willingness of customers to recommend a company's products or services to others.

*“The end customer will want to connect even where there is not currently the means for them to do so. National Grid should make gas more accessible.”* [REDACTED]

In response, we are implementing a host of improvements spearheaded by Project CloCC. We are making it possible for standard design connections to be delivered at a cost of less than £1m in under 12 months. Initiatives like our new online connections portal will be accessible to all users of the network whether large or small and the portal will make it easy for customers to check the status of their applications 24/7.

In February 2019, we published a stakeholder playback consultation<sup>112</sup> explaining our business plan direction of travel and asking for further input. We know from the feedback we received that, despite the changes we’ve just described, some customers still feel the process for bespoke connections (i.e. those not able to use standard designs) is unacceptably long. We will continue to explore what improvements, new products or services we could offer as we move into RIIO-2.

### Energy system transition

Some stakeholders have said that, because of future uncertainties, we should be adaptable to change and keep options open around how the network is used by customers:

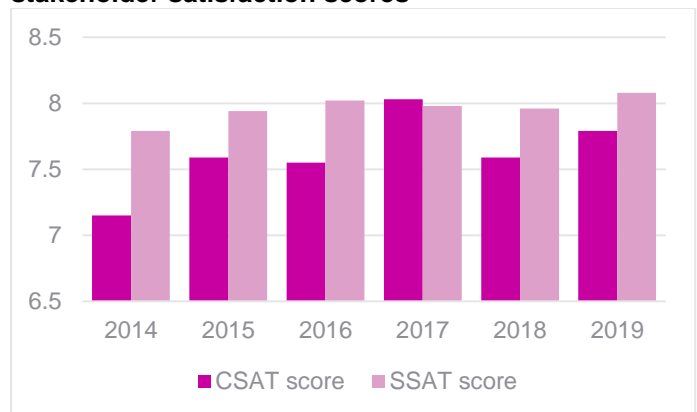
*“the RIIO-2 framework needs to allow for differing levels of work on the network to be both determined and undertaken during the RIIO-2 price control period”*  
[REDACTED]

We support this statement. The existing/ revised uncertainty mechanism proposed for incremental capacity and customer service improvements is a key tool that will allow us to be responsive to change.

### Customer satisfaction

We are incentivised by Ofgem to improve our customer and stakeholder satisfaction. Our customer satisfaction rating has increased from 7.1 at the start of RIIO-1 to 7.9 currently in 2018/19.

**Figure 27.3 Gas transmission customer and stakeholder satisfaction scores**



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

### Customer focus

We will improve our service for customers by being more responsive to their needs, aiming to raise our measured customer satisfaction scores. We will do this by listening to customer feedback and tackling pinch points in the customer journey, and we’ll start using a customer relationship management tool to enhance our ability to provide a joined-up service across our multi-disciplinary teams.

### Market facilitation

We will support the energy market’s liquidity by providing an efficient connection and capacity applications process in accordance with our code obligations. We will meet or beat the timescales set out in the Uniform Network Code for delivery of connection and capacity offers to customers.

### Optimising use of the existing system

We will make best use of existing assets by substituting capacity where possible rather than by building more transmission capacity, and we propose that the process for regulatory approval of capacity substitution should be made simpler. Where necessary we will deliver more capacity, providing transparency about our analysis of network capability and informed by clear, robust options analysis.

### Embedding innovation

We will support the UK Clean Growth Strategy, moving towards decarbonisation and the energy systems transition by continually looking for new ways to meet the requirements of a changing customer base. We will act upon learning from

<sup>112</sup><https://www.nationalgridgas.com/document/125911/download>

projects currently underway to consider the impact of higher hydrogen content gas on the network.

We will make our network more accessible to new entrants such as shale gas and biomethane entry customers and gas-powered vehicle refuelling station exit customers. We will embed the improvements of Project CLoCC into business as usual, making standard design connections possible for less than £1m in under 12 months. Key improvements include:

- a web portal to streamline the application to offer process for all connections
- application fees (for small and medium customers) reduced from £109k to £13k
- a quicker route through capacity reservation for pre-screened green light connection locations
- acceptance of higher oxygen content gas from biomethane producers
- standardised connection designs and immediate connection cost quotations.

**Outputs Connections**

Our connections priority maps to Ofgem’s output category ‘meet the needs of consumers and network

users’. Ofgem have decided to retain our existing RIIO-1 licence obligation relating to connections – specifically to comply with the connections process requirements of the Uniform Network Code. Our performance against this output is monitored through quarterly reporting published on our website.

**Customer satisfaction**

We will continue to be incentivised by Ofgem to improve our customer satisfaction scores. These output measures have driven improvements through RIIO-1 and we recognise there is further scope to raise our performance.

**Extra capacity**

If capacity reinforcement is triggered (such as the indicative reinforcement to increase entry capacity at Milford Haven in south Wales) our delivery of this work will become an important output. We’ll use notices to tell the industry how we’re handling the process, which alternative infrastructure options we’re considering and what our preferred solutions are. For example, we’ll consult openly with potentially affected communities about any proposed new cross-country pipelines in line with good practice for land use planning approval.

**How do our RIIO-2 proposals benefit consumers?**

Our connections proposals deliver 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 plan supports security of GB gas supply because: <ul style="list-style-type: none"> <li>- we make it easier for new sources of gas like shale and biomethane to connect to our system</li> <li>- diverse domestic and international sources of gas can access our network efficiently; we are part of a global gas market. The effectiveness of our processes has an impact upon the attractiveness of GB as a destination for the economic supply and consumption of gas</li> </ul>
“I want you to facilitate delivery of a sustainable energy system”	Our plan supports a sustainable lower carbon future because: <ul style="list-style-type: none"> <li>- we make it easier for lower carbon biogas to enter our system e.g. off-the-shelf standardised connection designs. This assists decarbonisation of the whole energy system with minimal disruption to consumers</li> <li>- we make it viable for gas-powered vehicle refuelling stations to connect to our network. These vehicles play an important role in decarbonising the heavy goods transport sector alongside electric vehicles for domestic use</li> <li>- lower connection costs open up new locations where offtake connections were not previously seen as economically viable</li> </ul>
“I want an affordable energy bill”	Our plan supports an affordable energy bill because: <ul style="list-style-type: none"> <li>- we provide a better service to new and existing customers, promoting a faster route to market e.g. web portal</li> <li>- where possible we provide capacity without building new assets. This keeps costs down and avoids uncertainty about the enduring value of new assets in decades to come</li> <li>- keeping costs down helps GB retain a buoyant energy-intensive industry sector in turn supporting employment</li> </ul>

## 5. How will we deliver?

As the energy market decentralises we have seen a surge in connection requests from smaller customers, many of whom are new to the sector with less knowledge of the gas system and the industry's ways of working. These new entrants expect easy to use digital tools to help them connect to the network and existing customers are also coming to expect easy and instant access to information that helps them run their businesses.

The changes we are implementing because of Project CLoCC are spearheading how we are being more responsive to all customer needs. We have started to deploy our new gas connection application portal and this will benefit all customers regardless of size and type. Throughout RIIO-2 we will continue to invest in the portal, related internal systems and other aspects of our website to improve our customer self-service capability and provide customers with unified, timely and continuous access to relevant information.

New functionality<sup>113</sup> introduced by these tools makes us more efficient, cutting down paperwork, reducing administration and saving time. For example:

- automatic generation of key files and standard contracts with customer data
- three types of customer journey; standard connection design, bespoke and PARCA
- email notification to customers and NGGT employees about changes in application status
- customers can self-serve downloading/uploading offers and acceptances
- ability to raise and track invoices.

Our second key enabler for improved delivery is the implementation of our Customer Relationship Management (CRM) system. This system will underpin how we manage our customer connection process across its entire lifecycle. CRM is the most efficient and effective way to manage customer data, our processes for interacting with customers and our identification of opportunities or issues. Following deployment in 2018 we've begun to digitise parts of that journey but, to ensure we can offer an end to end

simple, tailored and flexible service to customers, we will need to invest to bring more aspects of our customer interactions into the CRM system's remit.

## Customer choice - competition

Some customers have told us they would like the opportunity to deliver their own local connection works, rather than relying upon NGGT to connect them to our system. We are currently supporting 'self-connect' trial and this will provide valuable learning about the changes in process, roles, responsibilities and commercial arrangements that would be necessary to offer a self-connect option more widely.

## 6. Risk and uncertainty

Our future workload is uncertain because so much of our activity is driven by the number and complexity of the connection and capacity applications that we receive from customers. We assess workload by tracking the enquiries that we have received and monitoring market trends including outputs from the Future Energy Scenarios process.

Through Project CLoCC we already know there is increased interest from customers who want to connect. This confirms that the time and cost savings we've identified for the application process make connection to the network a viable option for new kinds of customer. By January 2019 we had received interest from 12 different customers enquiring about 25 potential connection sites. Four of these customers have confirmed that they will be applying for a standard design connection as the innovation project is implemented.

Considering the inherent uncertainty around future work requirements, we're proposing that only a small proportion of our costs are included in our base revenue. Expenditure for other activities will only be incurred if customer activity triggers a requirement for the work, and it will either be customer-funded on a case-by-case basis or handled by regulatory uncertainty mechanisms established by Ofgem. This is in consumers' interests because it means that, wherever possible, we will only incur costs based upon firm customer commitments. See summary Table 27.4.

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<sup>113</sup> For further information see [Project CLoCC Close Down Report](#)

**Table 27.4 proposed uncertainty mechanisms**

UM name	Type	Business plan proposal – what the UM addresses	Frequency
3. <b>Incremental capacity</b>	Reopener	Potential costs associated with release of incremental capacity are unknown. Revised incremental capacity reopener for RIIO-2.	Case-by-case basis
4. <b>Pipeline diversions</b>	Reopener	Allows recovery of pipeline diversion costs to the extent that they cannot be reasonably recovered from parties requesting the diversion.	Annual

## 7. Our proposed costs for RIIO-2

Our estimated costs for RIIO-2 reflect a balance between the increase in workload we are seeing, our increased spending on information systems like the connections portal and CRM tool to improve customer service, and the efficiency benefits we expect to achieve from working smarter – for example, using the customer portal. We have assumed that we can flex resources across internal teams to meet peaks and troughs in workload, with zero net cost for customer-funded work. Please refer to Chapter 31 for a full list of our planning assumptions.

Costs not accounted for through the uncertainty mechanisms set out in table 27.4 are shown below.

**Table 27.5 Areas of spend “I want to connect to the transmission system” with no related UM**

Activity	Base revenue requested?	Comment
<b>System operator activities</b>	Yes £1.2m p.a.	Operating costs for the customer account management, connections contract and network analysis teams who manage our portfolio of commercial agreements with customers. Also includes supply point administration (3% of Xoserve costs)
<b>Customer service (IT)</b>	Yes £1.2m p.a.	Investment for more responsive customer service including: website, connections portal and customer relationship management system
<b>Local connection works</b>	No	Zero net cost forecast for RIIO-2 because actual costs incurred are recharged to customers on a cost pass-through basis

Our proposed total expenditure related to the connections activities we’ve described in this priority is summarised in the following tables.

**Table 27.6. summary of connections costs**

Activity spend (£m in 18/19 prices)	2022	2023	2024	2025	2026	Total RIIO-2	Annualise d RIIO-2	Annualise d RIIO-1
<b>System operator activities</b>	1.2	1.2	1.2	1.2	1.2	5.9	1.2	1.2
<b>Customer service (IT)</b>	1.1	1.4	1.6	0.8	0.9	5.8	1.2	1.0
<b>Pipeline Diversions</b>								
<b>Local connection works</b>								
<b>Incremental capacity (UM)</b>								
<b>Total spend</b>								

Note to table 27.6: Diversions and local connection works have a zero net cost forecast for RIIO-2 because actual costs incurred are recharged to customers on a cost pass-through basis

The key changes we have made to the connections part of our business plan since our February 2019 stakeholder playback consultation<sup>114</sup> are:

<sup>114</sup> <https://www.nationalgridgas.com/document/125911/download>



- Inclusion of indicative new network reinforcement costs for incremental capacity load-related work (uncertainty mechanism costs triggered by a customer application reaching PARCA phase 2 in March 2019)
- Inclusion of supply point administration and customer service improvement IT costs (granularity of cost data which had not previously been separated and mapped to the connections area of our plan).

### Business plan data templates

Our business plan is accompanied by a set of spreadsheet BPDT in a format required by Ofgem. The following table provides a summary of how our base revenue and uncertainty mechanism proposed spend flows into our RIIO-2 BPDT.

Table 27.7 summary of connection costs – BPDT split

RRP category (£m in 18/19 prices)	2022	2023	2024	2025	2026	Total RIIO-2	Annualised RIIO-2	Annualised RIIO-1
Direct costs	1.2	1.2	1.2	1.2	1.2	5.9	1.2	1.1
Load-related (UM)	■	■	■	■	■	■	■	■
Non-load related	0	0	0	0	0	0	0	0
Non-operational capex	1.1	1.4	1.6	0.8	0.9	5.8	1.2	1.0
Grand total	■	■	■	■	■	■	■	■

Notes to table 27.7

- Direct cost includes the team and people to carry out activities
- Load-related includes the indicative cost of system reinforcement for new incremental capacity
- Non-load related includes Net Zero forecast for customer funded connections and diversions
- Non-operational capex includes customer service improvements (IT)

### 8. Next steps

We will work with Ofgem to implement the proposed RIIO-2 framework changes that are relevant to this topic including:

- simplification of the regulatory approval process for substituting capacity
- design of the incremental capacity uncertainty mechanism
- we will propose bespoke outputs for stakeholder engagement
- work with the independent stakeholder user group to determine which customers future satisfaction surveys should target and the design and content of future surveys.

We will clarify the situation for customers wishing to connect higher hydrogen content gas sources to the network. This will be informed by learning from several hydrogen projects currently underway with partners. For further information see chapter 25.