



# Chapter 10

## The whole energy system of the future

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

**Gas  
Transmission**

**nationalgrid**

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

## Summary

Many stakeholders tell us that they support the principle of a whole system approach. However, across the industry there are differing views on exactly what this means and what the approach should be.

We support an integrated approach. That means optimising the way that gas, electricity, transmission and distribution work together, along with links with other sectors such as heat and transport. The aim is to deliver outcomes that benefit current and future consumers without favouring one energy source over another.

We recognise that gas transmission has a role to play in enabling consumers to use the future energy system. During RIIO-2, the gas industry needs to develop ways of working to enable the industry to deliver benefits to consumers.

Our network and the market processes we facilitate will be important in the energy transition. We believe our focus needs to be on:

- Setting out the measures we will take to facilitate the energy transition in a transparent, flexible and agile way. This will require investment in information systems, such as balancing and capacity systems.
- Determining what successful consumer outcomes look like for the whole energy system of the future and the improvements we can make. These could include:
  - new/different services we could provide.
  - new ways of collaborating across sectors.
- Helping to inform choices and keep options open for policy makers. For example, this could be in relation to decarbonisation of heat and green gas.
- Developing innovation projects to support the energy transition. For example, hydrogen innovation projects.

We won't have all the answers before RIIO-2 starts. There will need to be more collaboration and communication across industry. We do need to act now to set the right trajectory for RIIO-2 and beyond. This will ensure we have the right frameworks in place to benefit consumers.

## What our stakeholders tell us

Stakeholders tell us that they want National Grid to facilitate the whole energy system of the future. They recognise that gas transmission must play an important role in doing this. There needs to be a more integrated, collaborative approach across sectors. Stakeholders also expect us to look for innovative ways to meet the challenges ahead, especially in decarbonising heat. We are seen to be well placed to have a say and influence policy. Some of the points raised include:

*“National Grid should be incentivised to continue to facilitate the effective energy system of the future.”*

*“National Grid needs to be future fit, flexible and innovative.”*

*“Use existing infrastructure to supply hydrogen, no premature decommissioning that would compromise this opportunity.”*

Our stakeholders also say: “National Grid could be more seamless between gas and electricity.” However, there are currently barriers to making this joined-up approach a reality. For example, there are restrictions on information that can be shared across gas and electricity networks under the Utility Act. During RIIO-2, we will be working with industry and the regulator to see how these barriers could be overcome.

Throughout 2019, we will continue to work with stakeholders to understand how we can meet the challenges ahead.

### Our activities and current performance

- To facilitate the gas market, we make sure that we have the right information systems (IS), people and processes in place. This allows customers to use the market and have a role in the energy system. During RIIO-2, we will continue with this role so that new entrants can access the market as well as supporting existing customers. For example, we will do this by facilitating modifications to the Unified Network Code (UNC).
- During RIIO-1 we published stakeholder insights in The Future of Gas: How gas can support a low carbon future. We committed to work with industry and Ofgem to develop a long-term Gas Markets Plan (GMAP) to ensure that we develop the markets appropriately. We will be working with stakeholders to develop this plan in early 2019.
- The Network Innovation Allowance and Network Innovation Competition have enabled us to undertake many innovation projects that are producing benefits. We talk about some of this work elsewhere in the document. We have also played a key role in the ENA Gas Innovation Governance group, including taking the chair role in 2017. This has enabled us to undertake more collaborative projects.

As part of our collaboration with the Gas Distribution Network, we are involved in several innovation projects looking at the transportation of hydrogen as a means to 'greener gas' – a cleaner fuel that can help to decarbonise heat. An example is a feasibility study into 2% hydrogen blending at St Fergus and H2 pipeline and hub at Aberdeen.

### Hydrogen and gas networks

Government recognises that heat is one of the main challenges for decarbonisation. Important future policy decisions can be expected in the mid-2020s. We recognise we have a role to play in informing this policy.

One of the options the industry is looking at is the use of hydrogen as an alternative fuel. At its point of use hydrogen is a clean fuel leaving only water as the by-product of combustion.

There are several different ways in which the GT Network in conjunction with hydrogen can support decarbonisation:

- (i) Supplying natural gas as a fuel source to produce hydrogen (e.g. through a process known as Steam Methane Reforming) with Carbon Capture & Storage technology.
- (ii) Incorporating a hydrogen-rich (greener) blend of gas into the existing transmission system.
- (iii) Repurposing parts of the existing GT Network for 100% hydrogen transportation.

We have recently launched a project to look at the feasibility of the GT Network being used for hydrogen. This project will look to build on some of the projects undertaken by the gas distribution networks to ensure a joined-up approach.

- However, there are barriers to taking a joined-up approach. Steps are needed to improve cross sector collaboration. For example, there were initially significant barriers to joint gas and electricity Network Innovation Competition projects. These were improved on in the 2017 innovation consultation.
  - We have used round-table events to engage industry and promote how we can work together to enable whole energy system outcomes for consumers. Senior representatives from Ofgem, BEIS, networks, innovators, and other energy industry experts took part in these events.
  - We recognise that one of the key areas we can support is the decarbonisation of heat. We are looking at the direction of travel for the future of heat. This includes studying the key inputs required to influence policy decisions in support of a whole energy system approach.
- We will help to inform choices and keep options open for policy makers. For example, this could involve areas such as decarbonisation of heat, and green gas, including hydrogen.
  - We will identify where we can improve consumer outcomes. This could be through new and different services we could provide or ways to collaborate across sectors. We will work with industry and the regulators to understand how to share information more effectively. We will work with the regulator to ensure that RIIO-2 has the right frameworks to support an integrated approach.
- Have the right IS systems to be able to support the continued use of the energy system now and in the future. A significant amount of our work in RIIO-2 will be to ensure we have a balancing and capacity system that is fit for future changes, investing in systems such as Gemini.

### Our direction of travel

During 2019, we will continue our stakeholder and industry engagement. This will help to develop our business plan and propositions. Our propositions are split into three main areas:

- Have the right framework, resource and processes in place to be able to meet and facilitate the changes ahead for the future energy system.
  - We will use our knowledge and central role in the industry to coordinate and deliver actions now and during RIIO-2 where there is clear value to consumers.
  - We will seek to engage more with stakeholders and consumers. We need to be able to explain clearly what successful consumer outcomes for the whole energy system look like. For example, clearly understanding the trade-off between the consumer priorities around no disruption, low cost and high reliability.
  - We will identify new ways of working. These include changes to the gas and electricity frameworks to remove sector barriers and enable a more integrated approach.

#### Gemini:

We provide essential balancing and capacity processes and services. They make sure that the competitive wholesale gas market runs effectively.

This is currently facilitated through a platform called Gemini. During RIIO-2, this IT system will require a new platform as the existing system reaches the end of its life. We aim to develop a replacement solution that will adapt to future needs.

- Enable innovation to identify solutions that support the energy transition.
  - We will continue to build on and expand our portfolio of innovation projects. We will work collaboratively with other networks and the industry to investigate the best solutions to support the energy transition.
  - We will look to build on the successes of our existing innovation projects undertaken through the various innovation allowances.

### What it could cost

Costs are split into two main categories. The first is the cost to implement and maintain the systems and services we provide to industry, plus the cost of our teams to do the work we outline in this chapter.

Approximately two-thirds of our spend is on investing in IT systems. We envisage investing a significant amount on a new platform for Gemini. This will enable us to continue our role supporting a competitive wholesale gas market.

The remaining part of our spend is focused on ensuring we have the right resource in place to deliver our outputs. Some of these costs allow us to continue our role in market facilitation and identifying new services and ways of collaborating across the industry.

We also have an allocation of costs for the dual fuel teams that develop our Future Energy Scenarios. More detail can be found on the [FES](#) website.

We will ensure we have the right resources in place to progress innovation projects. These projects will enable the energy transition and make our business more efficient. The historical and future costs for the NIA/NIC costs are not included here because they are funded outside our controllable costs. Ofgem is currently considering the future regulatory treatment for this.

### Initial planning assumptions

Our initial planning assumptions are:

- Whole system coordination: We assume we will need to participate in greater coordination across the gas industry and sectors including electricity, heat and transport. We are working with industry and stakeholders to define what will be needed in RIIO-2.
- Innovation: Innovation will play a key role in producing solutions across all sectors to achieve whole energy system outcomes that benefit stakeholders and consumers.



### What it could cost

**T1  
annual spend  
£21m**

**Low  
£20m**

**T2 annual  
spend range**

**High  
£30m**

Key drivers for the changing trend and range:

- Projects such as Gemini replacement to develop our systems and services.
- The scope and our role in facilitating markets and associated changes.
- The need for more integrated whole energy system coordination.



### We welcome your views:

#### Chapter:

The whole energy system of the future

#### Question:

14. Where can National Grid Gas Transmission add most value through the RIIO-2 period to facilitate integrated energy systems of the future?

**Submit your feedback online [here](#):**

# How to use this document

## We want your feedback

### Who is this consultation aimed at?

We are interested in the views of all stakeholders who are impacted by what we do and shaping the future of gas transmission. This includes the views of gas consumers, government and regulatory bodies, energy industry professionals and members of the public.

### Tell us what you think

This consultation is open until 31 March 2019. You may give us feedback in the ways outlined below. We particularly seek your views in response to the specific questions we have posed. These are summarised on page 12. You may respond to all questions or just those relevant to your specific views.

## Ways to feed back:

### Make notes

Throughout the document, we have provided space for you to read and make notes at the start of each chapter (opposite). You can then type up your notes and send them in an email or submit them online.



### Interactive pdf notes

Alternatively, we will be sending out editable pdf versions of this document with note fields for you to type directly into.

### Email

We have a dedicated email address specifically for your feedback to this document. We welcome your thoughts at:

**[jennifer.pemberton@nationalgrid.com](mailto:jennifer.pemberton@nationalgrid.com)**



Alternatively, you can put your thoughts in writing and send to: Jennifer Pemberton, National Grid House, Warwick Technology Park, Gallows Hill, Warwick. CV34 6DA.

### Online

You can go directly to the website and submit your comments [here](#).



**Please share  
your thoughts:**