nationalgrid

NGET and NGGT Digitalisation Strategy

December 2020

This is an exciting time for the energy sector as we decarbonise and decentralise our energy system. Data and digitalisation are key enablers for unlocking the benefits of the energy transition and National Grid is committed to playing a leading role.

The UK's commitment to Net Zero greenhouse gas emissions by 2050 has focused minds on the task in hand and at National Grid we see Net Zero as both a huge challenge and opportunity. We believe in a UK future that is clean, green and thriving, where nobody gets left behind.

Decarbonisation is fundamentally changing the generation mix. Green technologies and cleaner, renewable electricity generation continue to reduce our reliance on traditional energy sources. With technology advances and falling costs, more distributed and embedded generation has emerged, and we are seeing rising levels of decentralisation. Digitalisation facilitates the advancement of green technologies through increasing the volume and quality of data sharing via virtual networks, improved analytics, and the development of digital capabilities across the sector. This will become even more important as the energy sector converges with transport, telecoms and other industries, in the drive to full whole system decarbonisation.

In addition to the key role digitalisation will play in the pathway to Net Zero, it also provides an opportunity for the energy sector to bring about cost savings for consumers, improve customer experience, enable greater whole system coordination and transparency, and accelerate the development and deployment of innovative technologies.

We are proud of the role we are playing in the decarbonisation of society and will continue to deliver the underpinning data and digital transformation as outlined in this strategy.

Andi Karaboutis
Group Chief Information
and Digital Officer

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1 Where we are now

Over the course of the last few years, digitalisation of the energy system has become a growing priority for our stakeholders. There has been increased focus on the value of energy data and digitalisation for society as a whole, with organisations such as the National Infrastructure Commission, the Centre for Digital Built Britain, and the Energy Data Task Force from the Department for Business, Energy and Industrial Strategy (BEIS), Ofgem, and the Energy Systems Catapult - all emphasising the opportunity and outlining principles and steps to deliver that benefit for society.

We have recognised the importance of data and digitalisation, and over the RIIO-1 period have invested significantly in meeting the highest priority needs of our stakeholders and laying strong foundations for future work:

- we have digitalised our National Grid Electricity Transmission (NGET) Customer Journey with ConnectNow, simplifying the connections process and providing customers with easy access to the information they need

- we've rebuilt our core National Grid Gas Transmission (NGGT) data platform (MIPI) and its front end to provide clearer visuals and easier to use API feeds for direct access to data, resulting in 66m hits each month as people use our data to achieve their goals

- we've begun our Agile Transformation, establishing a core Agile capability and delivering products such as ConnectNow iteratively, using multidisciplinary Agile teams

- we've laid solid Data Management foundations: adopting best practices, training data practitioners, and creating data catalogues

- we've invested in data platforms, such as our data lake, that enable us to gather, manage and share our data more effectively.

There is plenty more to be done in the coming years, and this document sets out how we will approach using data and digitalisation to deliver benefit for our stakeholders and society.

2 Our Strategy

"We intend to be leading the pack of energy networks in delivering benefits to society through data and digitalisation."

Our UK Board recognise the importance of digitalisation of the energy system to society as a whole, particularly in the context of achieving Net Zero by 2050. They have set out a combined data and digitalisation strategy for NGET and NGGT that emphasises understanding the key role we play in the wider system and maximising the value of our data for all stakeholders.

We will therefore continue to actively lead on coordinating approaches to data and digitalisation across the industry. Where specific opportunities to deliver value for stakeholders arise that are best achieved by deviating from those common approaches, we will be clear about our rationale for this.

Ultimately, the needs of our customers and stakeholders are at the heart of our data and digitalisation strategy. We are only part of a rapidly changing energy data ecosystem and enabling the whole system to adapt effectively is critical to achieving our vision of a clean, fair and affordable energy future.

Listening to our stakeholders is therefore key. We have engaged with a wide range of stakeholders as part of both developing our business plans and this digitalisation strategy, and their ask of us is clear: facilitate the whole energy system transition by embracing innovation and transparency, whilst continuing to keep the system safe, reliable and affordable.

In addition, our customers have said they want us to digitalise the process of connecting to and using the transmission systems to make that really easy for them. Our stakeholders have also made it clear that they consider transparency and common standards across the industry to be essential.

Our strategy and focus for investment have been determined by these stakeholder priorities. We have identified **four areas** to focus on over the next five years:

1 Digital Culture
The adoption of digital and data-focused ways of thinking and working, in order to be more responsive to stakeholder needs, more innovative and more cost effective

2 Data and Data Platforms
The collection, management and publishing of data that will benefit stakeholders (and underpin delivery of other focus areas) as well as investment in appropriate platforms to enable this

3 Customer Journey
The digital optimisation and automation of the end-to-end customer journey to increase responsiveness and deliver on our customers' evolving needs

4 Grid Management
The management of network monitoring, modelling, forecasting and scheduling using data and AI to deliver network reliability cost effectively as we transition to Net Zero.

We have engaged with our stakeholders	Who have told us they want us to...	Which we will deliver by focusing investment on...
Energy Insiders	Facilitate the whole energy system of the future	Digital Culture
	Innovate to meet the challenges ahead	
Enquiring Minds	Be transparent and give me all the information I need	Data and Data Platforms
	Make it easy to connect to and use the transmission system	
Network and Asset Decision Makers	Provide a safe and reliable network	Customer Journey
	Provide value for money	
Policy Influencers	Care for the environment and communities	Grid Management
	Protect the system from cyber and external threats	

The stakeholder groups and priorities each element of our strategy addresses can be identified using this key at the beginning of each section.

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

Just as important as what we propose to deliver under our strategy is what principles we will employ when delivering it. The following principles (which align with the Energy Data Taskforce recommendations) have been adopted by our UK Board members and senior leaders to guide the implementation of our digitalisation strategy:

- we will have high quality, secure data, centrally mastered and catalogued with good governance processes

- we will use our data to support transparency and wider industry innovation as we make it available using cross-industry standards in a way that unlocks benefit for stakeholders and society

- we will empower our customers, providing them with the detailed information they need to interact with us, including information on connection to and operation of the network

- we will use enriched data on our assets to guide our asset management strategy, providing intelligence to all those who need it and enabling transparency on our investments and decisions

- we will utilise AI technologies like machine learning and advanced algorithms to drive efficiency and optimisation in the monitoring of assets, delivery of our work and running of our networks

- we will enable our people by providing them with access to tools and data, empowering them to make the right decisions and understand the impact of their options.

3 Stakeholder Engagement and Personas

"We have identified a broad range of stakeholder needs and have embedded these into our thinking using personas."

3.1 Broad Engagement

Our strategy revolves around delivering value for our stakeholders and therefore is built on a solid understanding of our stakeholders' needs. When developing our RIIO-2 Business Plan we undertook an extensive stakeholder engagement exercise over the course of two years to ensure we truly understood the full range of stakeholders' needs. We heard from over 1,000 individuals representing all our main stakeholder segments. We incorporated the views of over 11,000 household consumers and over 750 business consumers from a combination of face-to-face meetings, focus groups, online consultations and bespoke research studies. We also included feedback from over 300 stakeholders from our satisfaction surveys and complaints process, and we have used consumer trend data and other third-party publications as additional sources of insight.

As a result, we have a clear understanding of our stakeholders' current priorities. They want us to:

Facilitate the whole energy system of the future
Innovate to meet the challenges ahead
Be transparent and give me all the information I need
Make it easy to connect to and use the transmission system
Provide a safe and reliable network
Provide value for money
Care for the environment and communities
Protect the system from cyber and external threats

Our stakeholder engagement specific to our digitalisation strategy revealed very similar priorities so we have retained those used in our business plan. One area that came out very strongly during our digitalisation-specific engagement was the desire for us to coordinate activities across the industry and adopt common approaches. We recognise the value of this and the way it shapes how we achieve all the other priorities, so have actively considered that throughout the development of our strategy.

We provide more details on our RIIO-2 stakeholder engagement activity in our NGET business plan 2021–26 and NGGT business plan 2021-26.

NGET

https://www.nationalgrid.com/uk/electricity-transmission/planning-together-riio/our-riio2-business-plan-2021-2026

NGGT

https://www.nationalgrid.com/uk/gas-transmission/about-us/business-planning-riio/our-riio-2-business-plan-2021-2026

3.2   Personas

In order to ensure we more fully consider the needs of the subset of our stakeholders that are active users of our data we have developed a number of data user personas. Personas help us to categorise and evaluate the needs of different user groups, ensuring we embed them in our thinking when developing and implementing our strategy.

They also help us to evaluate the relative benefits and costs of meeting different users' needs, ensuring we can balance transparency and the benefits of data availability against the cost to consumers to meet these needs.

We have identified **four** key persona groups:

Energy Insiders

Who are they?
Energy Insiders are groups that work in the energy industry. This group will include other network companies and immediate users of our assets and systems. They will be technically savvy about energy data and utilise it in their own activities.

What motivates them?
This group want to use data to inform their day-to-day operations as well as their long-term investments and decision making about their activities. Newer entrants want to be able to compete in the market and use our data to help them.

What data do they want?
Energy Insiders want detail about their connections to our networks. They want to understand where our assets are and what that means for them. They need operational data on how our networks are running.

Behaviour and preferences
Because of their familiarity with the industry, many Energy Insiders will have quite technical needs. They can handle complex datasets and may require Application Programming Interfaces (API) in order to retrieve data directly. However, smaller/newer entrants to the market must be accounted for too. Some of this group will know how to request new datasets, but others may need signposting. They will often need named contacts in the company so they can talk to us directly.

Enquiring Minds

Who are they?

Enquiring Minds are interested in our assets and networks but may have unique needs for accessing our data. This could include members of the public, academia and wider energy innovators.

What motivates them?

This group want to use our data (often combined with other data sources) to answer wider questions they are interested in.

What data do they want?

Enquiring Minds want detail about our assets and the operations of our networks. They may be particularly interested in where our assets are. They want our data to be easy to combine with other data sources. Innovators and academia may want to gather large historical datasets and have access to APIs. They may want access to novel datasets that are not currently published.

Behaviour and preferences

This group may not know where to start, with more guidance and sign-posting required to available datasets. Non-technical language will be required to explain what datasets are, where they come from and any potential limitations. They may not be familiar with how to talk to us or be sure how to request new data. Enquiring Minds might find our datasets through search engines instead of coming to us directly.
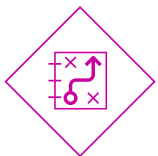
Network and Asset Decision Makers

Who are they?

Network and Asset Decision Makers are often part of NGET/NGGT or companies that work closely with us (e.g. distribution companies, system operators and our contractors). They are responsible for making decisions about assets, work on those assets and the operation of the network.

What motivates them?

This group want to be able to trust they are using the right data and that it is accurate and consistent. They need to access data at the best place to support their ways of working and don't want to have to hunt for it.

What data do they want?

Network and Asset Decision Makers will require access to a large number of different datasets to support their activities. This will include details on assets and their condition, investment records, operational data, and performance and risk data about our business.

Behaviour and preferences

This group will usually know want they want and do not want to go searching for it. Data should appear in their day-to-day processes and provide them certainty about what is happening. They want to be able to correct errors in data easily and have assurance they can trust what the data tells them.

Policy Influencers

Who are they?

Policy Influencers will tend to work in organisations such as regulators and other government departments interested in energy. They may also include other influential organisations such as consumer groups and the Electricity System Operator.

What motivates them?

This group want to be able to access data that supports them in their strategic oversight of the energy industry as well as having access to data to inform long-term policy. They may also want to use our data in their wider service to the general public.

What data do they want?

Policy Influencers will require access to regulatory reporting data to ensure we're meeting the requirements of our regulatory framework. They may also be interested in larger and longer-term datasets to help inform their analysis and decision making.

Behaviour and preferences

This group will expect consistency in datasets and want to be sure they are interpreting our data correctly. This group can be diverse in their understanding of how the energy industry operates and may need appropriate sign-posting. Groups not directly working with us regularly will want key datasets to be easy to find.

3.3   Tailored Engagement

In addition to our engagement to understand stakeholders' wider needs, we have also focused on specifically understanding their views on our digitalisation and data strategy. The full details are included in our engagement logs which we have provided to the Independent User Group for visibility, but the main elements are covered below.

We plan to set out a digitalisation stakeholder engagement strategy to take us into the RIIO-2 period and drive our plans for a series of direct stakeholder engagement activities, aligned with the various persona and stakeholder groups we have identified. We will keep stakeholders informed on this activity via updates to the digitalisation action plan.

3.3.1 Publications

Stakeholders have made clear that industry-wide collaboration and adopting common principles and approaches is critical to unlocking value through data, and there are number of excellent publications in this space that support that. We have considered these publications carefully and have built our strategy taking into consideration their recommendations. Of particular note are:

- Energy Data Task Force Report
- Data Best Practice Guidance
- Gemini Principles.

3.3.2 Energy Networks Association

The ENA Data Working Group was set up as an outcome of the Energy Data Taskforce report and is designed to ensure network companies work together to meet the recommendations. It coordinates delivery of industry-wide data initiatives and conducts related stakeholder engagement. We are focusing our involvement on the cases where stakeholders have made it clear that industry-wide standards are of particular importance to them – for example we are actively involved in workstreams on Network Mapping ("We want a single map of the entire network") and Presumed Open/Data Triage ("We want it to be easy to access/request data from multiple energy networks and combine it"). Stakeholder feedback has continually been solicited on the proposals being developed in these areas.

3.3.3 Ofgem Feedback

Ofgem provided feedback at a group level to all networks involved in the RIIO-2 process and also direct feedback to National Grid on our initial Digitalisation Strategy. They said we needed to provide clarification on senior ownership, accountability and board-level responsibility for delivery of the digitalisation strategy and action plan. They wanted us to identify how each planned activity is driven by stakeholder/user needs and describe how planned activities will be coordinated with other organisations. They asked that we provide more insight on how success will be measured, and how delivery risk will be assessed and mitigated along with explanations of how we are investing in our services. We have considered all this feedback in drafting the update to this strategy, as well as the early draft of the Digital Strategy and Action Plan best practice.

3.3.4 Independent User Group

We will review our data and digitalisation strategy on each publication every two years with the Independent User Group (IUG). On the 6th October and 30th November 2020, we provided drafts of our updated strategy and action plan to the IUG for challenge and review.

The IUG told us they liked that customers and stakeholders were at the heart of our strategy and appreciated our data customer personas and investment roadmap. They asked us to consider expanding and possibly broadening the concept of the personas, to be clearer on the golden thread between activities and strategy, and to include more detail on the breadth of stakeholder engagement (including creating detailed engagement logs for them to review). They asked us to be clearer on where we are now and what will change in the future, as well as having more detail on our short and long-term ambitions. They were also keen that ensure transparent updates to actions and progress on the strategy are provided throughout the delivery lifecycle.

IUG challenged us to be more proactive with the Presumed Open concept and asked us to be clearer about where we are actively leading by going beyond Ofgem requirements and ENA working group activity. They wanted us to be clearer on how we compare to others and how we are measuring our progress.

They also challenged us to ensure we have fully considered the major risks to this strategy and put appropriate mitigations in place.

3.3.5 Targeted Webinars and Workshops on the Digitalisation Strategy

On the 2nd of November 2020, we went through the NGGT Digitalisation Strategy and information provision update sharing some successes delivered earlier this year through our core data platform rebuild (MIPI) project. A guest speaker from Data Energy Systems Catapult was also invited to provide context on how A Strategy for a Modern Digitalised Energy System was developed using different segments of user groups to provide feedback.

We actively reached out to groups we had engaged with previously and the stakeholder groups we identified as being interested in this topic – both Energy Insiders (e.g. Gas Shippers) and Enquiring Minds (e.g. Academics and Innovators).

Through the delivery of the presentation, Sildo was used for attendees to ask questions and provide feedback on the content, and there were also specific questions we asked. The overall feedback we received was positive with some actions arising which have been considered in subsequent drafts of the strategy. The attendees also provided feedback on how future engagement on this topic area could best be communicated.

4 Our Focus Areas

"We are prioritising and accelerating digital investments
with the greatest value to stakeholders and society"

There are a wide range of opportunities for digitalisation that NGET and NGGT could pursue. In order to determine which opportunities to focus on, we carefully consider which investments best enable us to meet our stakeholders' priorities and therefore drive the greatest benefits to society.

Throughout our engagement, our stakeholders have made it clear that for our digitalisation to successfully empower them to achieve their goals it needs to involve more than just providing access to digital products – it needs to include fundamental changes to the way we work (such as increased agility). We recognise that achieving this cultural change is a challenging but critical component to the success of our strategy, which is why we have chosen Digital Culture as a core focus area for the next few years. This underpins everything else we are doing.

Improved transparency and easy access to our data is another key theme from stakeholders, which is why we are focusing on improving our data and the platforms we have to collect, manage and publish it. This will enable us to make high quality data quickly available to those who need it.

Enabling an increasingly diverse range of customers to easily connect to and use our networks is a vital part of how we will facilitate the energy system transition. Digitalising our Customer Journey is therefore our third focus area as this will remove barriers and frictions for our current and future customers and enable them to achieve their goals.

The ongoing energy transition requires us to manage increasingly complex systems whilst maintaining the world-class safety and reliability that society expects from us. Our focus on digitalisation of Grid Management is intended to enable us to rise to that challenge – deploying data and AI to allow us to manage our assets and networks optimally in both the short and long term.

To illustrate each of these priority areas more clearly, we've provided case studies of work we have done to date, as well as examples of ongoing or future projects.

4.1   Digital Culture

We recognise that digitalisation is as much about ways of working as it is technology. After listening to stakeholder feedback on our historical ways of working, as well as taking into account wider trends, the National Grid Board has been driving a broad programme of culture change for the last two years to embed digital and innovation mindsets into the organisation. Whilst we still have further to go, the benefits of this are already being felt by our stakeholders, with customers involved in digital projects like ConnectNow commenting on how refreshing and empowering our approach has been.

Our Values embody how we want everyone in National Grid to work, and the addition this year of 'Make it Happen' to our existing Values of 'Do the Right Thing' and 'Find a Better Way' demonstrates our commitment to increasing the pace and flexibility in how we deliver for our stakeholders.

Other elements of our drive to embed digital ways of working into our culture include our Agile Transformation programme, our Innovation Culture initiative, and our investment in Data capability and culture (which is covered under the Data and Data Platforms priority area).

4.1.1 Agile Transformation

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

Embedding Agile ways of working across the organisation is critical to ensuring that we maximise the opportunities digitalisation has to offer. Over the last two years we, through executive sponsorship and leadership from the Chief Information and Digital Officer and directors of both the NGET and NGGT businesses, have enhanced our Agile people capability, culture, and technology. This work has included:

- the establishment of an Agile Transformation Office which is responsible for accelerating National Grid's transition to Agile delivery and enabling teams across the business to deliver rapid, high-quality change

- the creation of ngDigital which 'ideates' with customers and stakeholders to build and scale digital concepts. We have set up regional, multi-skilled, cross-functional sprint teams

- investing in technology platforms and tools that support Agile delivery (e.g. JIRA)

- Embedding Scaled Agile Framework for Enterprise principles throughout the wider organisation.

Many of the case studies outlined later in this document have been delivered (or will be delivered) through our ngDigital capability or through Agile teams across the business.

A typical delivery team consists of digital execution expertise from our ngDigital function combined with NGET/NGGT subject matter experts and internal or external end users. This team is often enhanced with consultancy support to accelerate ideation and value mapping, as well as support from National Grid Change Management and IT teams to embed change and deliver seamless integration.

This team then delivers in small increments, continually testing assumptions and if necessary, pivoting the delivery to ensure the right outcome is achieved. This outcome focus of Digital delivery is enabled by iterative solution design, where wireframes, prototypes and Minimal Viable Products are developed in rapid succession to fully understand the problem, remove risk early, and drive to the features that deliver the intended outcome. This approach has been very well received by stakeholders to date.

4.1.2 Innovation Culture

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

The National Grid board has committed to fostering a culture of innovation across the organisation so that we are well equipped to develop solutions to the challenges society is facing as part of the energy system transition. We have developed innovation strategies in NGET and NGGT that are focused on embedding a culture of innovation through specific action plans and defined targets on creative qualities (as measured by the IDEO innovation culture survey). The NGET and NGGT boards perform an annual deep dive to review progress against these targets and action plans.

Our Innovation and Digitalisation Strategies are designed to work together to achieve the cultural change we are aiming for. For example, the Agile Transformation activities under this strategy are integral to how we are achieving the goal in the NGET Innovation Strategy of creating multi-disciplinary teams and prototyping and refining ideas early in their lifecycle.

4.1.3 Workforce Capability

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

In addition to embedding cultural change, we recognise that we need to equip our people with the right skills to deliver digitalisation and operate in a digital world. We have already begun to do this, both through organic skills acquisition as part of involvement in digital sprints, as well as specific training focused on digital skills.

Where universal upskilling is required (e.g. data management and cyber awareness) we have adopted the approach of bite-sized digital training, which has resulted in strong engagement with our people. We recognise that future workforce trends show social learning to be an effective way of upskilling the workforce, so as part of our digital transformation we will create communities of practice to encourage and embed a culture of lifelong learning. During the Covid-19 pandemic, we have taken the opportunity to accelerate the digitisation of much of our existing training (where possible).

The use of digital technology in the field can also require specific training to maximise the benefit. For example, technicians and damage assessors in our Gas Transmission team are being trained in how to use digital 3D scanners to model and assess wear on gas pipes, and technicians in Electricity Transmission have been trained how to use thermal imaging cameras and radio frequency interferometry equipment as part of our risk assessment process.

We know there is much more to do in this space, so to ensure we thoroughly understand the capability and training requirements for our people throughout our digital transformation, we are adopting the following approach:

1 assess the impact of digital products and ways of working on our business capabilities

2 identify capabilities required to implement and execute processes after digital transformation

3 understand the gap for individuals and the skillsets they need in the future

4 develop a training programme and communication plan to transition our people

5 establish mechanisms to ensure we are on track in building digital capability into the business.

As an organisation committed to contributing to society as a whole, we recognise that our sphere of influence and responsibility extends beyond our current workforce into the wider need for digital skills in the energy industry and UK economy. We have been a leading voice in raising awareness of the need for these skills in order to achieve Net Zero, with our Net Zero Workforce Report highlighting that 400,000 new recruits are needed over the next 30 years, many of which will be in digital roles. We've taken that message to individuals from different backgrounds, with our The Job That Can't Wait campaign to encourage everyone to step up to the challenge of delivering Net Zero. We are actively working on building a pipeline of new digital talent not just for National Grid, but for the energy sector as a whole, to allow us to achieve Net Zero together.

4.2   Data and Data Platforms

4.2.1 What have we done?

Case Study: Gas Collaboration Platform (NGGT)

Net Zero	Innovate	Transp	Cust Exp	Env & Comm

Our stakeholders have told us that the ability to collaborate on different uses of our data is valuable to them, so our data collaboration platform provides an environment that enables different stakeholders to test and discuss new uses together and maximise the shared value of open and real-time information. It reduces barriers to entry to the gas market by allowing stakeholders to speak directly to the Gas National Control Centre and System Operator. Recognising that some of our stakeholders – particularly Enquiring Minds or newer entrants to the sector – may have less of a technical understanding of our data, we provide free tutorials and guides, datasets for download, webinar recordings of the Operational Forums and dedicated webinars for businesses that prefer that approach over larger conferences.

Case Study: Operational Data Triage (NGGT)

Net Zero	Innovate	Transp	Cust Exp	Value

Our customers and stakeholders provided feedback through the Gas Operational Forum that they needed more data to improve commercial decision making. We developed the high-level Data Triage process to ensure they can identify specific areas that are important to them delivering value for consumers and that these are dealt with transparently. We invited stakeholders to vote on which data sets provide the most value and benefits to end consumers, and this enabled us to focus on making the following data sets available during in 2020:

- National Transmission System Pressure Forecasts
- Near Real Time categorised direct connect flow
- NGGT Hourly Residual Balancing action published post day Gas Day.
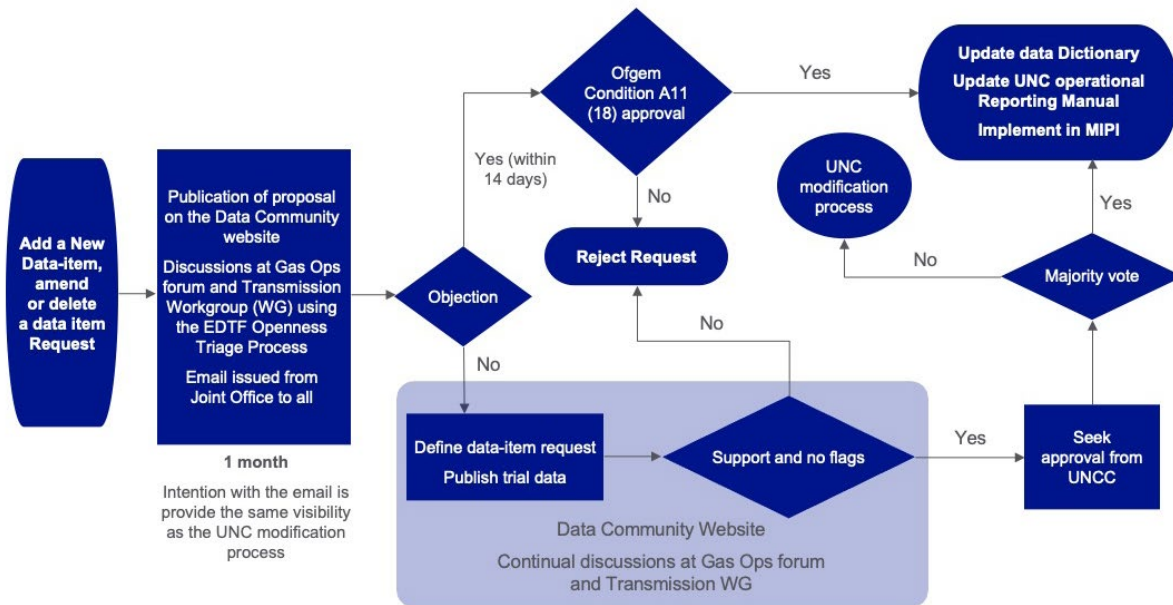
Adopting a stakeholder-led prioritisation process focused on Net Zero and consumer value has made it easier for us to deliver the data sets with the greatest benefits. Giving market participants more transparent information about the functioning of the system through this process has enabled them to balance their portfolios more efficiently, leading to reduced energy bills for consumers.
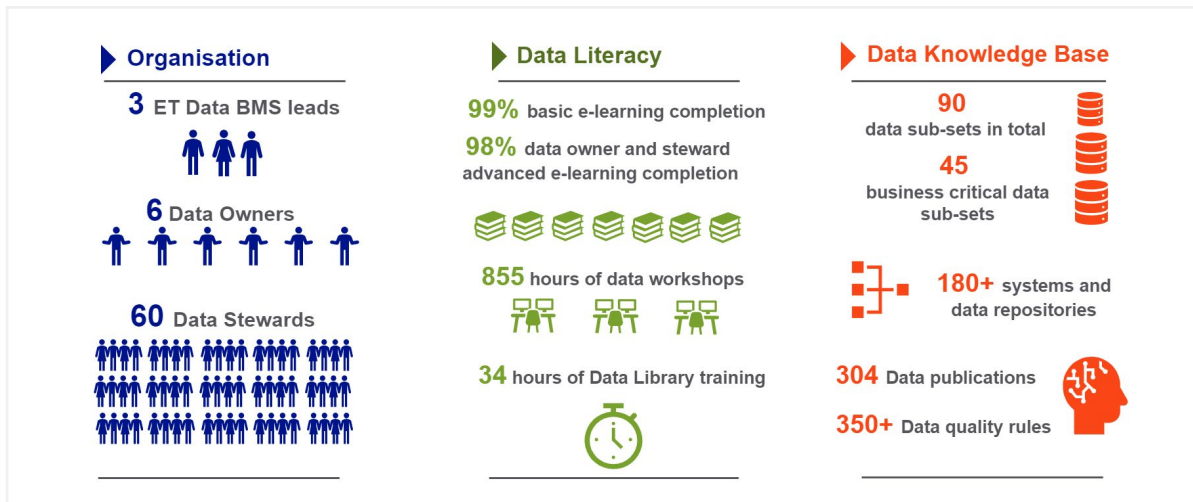
Case Study: Data Business Management Standard (NGET and NGGT)

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

We recognise that our data is one of the most valuable assets we hold and so our ability to manage it effectively is critical to delivering value for our stakeholders. As uses for our data both inside and outside of our organisation increase, strong data management fundamentals become increasingly important in enabling us to deliver high quality data quickly to different stakeholders whilst maintaining compliance with relevant legislation.

Over the course of RIIO-1 we have invested significantly in our data foundations. Across National Grid all our businesses meet our internal Data Management Business Management Standard which aligns with the globally recognised Data Administration Management Association Data Management Body of Knowledge methodology. We have assessed how our business-critical data is managed and have assigned clear ownership and accountability, making sure that we link back to key value drivers throughout the data lifecycle.

For example, in NGET we have populated a Data Library that tracks our different data sources and uses, established data quality reporting for all our business-critical data, and defined data improvement plans where required. This will facilitate our contribution towards industry-wide data cataloguing and metadata standards.

Organisation

3 ET Data BMS leads

6 Data Owners

60 Data Stewards

Data Literacy

99% basic e-learning completion

98% data owner and steward advanced e-learning completion

855 hours of data workshops

34 hours of Data Library training

Data Knowledge Base

90 data sub-sets in total

45 business critical data sub-sets

180+ systems and data repositories

304 Data publications

350+ Data quality rules

4.2.2 What are we going to do?

Open Data

Net Zero	Innovate	Transp	Cust Exp	Env & Comm

We believe that making data open and easily available has the potential to maximise benefit to society by driving innovation and accelerating the transition to Net Zero. In regards to applying this to the energy system, the Energy Data Task Force (EDTF) made **five** key recommendations:

1 digitalisation of the energy system[1]

2 maximising the value of data

3 visibility of data

4 coordination of asset registration[2]

5 visibility of infrastructure and assets.

We are working together with the Energy Networks Associated (ENA) through an established Data Working Group (in collaboration with BEIS, Ofgem and Innovate UK), to help co-ordinate work across the network companies all working towards the above areas.

Maximising the Value of Data and Visibility of Data

Making our data more widely available is one way that we can increase the benefits we deliver to society. We have been doing this already, and we will continue to actively engage with stakeholders to identify value opportunities for open data, particularly around datasets supporting innovation and decarbonisation.

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[1] met by the delivery of this strategy.
[2] delivered by cross-industry collaboration.

We will leverage the insights we have gained from developing the NGGT Operational Data Triage process to continue to lead development and refinement of the industry-wide approach through the ENA Data Triage sub-group. Working as part of the Data Triage sub-group, we have planned the necessary governance processes and metadata standards for a proof-of-concept of the data request process that includes a single, ENA-hosted form, with a high-level triage process to direct customers and stakeholders to the right networks for a response. We will pilot this approach and refine it based on stakeholder feedback. We will embed this into our internal processes to ensure that we can efficiently assess and respond to data customer requests and identify opportunities to publish open data. We will utilise different communication channels tailored to our stakeholder personas to promote the availability of the Data Request process and get feedback on it from stakeholders.

Alongside this, we are working on establishing an outward-facing open data platform to which we will publish datasets. We are investing in the technology that will allow stakeholders to search for, discover, and understand the data that will help them achieve their goals. We will also ensure our platform will consider common technical standards being worked on in the ENA Data Working Group utilising common structures, interfaces and design patterns. This platform will enable us to quickly respond to new requests in a standardised way and make it easier for stakeholders to combine different data sources across the industry.

Making even more of our data available in standard, easy to use formats will enable stakeholders of all types to better understand the energy system, allowing them to innovate and deliver value for society.

Visibility of Infrastructure and Assets

NGET and NGGT already share asset location data to support the digital mapping of the UK. Our network is visually represented on our website and we also provide downloadable datasets in industry standard formats that are free and open to use.

We have leveraged our experience and expertise gained in developing our own publicly available network mapping data to help drive towards the ENA's Network Mapping Sub-Group objective of developing a nationwide, multi-network mapping tool. This will provide geospatial data for all network data in a consistent format. This work is well underway with a vendor already selected to deliver the prototype tool.
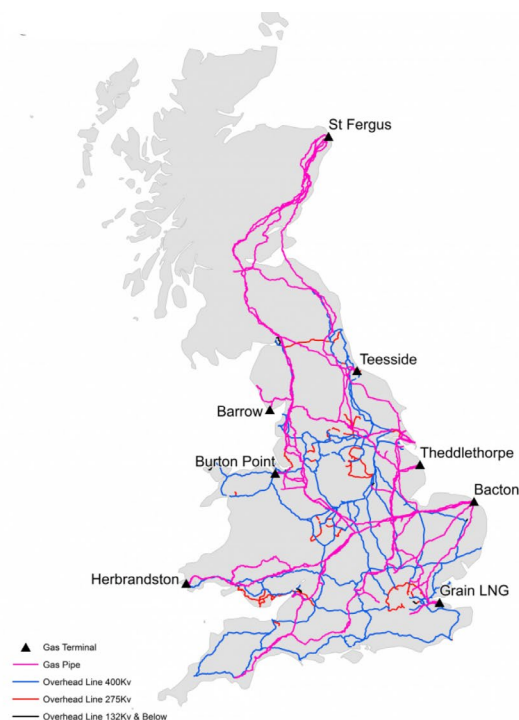
These datasets are for indicative purposes only. They can only be used for emergency and land use planning and cannot be used for commercial purposes. They are owned by National Grid and you are required to acknowledge us in your product or application using "**© National Grid UK**".

This data is supplied on a best-effort basis only, using available information as documented at the time by the transmission network operators. While every effort is made to make sure the information is accurate and up-to-date, we do not accept any liability for any direct, indirect, or consequential loss or damage of any nature--however caused--which may be sustained as a result of reliance upon such information.

The datasets contain gas transmission data only. For gas distribution data, please contact the distribution company for your area. You can find your local distribution company by going to the Energy Networks website.

If you are planning to undertake any ground works, please visit the Cadent Gas website or contact the Plant Protection team at least 14 days in advance.

All datasets are accompanied with Gemini 2.2 metadata.

Dates of modification:

- Gas Pipe – 06 August 2020
- Gas Site – 06 August 2020

Published ⌄	Name
11 Nov 2020	📄 Zip File containing all Shape Files
6 Aug 2020	📄 Gas Pipe
7 Feb 2020	📄 Gas Site

Data Lake

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

Our processes use data across multiple systems and to have a coherent picture of our operations we bring together multiple data sources into our Data Lake platform. Our Data Lake underpins all our data management processes and enables us to have a single source of the truth for reporting, data management and AI. Our Data Library and data quality rules are driven off it and it significantly simplifies and speeds up the process of supplying data to stakeholders.

In RIIO-1 we built our Data Lake around our core asset management processes and during RIIO-2 we will increase the number of connected systems to provide further detail on finance, project delivery and system operation. This will provide a richer end-to-end view of our processes and enable many of the use cases discussed under our Grid Management and Customer Journey focus areas.

We intend to move our Data Lake onto cloud-based technology which will provide increased flexibility to meet growing stakeholder needs and support more efficient deployment of analytics and AI. Utilising new cloud-based technology will also increase our capability to extract value from different data types such as geospatial, images and video.

Data Management

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

While we have reached a key milestone in Data Management maturity in the form of compliance with our internal Data Management Standards, we recognise that we have further to go in developing this capability so that it enables us to fully maximise the value of our data for stakeholders.

The key next steps here are:

- deliver on data improvement plans identified for each of our data domains

- embed data quality checks further into day-to-day activities to improve data quality on an enduring basis

- expand our Data Library and align internal and external metadata to provide greater transparency to stakeholders and facilitate industry-wide data discovery

- build on and enhance our data management tooling to deliver data management activities more efficiently.

Enterprise AI

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

Artificial Intelligence and machine learning are important enablers in the digitalisation of asset management and network operations processes. They provide deeper insights into the operation of our systems and assets, and can enable powerful solutions to support day-to-day decision-making.

We are in the process of moving our AI capability to enterprise-grade platforms, providing an environment that allows us to experiment and iterate quickly and then deploy successful solutions at scale in order to rapidly deliver value for stakeholders. We will be applying these tools to a wide range of opportunities, from improving key forecasts that we publish for stakeholders (e.g. our gas demand forecasts) to better understanding and predicting SF6 leakage in order reduce our carbon emissions. We will also continue to utilise AI in protecting our systems from cyber threats.

4.3   Customer Journey

Case Study: ConnectNow (NGET)

Net Zero	Innovate	Transp	Cust Exp

This is a case where stakeholder needs gave us extremely clear drivers for this project: our connections customers told us our processes and systems were too slow and not supporting their businesses to deliver their strategic outcomes; and the number of connection applications we received increased from around 30 to over 200 per year.

This year we worked closely with customers to build and launch ConnectNow, a one stop portal for electricity connection customers. It provides a clear, intuitive, real-time interface for those who would like to connect to our network, whilst providing transparency throughout their connection journey. The platform utilises data directly from our core systems, so customers see real-time status information on their project progress and finances. Making this easy has enabled new renewable generators to connect to the network, with 90% of the new generators we support delivering greener, cleaner energy. This has gone hand-in-hand with changes to our business processes and systems in the background, resulting in a much better experience for customers - direct customer satisfaction feedback on ConnectNow is currently 8.8/10.

Case Study: MIPI (NGGT)

Net Zero	Innovate	Transp	Cust Exp	Value	Env & Comm
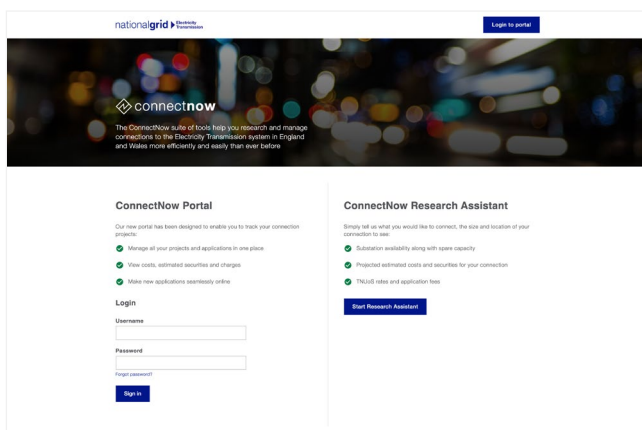
Some of our operational data is particularly important in supporting the transition to Net Zero, and maximising the value of that data involves making it available for wider use. In the last year we have focused on enhancing our data provision via the National Grid Gas Prevailing View, which is the primary mechanism for providing access to our operational gas data. Through collaboration with our customers and stakeholders (both in-person and virtually) we have re-built our core gas data platform (MIPI) and its front-end for clearer visuals and easier to use API feeds for direct access to data. This improved user experience has made our key operational data easier to find, and the improved layout and visualisation makes it much easier to use and understand. The new MIPI system has been used in multiple stakeholder processes, receiving 66 million hits per month since its July 2020 go-live – even more than the 59 million hits per month the NHS website received over the same period!
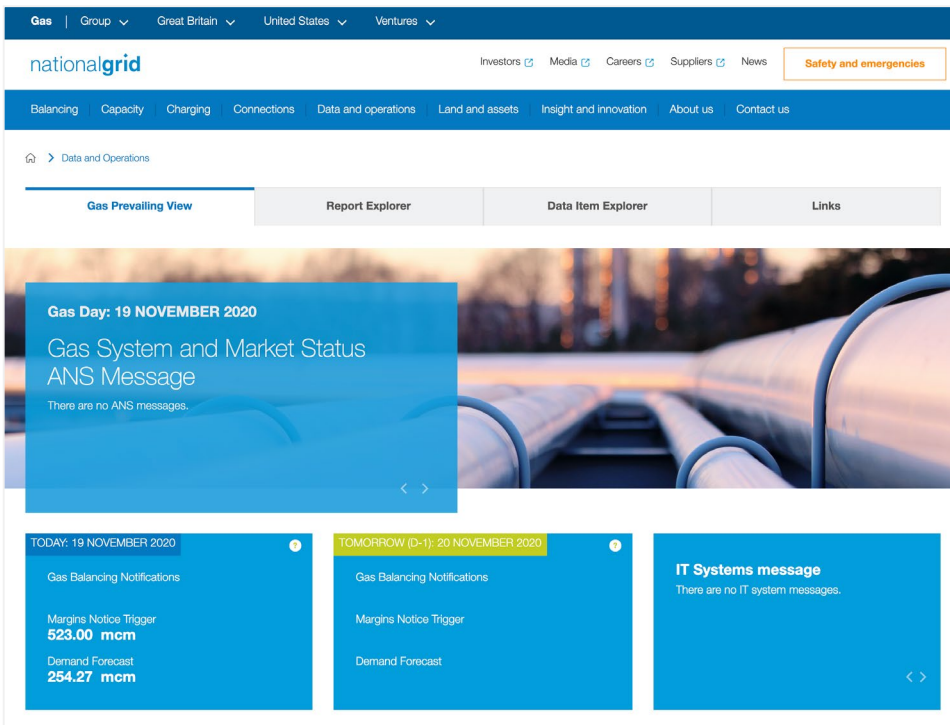
Connections Portals (NGET and NGGT)

Net Zero	Innovate	Transp	Cust Exp

In RIIO-1 we have created dedicated connections portals for Electricity and Gas customers through ConnectNow and the Gas Connections Portal. These portals provide an easy way for our customers to start the connections journey and provide guidance and information to move them through the process. We will build on these developments and enhance the processes that customers follow to make their connection experience as easy as possible.

We will:

- bring further stages of the connections process into our portals, ensuring customers have as much visibility of the process as possible

- continue improving integration with our backend Customer Relationship Management systems to make sure we understand our customers' end-to-end experience

- listen to customer feedback and re-engineer back-end processes to reduce frictions and frustrations they experience

- provide access to standardised designs for Electricity customers, as we've already done in Gas, making connections simpler for newer entrants in the market

- improve integration of our customer data with other elements of our delivery to allow better visibility of interactions with customer projects.

Customer and Stakeholder Management (NGET and NGGT)

Net Zero	Innovate	Transp	Cust Exp

Understanding our customers' and stakeholders' needs and preferences in detail is obviously critical to delivering effectively for them. We are therefore continuing to invest in capturing and analysing data about how they interact with our processes and systems on a day-to-day basis, and combining this with our more structured stakeholder engagement data to drive a better understanding of their needs. We are therefore continuing to invest in improving our Customer Relationship Management system, seeking to integrate it with all stakeholder and customer touchpoints so that we can apply a rich, unified understanding of each stakeholder across every area of our organisation and be consistent and smart in our interactions with them. This will enable us to deliver a seamless end-to-end digital experience for our customers and stakeholders, providing them with unified, timely and continuous access to relevant information and services, in a transparent and efficient manner.

4.4   Grid Management

4.4.1 What have we done?

Case Study – Geospatial (NGGT)

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm

In Great Britain, NGGT look after 7,630km of high-pressure underground pipeline. Understanding where our pipelines are is critical to providing a safe and reliable network. We have made a large investment in our geospatial systems and data, increasing the granularity of our pipeline records and removing legacy systems. This has enabled us to create a single source of data for pipelines, allowing us to align our monetised risk models and pipeline safety risk models with our core asset data. This ensures we're using consistent pipeline data across all our decision-making processes.

Case Study – Circuit Optimisation (NGET)

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value

In delivering a reliable electricity transmission network for the UK, NGET manages an investment plan of around £800m a year on behalf of consumers. Ensuring this investment is as efficient as possible is one of the major things we focus on in delivering value to the consumer, and data and digitalisation has a key role to play in this. With our industry-leading partners Copperleaf, we have invested in a single platform for monetised risk, asset investment planning and circuit optimisation that allows us to generate algorithmically optimised plans for delivering work on the network.

We designed and implemented innovative circuit optimisation functionality which takes a cost versus risk approach to timing interventions and allows us to bring work together into single outages on the same circuit in a way that maximises value for the consumer. This circuit optimisation tool takes outage constraints across multiple circuits and resource availability into account, ensuring our asset replacement plans are efficient and deliverable.

4.4.2 What are we going to do?

Asset Condition and IoT (NGET and NGGT)

Net Zero	Innovate	Transp	Safe & Rely	Value

In order to deliver a safe and reliable network we need to understand the condition of our assets clearly so we can effectively prioritise investment in maintenance and replacement of them.

Digitalisation presents an opportunity to increase the quantity and quality of data we have available on asset condition. We will implement Internet of Things sensor technology to monitor key asset variables such as vibration, temperature and pressure on selected assets. We will use analytics and AI to look for unusual patterns in the short-term and long-term trends in order to identify failures before they happen. More granular condition data will enable us to provide a more sophisticated understanding of asset risk across the country and use this to optimise our investment decisions further.

In line with best practice, we will embed the use of asset condition data across our processes, aligning our asset data capture with our investment processes to ensure we effectively leverage the best data available to inform all our decisions. We will do this in a transparent way that enables Policy Influencers and other stakeholders to see that our decisions are the right ones to efficiently deliver a reliable network for society.

Field Force Enablement (NGET and NGGT)

Net Zero	Innovate	Safe & Rely	Value

Keeping people safe and delivering work efficiently are key priorities for our stakeholders, and our field force work management systems enable us to do that as we deliver work to maintain network reliability.

We will implement an integrated digital workforce management solution that strengthens our capability to meet those priorities. We will use digital technology to bring knowledge and information to those who need it, with an enhanced knowledge repository than ensures key engineering expertise and best practice is shared amongst our field force. We plan to take advantage of new wearable hardware technology where this will support safety and efficiency.

We will also continue to employ data and digital technology in proactively managing work to ensure we reduce unnecessary plan changes, missed work opportunities and remove the blockers to the work we are doing on the network. To enable this, we will deploy a digitalised time booking and work management system with data and user experience at its core, which will give us the information and tools we need to continually optimise how we deliver our work.
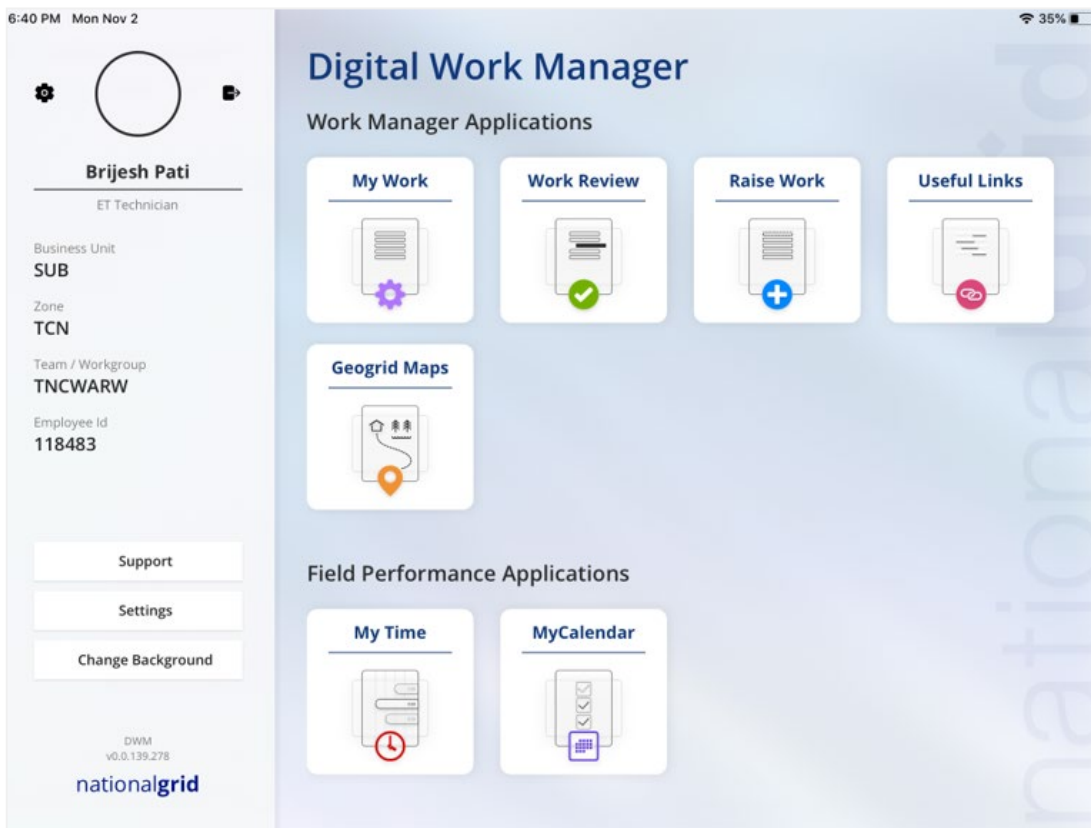
Asset Investment Planning (NGET and NGGT)

Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value

To maintain network reliability at the level expected by our stakeholders and support the journey to Net Zero we will be delivering an increasing amount of work on the network over the course of RIIO-2. Developing an efficient plan for this becomes increasingly challenging as the amount of work and complexity of the energy system increases. To enable us to do this, we will continue to invest in our Asset Investment Planning tool with Copperleaf to optimise and plan our investments across the network. This will include further development of how we manage our constraints and alignment between our project and financial systems to provide a consistent view of data and enable efficiencies in our project delivery.

The use of data and digital technology here will enable us to design plans that minimise deliverability risks, reducing unnecessary changes down the line (which add cost and delay to customers and consumers). The ability to easily develop multiple what-if scenarios, and re-optimise quickly will also allow us to be more flexible in how we integrate changing customer requirements into our plan.

Building Information Modelling (NGET and NGGT)

Net Zero	Innovate	Transp	Cust Exp	Value

One way that we can use digitalisation to deliver more efficiently for stakeholders is by using Building Information Modelling (BIM) to improve productivity and reduce rework. Using BIM during the Design and Construction phase of projects provides efficiency in data handover and reduces the overhead of entering and maintaining duplicate data in multiple models. It can also be used to rehearse projects with complex logistical and site implications and as a basis for data handover at project close.

We are actively exploring the use of BIM on 3 major NGET projects: London Power Tunnels and the 400 kV substation replacements at Littlebrook and Dinorwig. Similar opportunities are being explored by NGGT to help in the optioneering and delivery of gas construction projects.

Digital Twin (NGET and NGGT)

| Net Zero	Innovate	Transp	Cust Exp	Safe & Rely	Value	Env & Comm	Protect

The increased utilisation of renewable energy and the associated growth in smaller generation sources make it increasingly challenging to understand the required level of network capability. To enable this, we maintain digital twins of our networks (for example a power systems model of the UK electricity network) that we use to model different supply and demand scenarios and network configurations.

In recent years we have also invested in monetised risk models of our networks that combine information about asset failure modes, condition assessments and location to estimate the monetised risk for our lead assets and inform replacement and maintenance activities. NGGT also maintains a pipeline risk model that considers where pipelines are relative to things like housing, rail and motorways and uses this to inform what level of safety mitigation is required in the network (e.g. thickness of pipes).

We will continue to improve these models and the data that supports them. Note that whilst these models are not currently integrated with real-time data to inform shorter-term operational decisions, we are collecting data that would enable that. For example, we are collecting gas compressor data and intend to build a more detailed digital twin of our compressors that can be used to perform failure prediction on operational timescales.

4.5   Investment Roadmaps

Below is our current digital roadmap for RIIO-1, RIIO-2 and beyond. This will be updated in light of RIIO-2 Final Determinations. Due to our focus on continually listening to stakeholders and adopting an agile, 'experiment and fail fast' approach to testing value, we anticipate that these roadmaps will continue to change as we learn about where the greatest value lies for our stakeholders. We are also clear that success is not just about delivering a roadmap of digital products and services, but is also about changing our culture – being more innovative and agile.
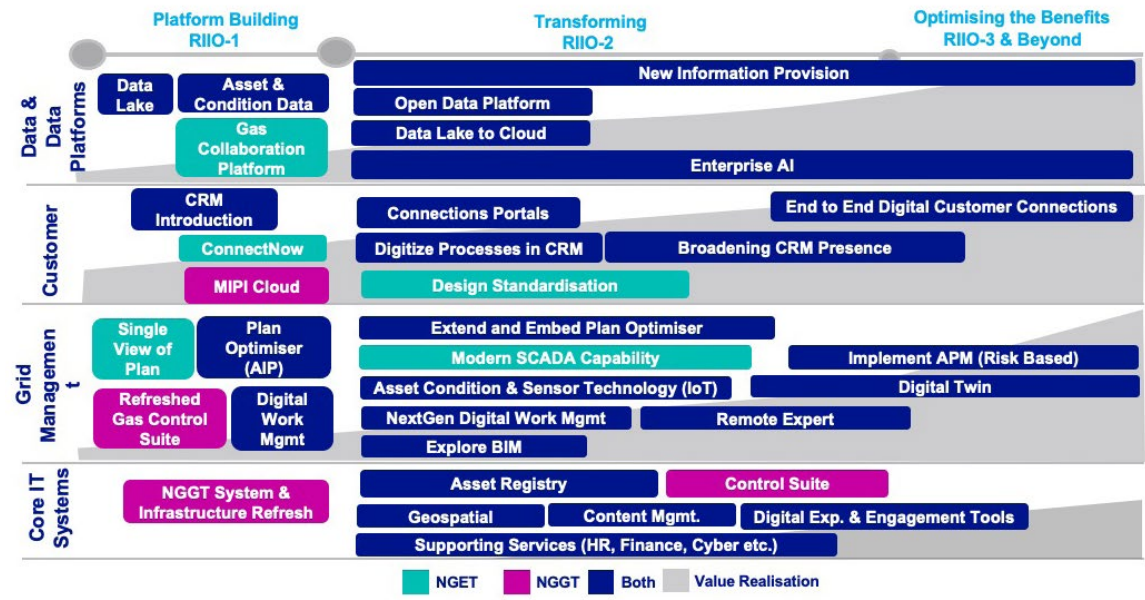
Mapping of digitalisation activities against stakeholder priorities

	Facilitate the whole energy system of the future	Innovate to meet the challenges ahead	Be transparent and give me all the information I need	Make it easy to connect to and use the transmission system	Provide a safe and reliable network	Provide value for money	Care for the environment and communities	Protect the system from cyber and external threats
Digital Culture								
Agile Transformation	·	●	·	·	·	●	·	·
Innovation Culture	·	●	·	·	·	·	·	·
Workforce Capability	●	·	·	·	●	·	·	·
Data and Data Platforms								
Open Data	●	·	●	·			·	
Data Lake	·	·	●	·	·	●	·	·
Data Management	·	·	●	·	·	●	·	·
Enterprise AI	·	●	·	·	·	·	·	·
Customer Journey								
Connection Portals	·	·	●	●				
Customer and Stakeholder Management		·	●	·				
Grid Management								
Asset Condition and IoT	·	·	·		●	●		
Field Force Enablement	·	·			●	●		
Asset Investment Planning	·	·	·	·	●	●		
Building Information Management		·	·	·		●		
Digital Twin	●	●	·	·	·	·		·

5 Governance, Funding and Risks

"Our digitalisation strategy is linked to our investment plans and we have in place robust governance to manage delivery and risks."

Governance

Our Digitalisation Strategy and Action Plan is owned at UK Board level by our Chief Information and Digital Officer. It is a core component of our overall business strategy and will be reviewed and updated at least every two years, with Action Plans updated on a six-monthly cycle in December and June. To help stakeholders track our progress we will maintain prior versions of our Digitalisation Strategy and Action Plans in an archive on our website. We will also maintain engagement logs and share these with the Independent User Group to capture how we have engaged different stakeholders, what they have said and how we have responded.

All the actions within our Action Plan are tracked and managed under our Digital Strategy and Action Plan Programme Management Board, which coordinates the groups and individuals responsible for completing those actions and maintains an overview of all activity under our Digitalisation Strategy.
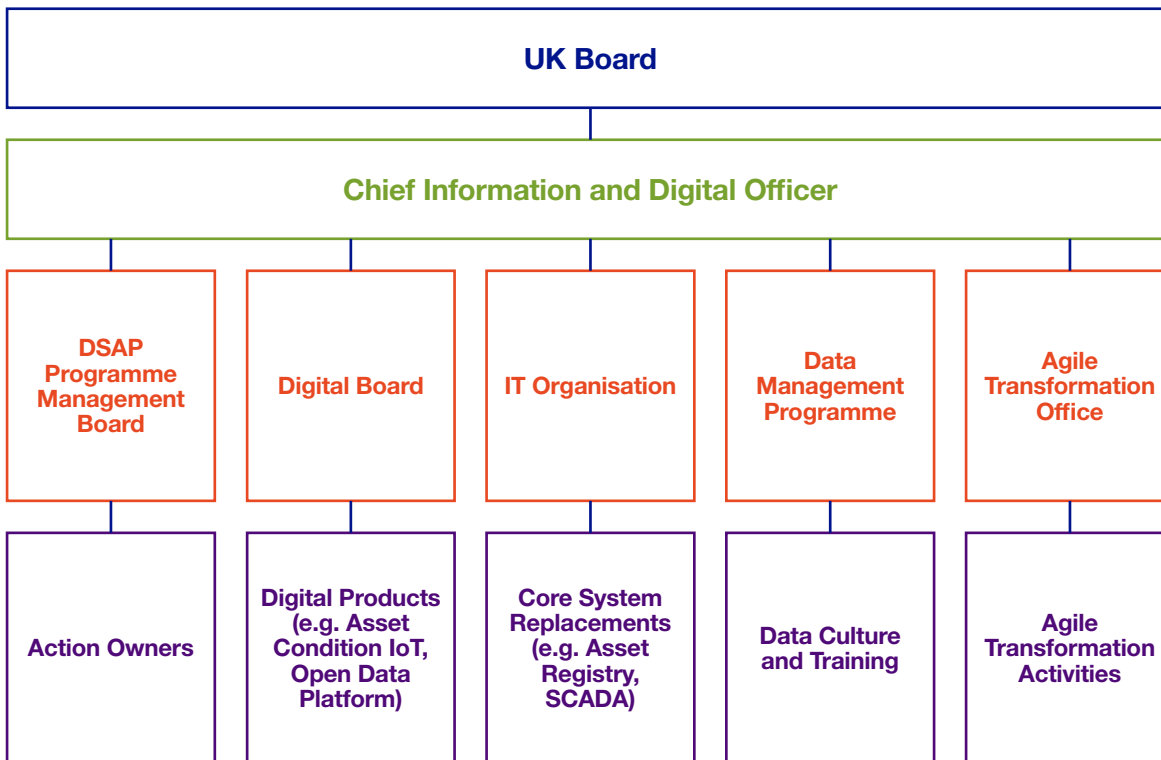
Delivery of specific digital products under this strategy is governed by our Digital Board. The Digital Board meets every eight weeks to monitor progress and decide which digital projects justify continued funding. At the Digital Board each project provides: an update on progress (which is often augmented by demonstrations of working software), an updated business case, and a plan for the next eight weeks. If the board decide not to back a project the team is disbanded and reallocated to other digital projects. Each digital project will also agree on key metrics that demonstrate value, these metrics are also reviewed at each Digital Board as part of the business case review, to ensure that leading indicators of stakeholder value are on target.

For elements other than digital products (for example culture change), these are delivered through dedicated workstreams. For example, we have an ongoing Data Management workstream focused on strengthening our data management culture and capability across National Grid.

We recognise that many of the core IT systems and platforms upon which our data and digital products depend will be reaching end of their life or support during RIIO-2 and will require refreshing or replacing. We coordinate this investment closely with our digital product development, whilst recognising that given the scale and nature of these systems they are typically more efficiently delivered by individual programmes with dedicated governance. We will generally deliver these through a delivery model that uses targeted expert resource sourced from our partners led by in-house Programme Delivery and Solution Engineering.

The Independent User Group also plays a critical role in challenging our plans and approach and holding us to account on our stakeholder engagement and action plans.

Governance structure

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│                              UK Board                                      │
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│                  Chief Information and Digital Officer                     │
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│Management│  │  Board   │  │Organis.  │  │Programme │  │  Office  │
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Row 1 boxes: **DSAP Programme Management Board** | **Digital Board** | **IT Organisation** | **Data Management Programme** | **Agile Transformation Office**

Row 2 boxes: **Action Owners** | **Digital Products (e.g. Asset Condition IoT, Open Data Platform)** | **Core System Replacements (e.g. Asset Registry, SCADA)** | **Data Culture and Training** | **Agile Transformation Activities**

Funding

Alongside the other stakeholder priorities, delivering value for consumers through our investments in digital is extremely important. The majority of the activities to deliver on this strategy will be funded under our RIIO-2 IT investment plans. Our plans focus on both unlocking new value for stakeholders and consumers through our digital investments as well delivering on our ongoing efficiency commitments with our core IT systems. We have yet to review the full impact of the RIIO-2 Final Determinations on our ability to deliver this strategy and will update this strategy and action plan once we have considered that impact.

Having access to timely and appropriate funding is key to delivering on our digitalisation commitments. As we adopt an Agile and iterative approach to delivering value for stakeholders, and as rapid technology changes present new opportunities, we anticipate utilising Ofgem's reopener process for IT investments to request further allowances for specific new investments. We require an effective reopener process, with timely decisions and appropriate funding allowances to support the Agile delivery of our proposed action plan. An example of where we anticipate utilising this approach early on in RIIO-2 is Building Information Management, where stakeholder needs and value drivers are still emerging.

Risks

We have identified the following key risks that may have an impact on the successful delivery of our digitalisation strategy. These have been initially cross referenced against our interpretation of our standard Digital and IT risk categories (shown in brackets) and we will continue to iterate on this work next year as we develop our mitigation plans further. Our risks are managed through our Risk Management Framework, ensuring each risk is understood, assessed and appropriate mitigation plans are in place and monitored throughout their lifetime.

The key risks identified and their mapping to the Digital and IT risk categories are as follows:

- **Risk A**
  The integration of data from different systems leads to unexpected cost and complexity (Complexity)

- **Risk B**
  Digital initiatives do not deliver the expected stakeholder benefits
  (Unknown processes, products and technology/Uncertainty)

- **Risk C**
  Malicious actors exploit digitalisation and the increased data availability
  (Human Behaviour and Leadership)

- **Risk D**
  We don't realise the benefits from some investments due to inadequate funding in RIIO-2
  (Uncertainty)

- **Risk E**
  Stakeholder value is missed due to lack of collaboration or collaboration slows realisation of value
  (Complexity)

- **Risk F**
  Compliance obligations are breached if we are unable to accurately control and manage our data
  (Lack of methodology).

Management of these key risks will enable compliance, assurance and enhanced decision-making, providing benefits by way of improvements in the efficiency of our data operations, effectiveness of tactics (change projects) and the strategy of the organisation.

Key Risks Context

Risk A

There is a risk that the integration of data from different systems in order make data easily accessible may lead to unexpected cost and complexity.

Context: As with many large organisations, our vast amount of data is stored across a wide range of systems. Our stakeholders want us to make this data easily accessible in order to unlock value. There is a risk that combining data from our multiple systems and making it easily accessible for use is complex and expensive.

We see this as a critical risk and have multiple mitigation plans in place:

- allocation of significant investment in our RIIO-2 business plan for our data platforms (including our Data Lake) to ensure we have the appropriate infrastructure and resources to effectively combine our different data sources into a consistent representation of our business. This is subject to adequate funding mechanisms being identified under Ofgem's T2 Final Determinations, as mentioned above and in Risk D on the following page

- adaption of our approach to replacing and refreshing our core systems to place data flows and integration at the heart of our design process

- adoption of data management best practices which are delivering increased accountability and transparency on data quality and use, leading to greater focus on data in our day-to-day decision making.

Risk B

There is a risk that digital initiatives do not deliver the expected stakeholder benefits due to rapidly changing requirements.

Context: Maximising the value of our digital investments to stakeholders is of crucial importance, and some investments may appear promising at first but fail to deliver the desired benefits. This is our primary motivation behind using an Agile delivery mechanism for our digital products and having a review of the progress and value case at our Digital Board every eight weeks. This ensures that we remain focused on delivering value for stakeholders and quickly identify where benefits are failing to materialise so we can allocate resources to more promising opportunities.

Risk C

There is a risk that malicious actors exploit digitalisation and increased data availability leading to potential data loss and/or theft, or disruption to the network.

Context: Increased automation and digitalisation of the energy system may present new opportunities for malicious actors. Granular data about our assets and networks is valuable to our customers and stakeholders but is also valuable to those looking to disrupt the system. Our stakeholders recognise this, with one of their key priorities being that we protect the system from cyber and external threats. We take this risk extremely seriously and our RIIO-2 business plans include a substantial investment in cyber security. To help mitigate the risk we shall:

- consider cyber security carefully in all our digitalisation activities and adopt a defence-in-depth approach that limits the impact of a single element failing; and

- when publishing or sharing data, we will consider not just the cyber security implications of that dataset in isolation, but the implications if it were to be combined with other available data. While the cyber security risks of sharing a particular dataset can often mitigated, where this is not the case then that data will not be made available to stakeholders.

Whilst data and digitalisation pose increased cyber security risks to the system, they also provide tools to combat that risk.

- We use cutting edge data and artificial intelligence techniques to protect the network against cyber-attacks and will continue to invest significantly in this area to keep our energy system secure.

Risk D

There is a risk that we don't realise the benefits from some investments due to inadequate funding in RIIO-2.

Context: There is a risk that some digital investments are not funded under Final Determinations and the benefits associated with those investments are therefore not achievable (as well as any benefits associated with investments dependent on foundational infrastructure not funded). We have engaged extensively with Ofgem and submitted supplementary evidence where required to further demonstrate the benefits and justify the costs of these investments. The reopener process also offers an opportunity to request further funding if the value case strengthens during RIIO-2.

Risk E

There is a risk that stakeholder value is missed due to lack of collaboration or collaboration slows realisation of value.

Context: We recognise competing risks related to industry-wide collaboration on data and digitalisation. Many of the greatest benefits to stakeholders and society are largely contingent on common standards and effective collaboration across the industry (and into other sectors). There is a risk that different participants developing in isolation is likely to lead to significant friction in energy data usage and slow the realisation of benefits for society. However, there is also a risk that ineffective decision making whilst collaborating could lead to slower progress and delay realisation of benefits for stakeholders.

Our approach to mitigating this risk is to be transparent in our digitalisation activities and proactive in our engagement with industry-wide groups (e.g. the ENA Data Working Group). We will promote Agile ways of working within those industry-wide groups, volunteering to develop Minimum Viable Products to quickly test value and refine concepts.

Risk F

There is a risk that compliance obligations are breached if we are unable to accurately control and manage our data.

Context: We have an obligation to comply with relevant laws regarding the data we hold and use, and if we are unable to accurately control and manage our data, there is a risk that we breach those obligations. Our approach to mitigating this risk is:

- to embed a culture of good data management and training across the organisation
- ensuring our data management processes are designed explicitly with our compliance obligations in mind.

6 Summary

"We are focused on working with our stakeholders to digitalise our organisation in a way that maximises the benefits for our stakeholders and society as a whole."

Our stakeholders have told us that digitalisation of the energy system has a key role to play in the transition to a Net Zero society, and that we have a critical part to play in that. Our strategy for digitalisation is:

Stakeholder Led

Our digitalisation is for the benefit of our stakeholders and we will continue to work closely with them to ensure we are delivering what they need.

Open and Transparent

We will continue to open up our datasets, providing increased insight into our networks and stimulating innovation across the energy industry.

Value Driven

We will use digitalisation to operate our businesses more efficiently and deliver greater value to consumers and stakeholders.

Agile

We will continue to embed Agile ways of working into our teams and design our digital investments to deliver value iteratively.

Culture Centred

We will embed data and digitalisation into our culture, changing the way we work and providing our employees with everything they need to maximise the value of our data to society.