Appendix 13A: Our strategic approach to the future of energy challenge

WALES&WEST UTILITIES

1 Introduction

This appendix is one of a number of appendices that provide more detailed information in support of Chapter 13 of our business plan, which covers our net zero ready vision for 2035. Although the appendices are presented as a series of short papers, each area has informed the development of our vision.

2 Our strategic approach

We first recognised the need for a national conversation on the future of energy in the run up to GD1. At that stage we initiated what has become a planned programme of activity, much of it of a collaborative nature. The overarching objective of this work has been to develop a decarbonisation vision for a gas network operated as part of a sustainable energy solution. Our priority has been to help decision makers, both local and national, to identify solutions that are affordable, sustainable and reliable for customers today and in the future. Our key concern is to ensure that the general public has the information it needs to make informed decisions.

A significant amount of the decarbonisation debate and focus up to around 2015 has been on renewable electricity, with little discussion on the 'whole energy system'. Note that electricity accounts for around one-third of energy emissions, with heat and transport making up the other two-thirds.

Our approach has been one of collaboration and we have focused on projects that produce evidence to help us understand the most likely pathways for decarbonisation. Most of the projects that we have led have been funded through the Network Innovation Allowance (NIA) although we have also supported projects led by others with different funding mechanisms and in some cases projects that were non-funded and led by community groups. Further information about our future of energy research is set out in Appendix 13D.

Our programme of work has taken place within the context of the wider energy debate which has evolved significantly during this period. The introduction of a legally binding obligation to eradicate the UK's net contribution to climate change by 2050 has provided a clear impetus and timeline. We are in a strong position having been looking at this for the past few years. We also have an evidence base that comes not only from research but also from our engagement and the efforts we have been putting in to understanding what is happening on our network and what our customers are looking for.

Our strategic approach to the future of energy challenge

Our activities have taken the following forms:

- Research

Work with others, and lead our own innovative research, to better understand the opportunities and challenges associated with decarbonisation of the UK.

- Stakeholder engagement

Undertake significant stakeholder engagement to understand the range of opinions and views from those involved with energy planning at a local level (such as local authorities) and at national level (such as with the Welsh Government and BEIS).

Increase engagement via customer groups, our Critical Friends Panel, workshops and focus groups to understand their concerns and priorities.

Collaborate with DNOs and wider stakeholders to improve our understanding of whole systems and to deliver innovation projects that are of mutual benefit.

- Analysis

Work closely with customers and developers to understand the scale and impact of current trends in user behaviours and new connections.

Undertake analysis using a range of connections data including from within our business, and also where available externally (such as, for example, the Capacity Market Register for flexible generation).

Develop analysis and assessment methods and processes to enable us to evaluate and compare decarbonisation scenarios at a whole system level for resilience, cost and carbon reduction in a way that is robust and consistent.

- Network performance

Undertake trials, network analysis and research to understand how our networks can be optimised to most effectively support future needs using a range of commercial and technical solutions.

3 Structure of the future of energy appendices

The appendices that support Chapter 13 of our business plan are presented in the following way:

Appendix	Summary	How the appendix has informed our business plan
13B: The wider decarbonisation debate	Provides a high-level summary of the debate that has been taking place since 2008, along with key policy developments.	We have engaged with the wider debate as a means not only of understanding the views of others but also as a source of evidence, data and expertise. We have been able to use all of these insights to compare the cost and value of different approaches and ultimately to develop our own net zero ready vision.
13C: Net zero consumer value proposition: (CVP)	Provides a high-level summary of the customer benefit related to investment in our network.	This information helps informs our understanding of the relative efficiencies of different decarbonisation approaches which informs our whole system thinking and vision design
13D: Our future of energy research	Provides an overview of the research we have undertaken to help us understand more about how our customers will want to use our network in future.	The findings of this research, which has ranged from desktop research to live trials, have provided the evidence base on which we have developed our forecasts and investment proposals.
13E: Local Area Energy Plans	Sets out our journey to date and future proposals in the development of Local Area Energy Plans (LAEPs), which started in 2014. We have been proactive supporters of local initiatives to develop these plans, which will ultimately help stakeholders to provide consumers with the lowest cost, least disruptive pathways to decarbonising heat, power and transport.	Through our work in this area we have developed a good understanding of how others approach the issue of decarbonisation and how we can best support them. This work influenced the way in which our innovative whole systems model Pathfinder was developed, including the way inputs and outputs are displayed. Looking ahead to GD2, we are keen to develop guidance in the form of documentation for those working to develop LAEPs and will continue to provide support through provision of data and modelling, with an increased team of experts.
13F: Whole system work	Explains the way in which we have worked with others to understand whole system operation, and outlines how we will continue to lead work in this area. Provides detail of our future charter.	This work has influenced the way in which we have developed our approach to decarbonisation and is one of the reasons we developed our Pathfinder whole systems model. We understand the significant interactions between vectors and how these need to be factored into our plans. A key example in our plan is the recognition of the impact of increased numbers of electric vehicles (EVs) on flexible gas generation requirements.
13G: Smart hybrid heating systems	Explains the potential role that smart hybrid systems could play in decarbonising heat.	The learning from Project Freedom had a significant impact on the way in which our net zero vision was developed. It demonstrated how hybrid systems can provide low-cost flexibility to make best use of renewable generation, green gas and existing network capacity and how these systems can therefore be a key solution to decarbonisation in our region.
13H: A consistent view of the future	Outlines the single scenario work that was carried out in 2018.	This work demonstrated the range of opinions and uncertainty around the use of different technologies in decarbonisation pathways. It highlighted the need for whole system modelling and engagement and led us to propose a net zero uncertainty mechanism in relation to investment to support decarbonisation.
13I: Enabling renewable generation	Demonstrates the future impact on our network of the recent growth of renewable generation.	The level of current activities in this area prompted us to undertake robust analysis to assess the potential impacts of continued growth on workload and investment need so this could be identified in our business plan.
13J: Biogases	Explains the current position – and future potential – of biogases, and the impacts we are already experiencing on our network.	Injection of green gas into our network has a major impact on the way our networks are managed and is probably the most disruptive of all of the changes we are facing. However, it is the least disruptive solution for customers and has the highest cost leverage (as calculated in our CVP). Our business plan recognises this value and it is a key component of our net zero vision.

13K: Transport	Outlines the impact of transport on our network to date and the potential impact of a rapid increase in EV adoption.	Our work in this area – and a comparison of results in the National Grid FES compared with our Regional FES – show a significant range of projections. We have undertaken analysis to ensure that we are able to support the higher end of the ranges but have protected consumers by proposing that funding is via an uncertainty mechanism.
13L: Heat networks and CHP	Explains the role that Combined Heat and Power (CHP) will play as a key energy source for individual non-domestic buildings and the residential sector.	The impact of CHP on our business plan is minimal because we do not anticipate significant changes in demand as a result. However, this will be monitored via our connections processes.
13M: Hydrogen	Outlines the important role that hydrogen will play in the industrial and dense urban areas of our region.	Completion of the Pathways project and engagement through our Regional FES project has had a significant impact on our net zero vision, with hydrogen now being anticipated as part of a hydrogen cluster in Wales South and in cities along the M4.
13N: System operability	Explains the improvements and innovations we will need to make to our resources, systems and processes to respond to the changes taking place in the energy system and its operation	Given the dramatic changes anticipated in the way our network is used – with increased variability in flows between peak and off-peak and increased injection of gas at lower pressure tiers – there will be an increase in the need for systems and people. This will be necessary in order to ensure that we can continue to operate our system in the most reliable and efficient ways.
13O: Decarbonising industry	Explains how we will engage with industry and manage the gas network to meets the needs of this critical sector.	There is a demand from business to understand how industry can be decarbonised without simply off-shoring the emissions by losing our manufacturing sector to overseas markets. We have committed to support this in GD2 both with much closer contact with business and by supporting groups dedicated to industrial and commercial decarbonisation.

4 Summary of where we have got to now

This section provides a summary of how the work detailed in the table above has informed our net zero vision:

Research has told us that:

- There are a number of solutions that will play a part in decarbonisation.
- The interactions between gas and electricity will increase and we need to plan on a whole-system basis; to understand both reliability and cost.
- Increased use of green gas and hydrogen will be a key solution to decarbonise heat and transport.

Engagement has told us that:

- Decarbonisation is a priority for most stakeholders but impacts on bills must be kept to a minimum.
- There is a significant need for resources to support groups that are developing decarbonisation pathways. This will include data, guidance and modelling capability.
- Regional approaches mean that different solutions are likely to be implemented in different areas.

Analysis has told us that:

- Peak demand in the short/medium term on our network is still increasing. It is also forecast to continue to do so because of increased use of flexible gas generation to support intermittent renewable generation and the increase in electricity demand from EVs, prior to a reduction in heat demand due to energy efficiency.
- Annual demand will decrease in the longer term as more loads adopt hybrid technologies and move to alternative forms of heating (for example electric) away from peak. A multi-vector

approach will minimise cost and disruption to customers while supporting resilient and decarbonised energy supplies.

Network performance has told us that:

- Our customers are going to want to use our networks in different ways, using a range of new technologies including gas vehicles and hybrid heating systems.
- New processes and systems will be needed to make sure that our networks are planned and operated in a way that maximises the use of existing capacity and avoids the need for high-cost investment.
- The most disruptive change will be significant injection of green gas and hydrogen within our network. However, these will be the most valuable enablers for decarbonisation.

5 Next steps

We will continue our work in this area as we progress towards GD2. We anticipate that there will be a requirement for innovation projects to support this area of work during GD2 because of the significant change required. Projects are likely to be required to:

- Deliver low-cost modern energy scenarios to allow customers to use energy in the way they want to use it.
- Maximise the adoption of technology that can demonstrate flexible, cross-vector or low carbon technologies.
- Deliver whole system solutions that enable no build options both within and outside of our geographical region.
- Implement the technology, methods and policies to deliver a net zero ready network by 2035.

Chapter 13 of our business plan includes details of the investment that we may need to undertake to support decarbonisation in our region. In all but one area of investment we propose that funding is subject to our net zero uncertainty mechanism, which is described in Chapter 12. This is appropriate because:

- This is customer driven work
- It is uncertain because
    - The UK may not decarbonise at a pace that meets 2050
    - Supporting policies need to follow manifesto pledges
    - Industry regulation, such as charging rules, needs to change to enable the most efficient pathway to decarbonisation
- Alternative options have been explored prior to proposing investment. These have included:
    - ‘Do nothing’
    - Buy flex from NG
    - Use a market based solution, such as flexibility
- Cost benefit analysis (CBA) has been used to evaluate alternative whole system solutions where they exist (for example, battery storage)
- The CBA undertaken evaluates the investment against the benefits, which are a combination of the financial and social impacts, and was conducted in line with the Treasury Green Book.
- The CBA has been illustrated in the form of the CVP. The CVP provides the net present value, positive being beneficial to the consumer, saving more than invested.
- Cost savings have been identified against the identified counterfactual, such as an electrified solution.
- Social impacts, notably carbon savings, have been valued in line with BEIS/Ofgem guidance.

6 Our future priorities

We have identified that the key next steps will be to increase our engagement with Ofgem, BEIS, the Welsh Government, local authorities and other energy networks (transmission and distribution).

Ofgem will have a broader role in supporting BEIS and the UK Government on net zero. We want to provide the required support to Ofgem to allow it to support the necessary investments for all energy networks in a joined-up way.

As LAEPs increase in prominence, there is a specific desire to work more collaboratively with the energy networks (transmission and distribution) who have coincident geographical regions and stakeholders as ourselves – SPEN, WPD and National Grid – to develop agreed pathways for decarbonisation. Our Regional FES outputs will form the basis of this work.