

Electricity
Distribution

Digitalisation Strategy

March 2023



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How this strategy impacts other areas of our plan

Our focus is to achieve the best possible positive outcomes for our customers, by utilising innovative solutions and smarter working practices to drive efficiency in all we do. This strategy forms part of a suite of wide ranging, ambitious and interconnected strategies that we will be implemented in RIIO-ED2. Each one is designed to contribute towards the delivery of the same four overarching strategic outcomes we will achieve for customers:

| | |
|---|--|
|  <h3>1. Sustainability</h3> <p>Lead the drive to net zero as early as possible.</p> |  <h3>2. Connectivity</h3> <p>Customers can easily connect their electric vehicles, heat pumps and renewable generation.</p> |
|  <h3>3. Vulnerability</h3> <p>First class vulnerable customer support programme where everyone benefits in a smart future.</p> |  <h3>4. Affordability</h3> <p>Maintain excellent customer service, safety and network performance and transform the energy grid for future generations, while keeping bills broadly flat.</p> |

Each of our strategies is embedded across our operations and never delivered in silos. This will lead to joined up delivery, utilise opportunities to share knowledge and expertise across NGED teams, and achieve maximum benefits for customers. By doing so we will ensure each of our strategies has a far reaching impact and identifies opportunities to improve our service, performance and efficiency in every possible area of our business. Our strategies are therefore highly interrelated and co-dependent.

The following table provides a snapshot of some of the extensive impacts of this Digitalisation Strategy and Action Plan Strategy, and signposts to other areas of our plan upon which its successful delivery will be dependent.

| Strategy | Reference within the strategy: | | |
|--|--------------------------------|---|---------|
| Climate Resilience | - | - | - |
| Customer Vulnerability | ✓ | Using innovation to efficiently identify vulnerable customers and deliver a range of accessible, tailored services to meet their bespoke needs. Including identifying specific data user types to ensure vulnerable customers benefit in a smart future | Page 74 |
| Destination Net Zero: Business Innovation and Efficiency | ✓ | Enabling customers and stakeholders to access a wide range of data easily, including understanding available capacity and key network operations | Page 10 |
| Digitalisation Strategy and Action Plan | - | - | - |
| DSO | ✓ | Delivering smart and flexible solutions to maximise the utilisation of the existing network before further conventional reinforcement is needed | Page 11 |
| Environment & Environmental Action Plan | ✓ | Identifying data user types to improve environmental monitoring and identification of innovative solutions to improve performance | Page 74 |
| Innovation | ✓ | Utilising innovation as part of our roadmap to deliver far-reaching digitalisation solutions | Page 7 |
| Major Connections | ✓ | Providing a self serve connections option for low carbon technologies | Page 63 |
| Network Visibility | ✓ | Increasing network insight and enabling more efficient operation by embedding digital solutions | Page 17 |
| Net Zero Communities | ✓ | Identifying data user types to support community energy groups, understanding the data they require to enable them to participate in a wide range of smart energy services | Page 75 |
| Social Contract | - | - | - |
| Whole Systems | ✓ | Work collaboratively across sectors to deliver best value whole systems solutions to our customers and improve network efficiency | Page 41 |
| Workforce Resilience | ✓ | Providing the right data and solutions to improve how employees do their jobs and deliver innovative training approaches that develop the new skills and capabilities required in a smart energy future | Page 7 |

Foreword

Digitalisation of the energy system is at the heart of NGED's transition to build a smart and efficient energy system, supporting the UK's clear commitment for net zero carbon emissions by 2050.

The requirements of our network are changing, driven by customers' needs, decentralisation of generation now connected throughout our network and decarbonisation focused on the increasing transition of the transport and heat sectors to electricity.

We welcomed the recommendations within the Energy System Catapult's Energy Data Taskforce report in RIIO-ED1 and my team were actively involved in contributing ideas to it. It sets out a number of expectations and recommendations, which has further sped up the digitalisation journey across the energy sector.

Our strategy continues to use the five key recommendations as guiding principles to support digitalisation and drive value and visibility of data. We have benchmarked our current position, where we will be at the end of RIIO-ED1 and RIIO-ED2 against these five key recommendations. This will enable a consistent approach to understanding our progress, as we recognise it is important to provide regular and purposeful updates of our progress.

We are committed to continuing to digitalise our business to ensure that we remain an efficient and effective operator of our network and deliver data and solutions in the right format, at the right time to customers and stakeholders to meet their needs and ambitions.

Our focus to continue to **improve data management, increase network insight and operation** and **deliver for stakeholders** will ensure that we deliver these aims and beyond to further improve our business efficiency, turn our data into information to benefit our employees and customers, deliver insight for network capacity and connection planning and new service propositions.

Our transition to a digitalised business through our Strategy, Roadmap and Action Plan will continue to be revolutionary, building on initial developments through our distribution system operator transition and innovation programme and cover all parts of our business.

We have already made a number of developments; the investment in our connected data portal now enables huge amounts of valuable data to be accessed centrally and we continue to invest in our Integrated Network Model (INM), ensuring we have a single source of the truth for our data, providing greater detail for us and our customers to benefit from.

Our data and digitalisation governance group, which I chair, drives our programme to ensure that a consistent and appropriate approach is taken across our complete business. This ensures we continue to focus in the right areas, do not leave any part of our business, employees, customers, or stakeholders behind.

The development of our workforce and skills is another key component of ensuring we can digitalise our business; we have already invested in data science apprenticeship scheme to ensure we have the right skills and capability moving forwards. We will continue to assess our needs and invest in the right training and skills to prepare for long term success.

Finally, I look forward to regularly sharing our progress, achievements, and benefits of our digitalisation journey.



Graham Halladay
Director of Operations



Digitalisation Strategy Executive Summary

Digitalisation of the energy system is at the heart of NGED's transition to build a smart and efficient energy system, supporting the UK's clear commitment for net zero carbon emissions by 2050.

Revolutionising and transforming our business through digitalisation

Data and digitalisation provides us with an extraordinary opportunity to transform our business and play a leading role in the transition of our energy system to one that meets the challenge of net zero emissions whilst placing customers and stakeholders at the heart of everything we do.

Our innovative new digitalised solutions and services will transform the way customers interact with us and with energy, providing them with real value to the extent that for every £1 we invest in digitalisation, we will deliver £17 worth of value in the form of lower bills, improved service and new solutions to optimise processes.

Our Strategy is bold in its intention, and through a carefully devised approach that utilises data as an enabler, puts customers at the heart of digitalisation and develops a new culture for our business, we will deliver digitalisation successfully to the benefit of both our customers and our business.

Enabling our transition through data

The availability and utilisation of good quality and accessible data is a key enabler in moving from a legacy analogue system to a modern, digitalised energy system.

To power this transition and the transformation of our business, we need to provide increased and timely access to quality data to our employees and through open access to our customers and stakeholders.

Ensuring we meet and exceed the Data Best Practice Guidance adopted by Ofgem will continue to build on our success to address the emerging challenges of the net zero transition.

Data will become intrinsic to the activities of all employees through a coordinated approach to data management and our commitment to this will be advanced through appropriate training and a culture of responsibility and ownership of data.

How we will approach digitalisation

To deliver our ambition to become a 'data first' business with data at the core of our decision making, we have set out a bold vision for the role that digitalisation and data can play in transforming our business and delivering net zero for our customers and stakeholders. We have engaged widely with our customers and stakeholders and focused on delivering better outcomes, improved customer service and new channels and solutions throughout our Digitalisation Strategy. Combining this engagement with careful consideration for the needs and drivers behind our investment, has enabled us to group our approach to delivering the strategy into three core areas:

Improving data management

The availability and use of good quality and accessible data is key to moving from a legacy analogue system to a modern, digitalised energy system and improving data management. We are clear on the need to provide increased open access to the right data at the right time within our organisation and to our customers and stakeholders. This will be supported by our investment in new systems, enabling us to further digitise our records and improve data capture activities.

Using increased and improved data is key to how we operate our network in real time and increasing network insight and operation. The provision of more informed actions will help maximise the capability of our existing assets and how we maintain, plan and reinforce our network in the long term.

For instance, the introduction of advanced control systems across our a network using increased and improved data will deliver greater network insight to make our decision making more effective.

Increasing network insight and operation

Our focus is on meeting and surpassing customer needs and expectations and delivering for stakeholders.

Significant and ongoing internal and external engagement will ensure our priority areas meet current and future challenges as effectively and efficiently as possible and deliver for all stakeholders, such as digitalising customer contact channels whilst ensuring traditional channels remain available for those that need them.

We know that collaboration is key to delivering our strategy and the best value to our customers and stakeholders will underpin our approach across these three core areas.

We actively take opportunities to collaborate with other DNOs, cross sector partners and stakeholders, and the wider energy sector to make sure this happens and we are committed to ensuring our collaboration grows as we deliver our Digitalisation Strategy.

Delivering for stakeholders

Placing customers and stakeholders at the heart of digitalisation

Our data and digitalisation activities are informed by extensive and ongoing engagement with stakeholders, both internally and externally, to ensure we meet their different needs and expectations. To support this, we have created user personas for our key stakeholder and customer groups to provide even greater levels of insight into their needs and to provide a blueprint for specific roles to ensure our investments and developments are aligned to meet and exceed their needs.

Our needs based approach to users will continue to adapt as the needs of the sector evolve in the transition to net zero. In addition, we will further segment customers according to their needs in relation to geographic, technographic, behavioural, economic and demographic factors. By sharing our current user types, we can understand from feedback and engagement where these can be developed and enhanced, ensuring we are capturing the right user types to prioritise datasets and digitalised solutions.

Building a data culture and developing our people

To help deliver the outcomes from our Digitalisation Strategy, will transform our culture, behaviours, skills development and approach to attracting new talent to our business in order to better integrate data, technology and our people to capitalise on the opportunity for our business that data and digitalisation brings. We are following three guiding principles as we seek to continue developing our data culture:

1. culture only exists through the observable behaviours of our people, so we will take a pragmatic approach, focusing on shaping their behaviours around data.
2. we will make it easier for our people to interact with data. By improving the interactions with data we can better leverage data across our business.
3. data literacy is not as important as making data matter for our people, so we will make sure that our people are given the opportunity to interact with data in a meaningful way.

We will seek to blend traditional learning methods with more immersive learning solutions, allowing our people the opportunity to 'learn by doing'. Implementing cross-functional working will reduce organisational barriers between departments, increase collaboration and bring together different skill sets to deliver a better end to end experience for our customers and stakeholders.

Our plans for delivery

We have well justified and ambitious plans to deliver digitalisation for our business and our stakeholders and will ensure these are balanced with the delivery of our ongoing commitments to our customers and traditional activities.

For each RIIO-ED2 project there is a detailed Engineering Justification Paper which provides a detailed scope and needs case, delivery timescales, risks and issues and customer benefits and outcomes as well as a benefits map. To deliver value from these plans as quickly and effectively as possible, we are adopting an agile delivery model, leveraging digital tooling from our IT function.

This will allow us to use Kanban (source Wikipedia) methodology to manage and smooth workflow and deliver value earlier to our stakeholders. We recognise that agile requires a change in culture and mindsets and as a result will be investing in training and developing our people over the course of RIIO-ED2 to further build agile mind sets and an agile culture.

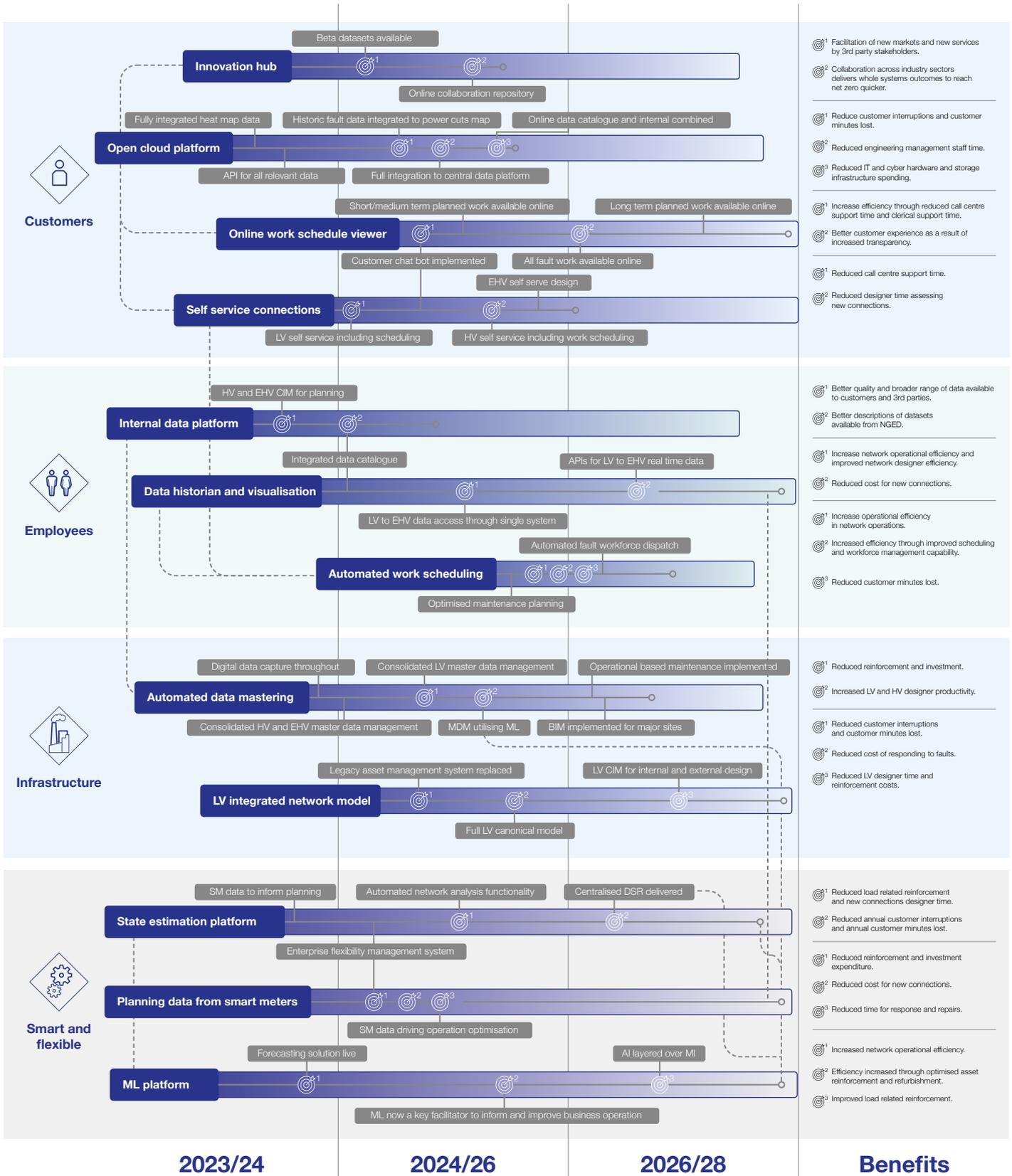
Delivery of our plans will unlock significant and tangible outcomes for customers and stakeholders including better choice, customer experience, access to our data, new markets and services and ultimately better value for money through efficiency savings in our operations, enabling our transition to a digitalised business of the future.

Our Digitalisation Strategy and its outcomes will be effectively tracked and measured to ensure we are delivering benefits for all. We have clear, meaningful success measures that enable us to track our understanding of employee and customer needs, how we have improved data quality, our position relative to the industry, the value we have driven from our systems and solutions, the effectiveness of our collaboration and how well we have developed skills and capabilities.



Digitalisation roadmap

Our Digitalisation Strategy is delivered through our Action Plan containing a programme of projects, summarised in our Digitalisation Roadmap, with a whole that is greater than the sum of its parts. It is ambitious, revolutionary and will deliver for our key stakeholders and our business. It visualises the programmes and projects featured in our strategy, the interdependencies as well as high level timelines for delivery and the customer and stakeholder outcomes they will deliver.

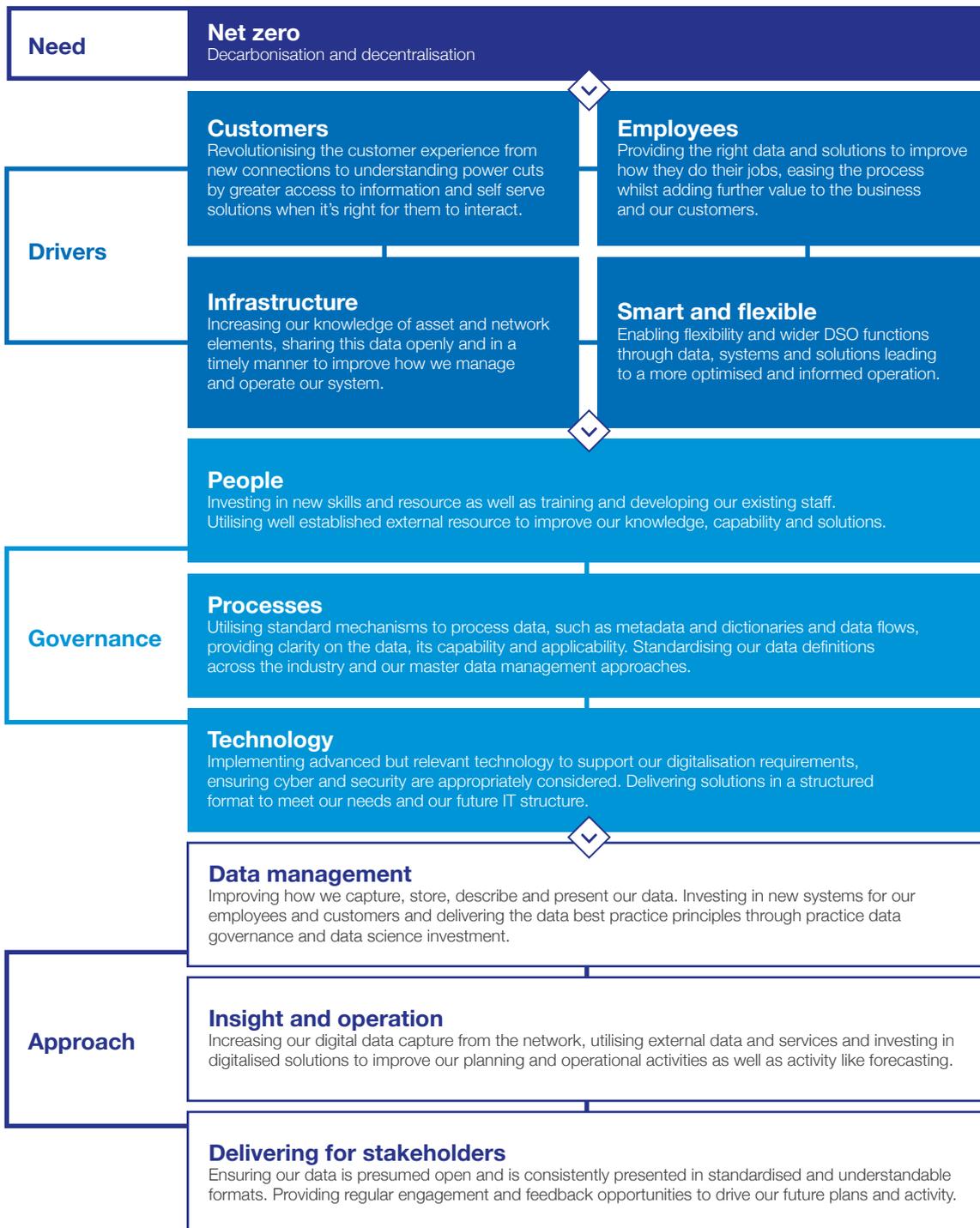


1. Introduction

Our vision and commitment to digitalisation is focused on the need to deliver the UK's net zero target by 2050 through decarbonisation and decentralisation. We will provide a smart and flexible network that enables our customers and stakeholders to actively participate in and benefit from the energy transition.

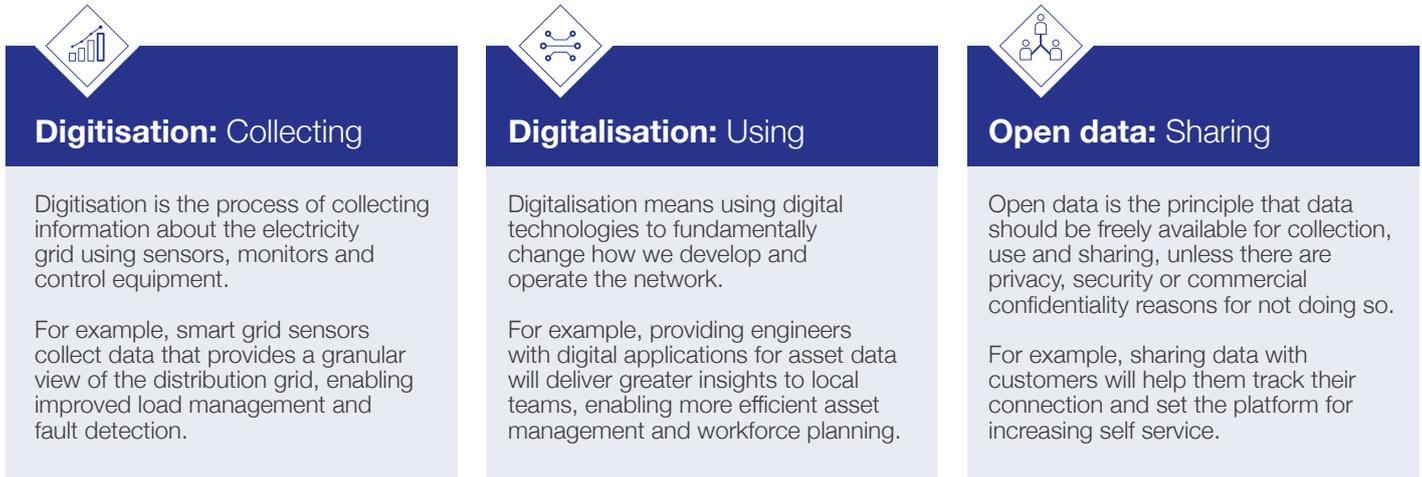
Our Digitalisation Strategy will be established into the business through four key drivers; providing a revolutionised experience for our customers, enhancing the productivity and value our employees deliver to customers and the business, bringing leading knowledge to our assets and infrastructure, and ensuring we further develop our smart and flexible solutions.

A key function of delivering our digitalisation and data commitments is governance, centred on people, processes and technology. Our approach remains consistent around our three core principles, delivering for stakeholders, data management and insight and operation.



1.1. What is digitalisation?

To understand the term, it is important to draw distinctions between digitalisation, digitisation and open data.



1.2. Digitalisation – the need

Digitalisation of the energy system is at the heart of NGED’s strategy to build a smarter and more efficient energy system. The UK has a clear commitment to net zero carbon emissions by 2050. This requires unprecedented changes to the way customers use and generate energy.

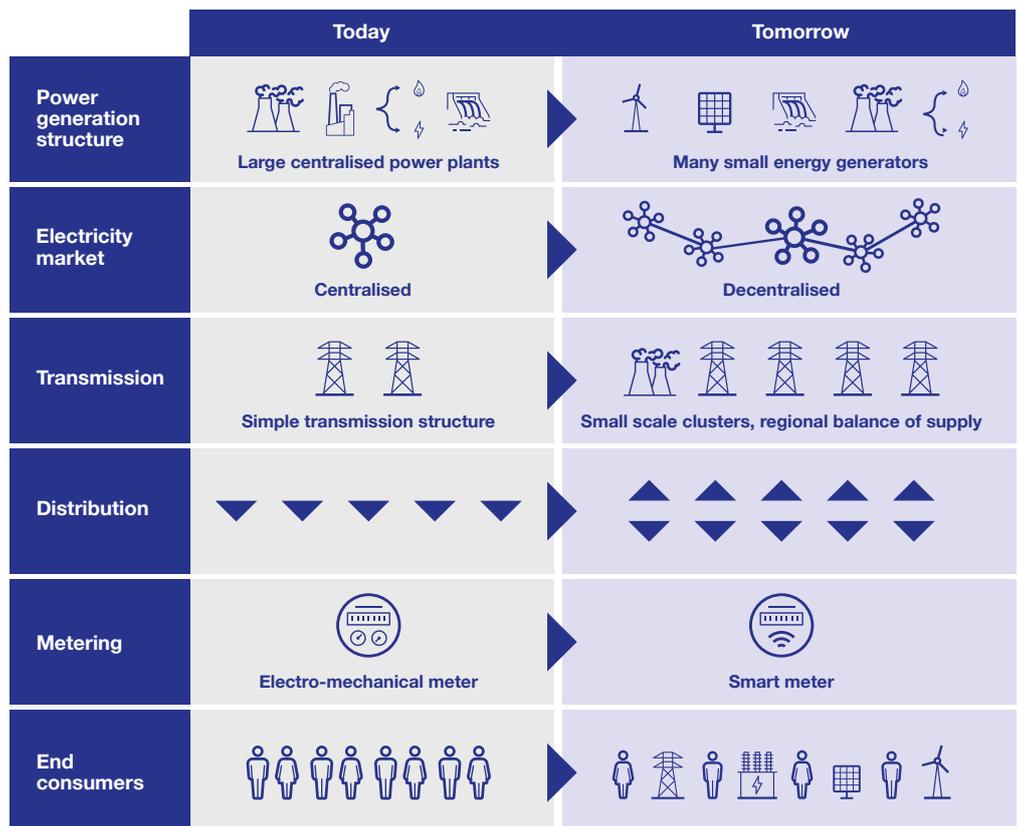
We operate the network for our customers, so it is essential we continue to respond to their changing needs and adapt our operations to continue to deliver excellent customer service, reliability, value for money and to deliver new, innovative, digital services over time.

Our Digitalisation Strategy will also enable us to support our most vulnerable customers through the energy transition, enduring that no one is left behind.

At NGED, we are seeing significant levels of distributed renewable forms of generation connecting directly to our network, such as solar, wind, and energy storage along with increasing levels of Low Carbon Technologies (LCT).

This is most prevalent from electric vehicles and heat pumps, driven by our customers fundamentally changing the way they interact with energy as their adoption of new technologies increases.

As a result, we are seeing our traditional role as a Distribution Network Operator (DNO) transform to include Distribution System Operator (DSO) functions to manage real time energy flows, and use technology, innovation and commercial arrangements to make optimal use of the existing network capacity, and to deliver better services for our customers.



1.3. Decentralisation and decarbonisation

Our energy system is undergoing a transformational change, both in the UK and at a global level. Gone is the UK's reliance on large scale centralised generating resource, marked by significant periods without any coal produced electricity.

This means that electricity is being generated more locally, increasingly connected directly to the distribution network. How our network needs to operate and interact with our customers to facilitate this type of operation is changing; data and digitalisation is and will continue to be at the centre of this.

We currently have 10GW of distributed generation connected across our four licences areas, which represents 30% of distributed generation in the UK. Our Distribution Future Energy Scenarios (DFES) illustrates how this is going to increase towards 2050.

To support the UK government's commitment for the UK to become net zero means that existing ambitious plans to decarbonise, focused on low carbon transport and the electrification of heating have further increased.

This will see significant increases in demand on the existing electricity network.

Throughout the UK it is projected that by 2050 the number of electric vehicle and heat pumps will be in the region of 17.6 million and 6.3 million, respectively. Within our four licence areas these numbers are expected to be 6.9 million and 1.3 million. Their adoption towards 2050 is shown in our DFES work.

Enabling customers and stakeholders' access to data to understand the capacity and operation of the network today and forecasts as to how that will change moving forwards, timely and effectively, is crucial to enable them and others to understand how to integrate LCTs most effectively and efficiently and other new technologies on to the system.

Figure 1: Generation and storage growth

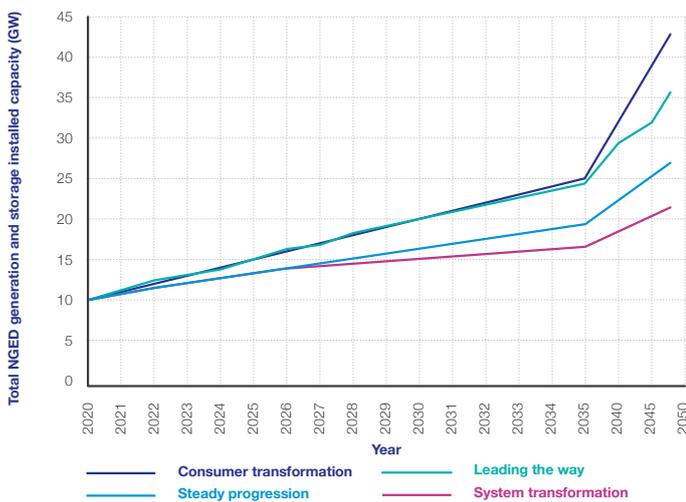


Figure 2: Electric vehicle projections

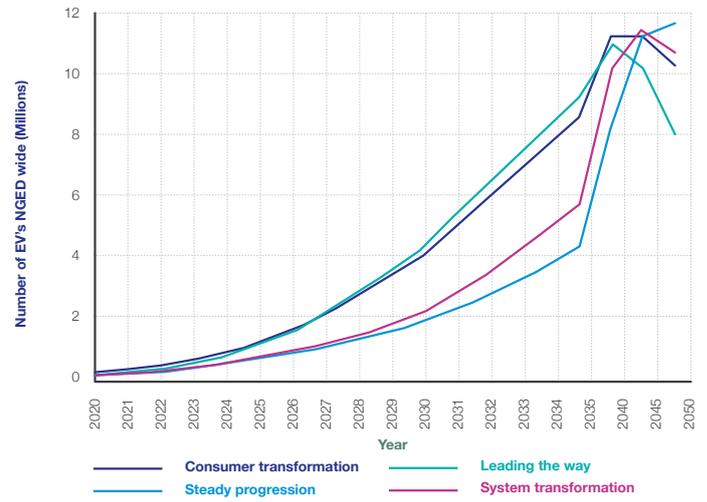
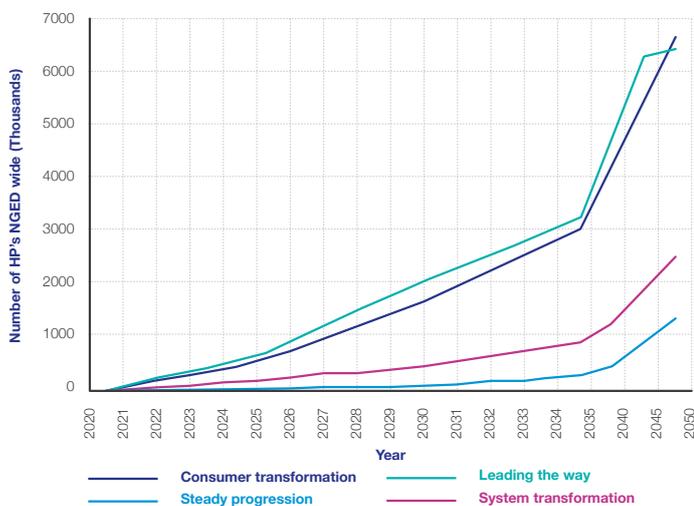


Figure 3: Heat pump projections



1.4. Customer and employee focused

A key benefit of digitalisation is that it allows us to be much more dynamic in how we respond to the needs of our customers and stakeholders.

Our business activity and the data we collect is driven by our stakeholders, and the way in which we digitalise our business will be no different. Our strategy is to make sure that we can adapt to the changing needs of our customers and stakeholders as they change over time as we understand how we serve our stakeholders will continue to evolve and expand.

We have developed and tested our strategy and action plan extensively through wide stakeholder sessions, both internally to ensure it meets the needs of our employees and externally as part of direct digitalisation workshops and wider engagement sessions as digitalisation cuts across our complete business. This is a traditional 'synchronous' method of collecting feedback that works well both for our staff and customers, but we will also implement new, modern, asynchronous techniques for engagement in digitalisation that help us to shorten the time from feedback to implementation.

We will leverage learning and experience from specialist stakeholders, such as telecoms, who are further forward in their digitalisation journeys to ensure our priorities for development and our methods for addressing needs are the best they can be.

We define user types to effectively deliver their specific needs and have expanded this further to include user personas to more effectively 'set the scene' for their needs, skills, expectations and critically the benefits they are aiming to deliver. We have already identified connections and flexibility as two key business elements that digitalisation and improved data is and will continue deliver improved process and outcomes.

Engaging and serving our stakeholders will continue to evolve and expand through the use of single source data portals, meaning that accountability, confidence, decisions, outputs and benefits are increased to best serve their needs. This has already shown increased access and utilisation of our data to deliver value and benefit.

1.5. Delivering smart and flexible infrastructure

The transformation of our network to an energy system that can support the drive to net zero requires smart and flexible solutions to help manage the distribution of energy.

Data and digitalisation are key facilitators of this transformation and to drive insight to improve our understanding and operation of our infrastructure, assets and connectivity.

Providing accurate, user friendly and comprehensive market information and data will support delivery of our DSO Strategy, placing data and digital technologies at the heart of our energy system. By making this data open, we deliver customers and stakeholders the visibility they need to make informed decisions when interacting with our network.

We have already implemented several flexibility services and active network arrangements, such as our Flexible Power platform used for procurement and activation of flexibility. We will increase the visibility of our network through more sensors and monitoring, whilst utilising data such as smart meter data to drive insights at a local level.

This will place better data in the hands of our engineers to aid their decision making whilst also helping implement better and quicker fault detection, a key enabler of the delivery of our business targets that will deliver benefits for customers and stakeholders alike.

We recognise the need to implement new systems and solutions to deliver the needs for our customers and stakeholders and this is a key focus of our digitalisation journey.

Solutions like energy forecasting will ensure the needs of our network in the short and long term continue to be well understood whilst autonomous control systems at the grid edge will optimise localised utilisation for multiple outcomes to deliver improved energy performance.

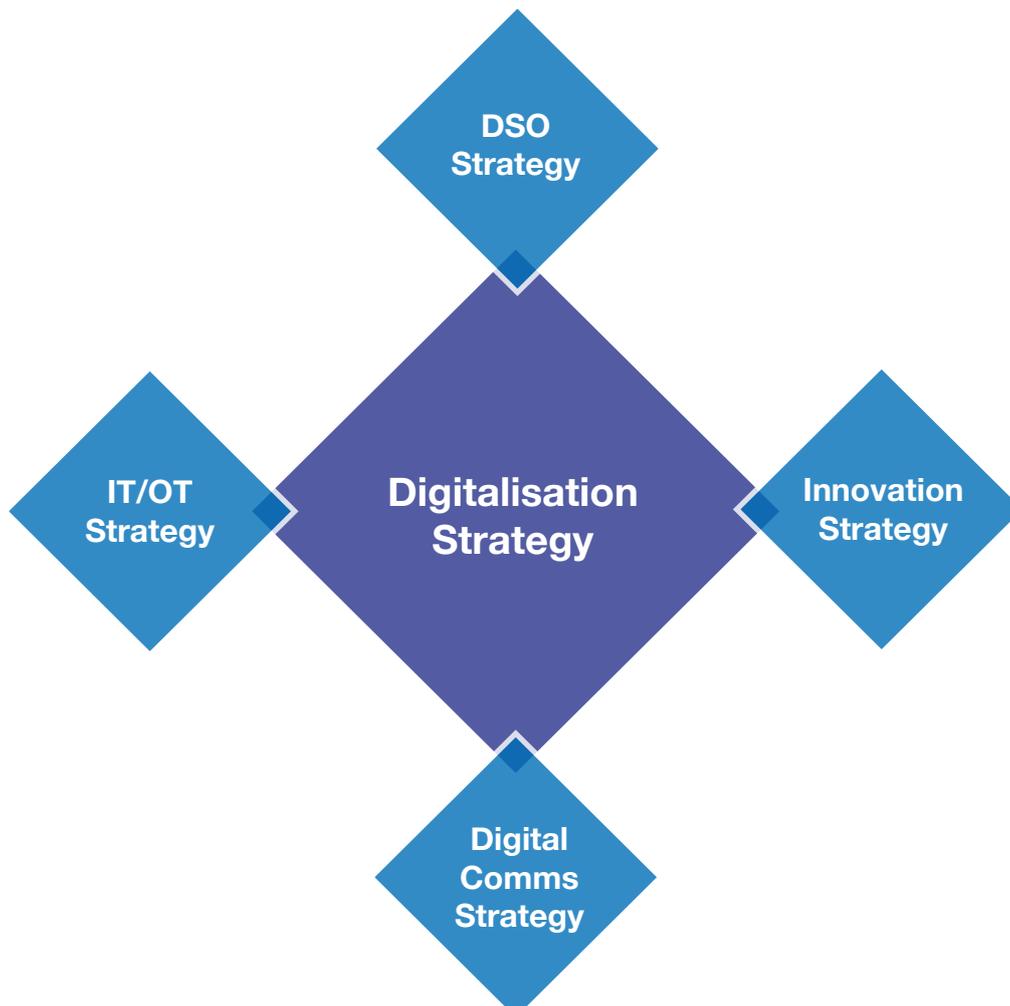


1.6. How each of our strategies fit together

Our Digitalisation Strategy is key to delivering transformational change throughout our business including how we plan, manage, and operate our network, interact with and provide data to customers and market participants. We have made sure our digitalisation strategy is fully aligned and integrated with our other business strategies to deliver solutions to:

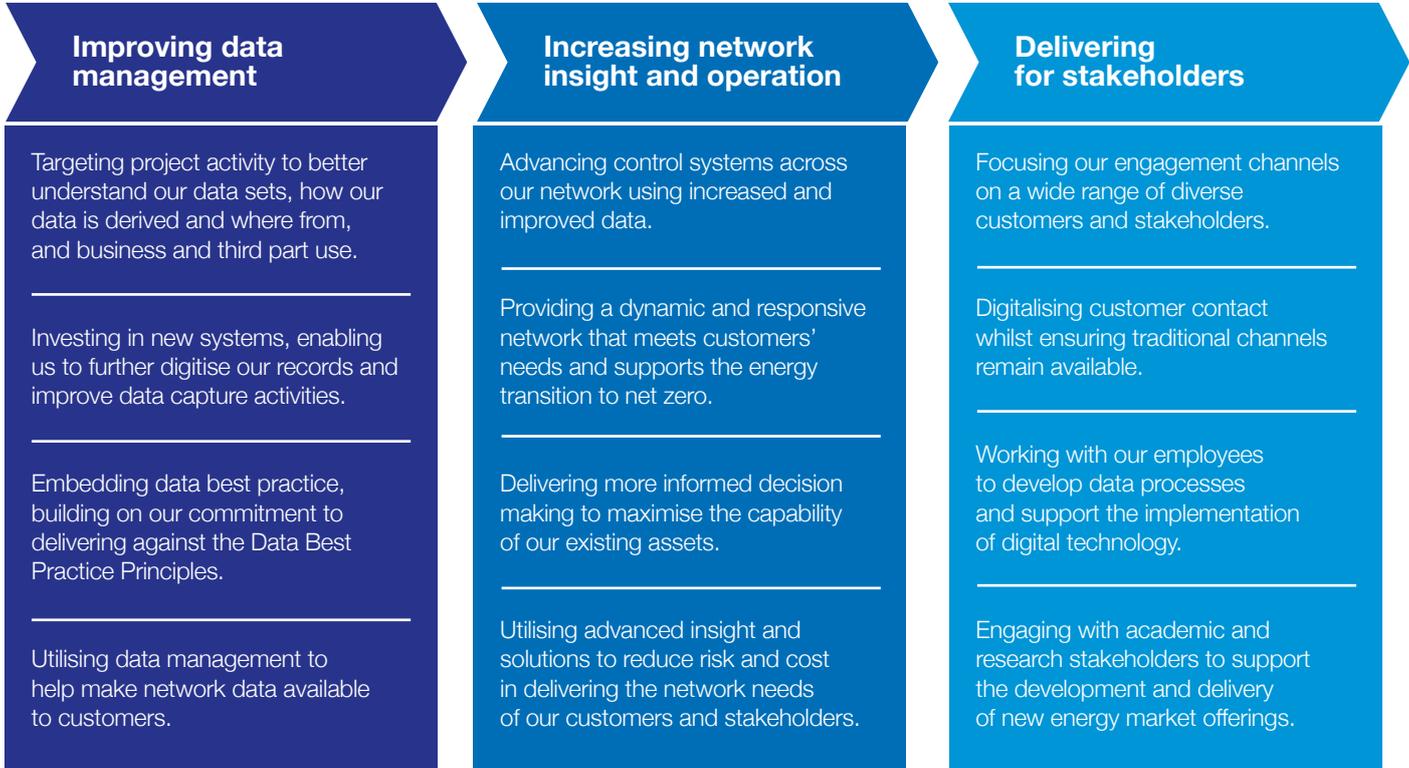
- **Meet the changing needs of our customers:** for example, our Digitalisation Strategy will enable us to collect better data on our vulnerable customers to ensure that we are able to offer them tailored services to support them through the energy transition.
- **Utilise our Innovation Programme to develop data and digitalisation solutions:** for example, our Innovation Programme is developing machine learning (ML) algorithms to identify and propose improvements in our Geographic Information System (GIS) data that will help improve the accuracy of network modelling, regulatory reporting and the information we share with third parties.
- **As the level of our data increases, and is presumed open, it is vital that our Digital Comms Strategy is aligned:** for example, we are using data and digital communications to deliver proactive omnichannel communications that enable us to keep customers better informed and updated and we will align their customer experiences and feedback through a single system of record.
- **Ensure that our future information and operational technology (IT/OT) developments are aligned to the needs of future business operations:** for example, we are deploying the next generation of sensors to our low voltage network, as understanding power flows in real time is vital to deliver on our DSO ambitions, compared to traditional maximum demand sensors.

Figure 4: NGED Strategy integration



2. Our approach

Our Digitalisation Strategy is delivered across three pillars, which have been developed and refined through ongoing internal and external stakeholder engagement. We continue to engage extensively through our innovation, network strategy and dedicated stakeholder engagement team in support of these three pillars and the Digitalisation Strategy.



2.1. Improving data management

Improving our data management is key to enabling the development of digitalised solutions and ensuring our customers can interact with and benefit from our data. We understand the need to continually improve in this area and our success measurements will help us track our progress. A key part of improving our data management is to employ best practice in this area, and we are committed to delivering against the Data Best Practice Principles¹.

Governance processes

Key to robust and appropriate data management is data governance with a clear focus on appropriate data owners and processes, responsibility and transparency in order to enable data quality to be managed and improved. Providing a set of rules and processes to follow that are fit and appropriate for our complete business is key to ensuring that we maintain a consistent approach to data improvement and management as well as providing a route for feedback to improve and adapt as required. Our data governance processes, set out further in our Data Strategy, are managed centrally to ensure coverage across the business and incorporation of all necessary people, process and technology considerations.

Improving data quality

Good data is essential to maximising the impact of digitalisation for our customers and our business. We have seen this demonstrated already in the improvements and innovation delivered in our smart and flexible solutions which require accurate, reliable data to deliver for our customers.

With better quality data, we can better tailor our services to deliver the outcomes our customers require, whether that be providing support services for vulnerable customers or digitalising contact channels for customers looking for self serve solutions. It is therefore key we continually improve the quality of the data we collect and use and the importance of this is demonstrated by our specific data quality success measures which we will use to capture our progress in this area.

The first stage in improving our data quality is to drive improvements in data collection and we will continue to do this by developing the digital data collection methods available to our colleagues in the field, facilitating their ability to make better operational decisions for our customers and our network. Now and through RIIO-ED2, we focus on delivering long term, sustainable improvements in data collection by replacing manual data collection process with automation and supplementing this with ML technology to improve data requesting and collation.

Applying data governance processes is already supporting data quality improvement as well as the implementation of project driven improvement activities to fill data gaps and quality issues.

Our approach to data, including our clear data governance, plays an important role in improving our data quality through clear ownership and responsibility. Implementing this data centric approach throughout our business is driving data quality improvements including changes to how we capture data at source, store the data and manage it. For our historic data we have largely relied on relatively manual processes for improving it. We now focus on rules based improvements initially to enable a degree of automation supported by ML to provide improvement on an enduring basis.

Single source of the truth

We store our data using several different legacy systems, with the same data often stored multiple times (for example, some asset records are held in the asset register and in the control systems).

Storing data in multiple systems can lead to inconsistencies which is why our focus is to have a single source for our data. Furthermore, we will focus on improving the data we hold about our customers, so we can provide better customer service and additional services for our vulnerable customer base to support them through the energy transition.

We have implemented our High Voltage Integrated Network Model (INM), which provides a consolidated canonical model by connecting directly to our three core asset data systems: enterprise asset management, network management and geospatial information systems.

The INM identifies discrepancies in data between these systems and uses an automated ML process to create a single version of our network, assets and connectivity, driving consistency and confidence in data.

We will expand the initial implementation of our central data catalogue to provide regular and reliable single point access to trusted data in a timely and effective manner throughout the business. This will enable customers' decisions to be better informed and made more dynamically (for example, where best to connect their LCTs to our network).

Our innovation programme has already developed new solutions to enhance the operations of our network by having more data available. These solutions, together with advanced control systems, are being rolled out to improve the effectiveness and efficiency of our network operation.

What this will look like for customers

Case Study

Revolutionising customer connections

1 The case for change

The 2030 fossil fuel vehicle ban, and the UK's 2050 net zero target will result in huge volumes of low carbon technologies connecting to NGED's network at a local level, with as many as 1,600 connections expected each day and over half a million each year.

Decarbonisation of transport is a core element of achieving Net Zero, and with all new cars being electrified, this will lead to around **1.5 million** new electric vehicle (EV) connections by 2028. 66% of EV charging point connections are currently classed as 'connect and notify', which means that EV charging point installers can connect the charging point and submit a notifications form to **NGED within 28 days.**

This represents a significant number of applications which could be processed using an automated approach.

This would enable our people to focus on more complex customer activities, providing the industry leading customer service our customers have come to expect from us.

2 Today's challenges

The current 'connect and notify' process is largely manual and can take our team 25 hours to process a batch of 100 applications.

Larger installers can send data for **several hundred new connections each month**, which can lead to a significant volume of applications for our team to process manually, all of which are sent to us at the same time. The volume of applications will continue to grow, so we recognise the need to transform today's manual processes.

We often need to contact installers, which is currently done via email and results in unnecessary delays to the connections process. Furthermore, our customers do not have full visibility of the status of their connection request, and there are limited digital self-service options.



What this will look like for customers

Case Study

Revolutionising customer connections

3 Our vision for the future

The new customer journey is centred around digital self service, providing our customers and their installers with much greater visibility throughout the process.



A new **customer relationship management portal** will replace email as the main communication method, centralising all communication between our customers, installers and NGED.

The portal will act as a **central source of connections data**, which we can leverage to identify areas of high low carbon technology clusters. These advanced insights would allow us to proactively manage our network and continue to provide a resilient electricity supply.



3rd parties can **quickly and simply notify us** of connections using an application programming interface (API) based on open standards directly to the portal.

This will **automate the existing notifications form submission process**. The NGED records team will be notified through the portal of any application errors, identified through machine learning to support our team as we adapt to the rapidly changing energy landscape.

We will continue to contact customers to gather feedback to help us develop and improve, ensuring we provide the same consistently high level of service as we innovate our processes.

4 Benefits for our customers

We will reduce the time it takes to process 'connect and notify' charging point installations by automating a largely manual process.

This means applications can progress at a much faster rate, providing a frictionless experience for customers and their installers.



We understand our customers have a desire for more timely updates and information. The portal offers instant access to information for customers and their installers.

This ensures that they are all well informed at each stage of their connections journey. By making the EV connections process as seamless as possible we can ensure that no-one is left behind in the take-up of low carbon technologies.



2.2. Increasing network insight and operation

Leveraging value from data and embedding digital solutions is fundamental to become a truly digitalised business with enhanced visibility of our operations and network. As part of RIIO-ED1, our innovation projects have delivered new solutions capable of providing enhanced visibility of our network, what it is doing and what it is likely to do.

During RIIO-ED2, we will continue to deliver and build on these improvement and innovation solutions, such as automated optimised outage planning solutions, and together with advanced control systems we will roll these out across our network. This rollout is aligned with our customers incrementally switching from fossil fuels to electricity to meet their heat and transport needs, requiring a more dynamic and responsive network. Using increased and improved data is key to how we operate our network in real time and the provision of more informed actions will help maximise the capability of our existing assets and how we maintain, plan and reinforce our network in the long term.

Additional data and monitoring

Improved network monitoring and access to more data enables decisions to be better informed and made more dynamically. It is becoming ever more important to have access to data with greater granularity as customers are increasingly engaging with the network for responses to their needs. We are improving our base level network visibility to inform our business and customers with planning and operational timeframes. Targeting areas of greater LCT integration, either actual or projected, with more dense data capture capability in the first instance will support our customers and our business with informed optimised operation to minimise the need for traditional network reinforcement.

We will drive value from increased asset data, such as data provided from increased sensors on our Low Voltage assets, to understand the condition of the network and specific assets. This will enable greater proactive asset management to identify and plan interventions which deliver cost savings and risk reduction over routine or time based maintenance.

As well as network data and monitoring, we recognise the value wider data capture can bring to inform and improve our customer service business efficiency, from understanding processes like new connections and outage planning, to how we engage with customers effected by power cuts.

Understanding yesterday, today and tomorrow

Detailed understanding of our network's historic, live and future activity informs key network operation decisions for us and our customers on how they operate their assets or connect and interact with our network.

We have recognised this need and share our real time and historic network power flow information openly in our three formats, highly visual, raw data and API, for our four licence areas and have reflected this in our business targets and digitalisation success measures.

Our commitment is to further increase the granularity of this data to provide greater insight and as our forecasting maturity develops, we will share this in the same manner to support increasing use of our flexibility services and other solutions.

Use of external data and services

Whilst we are increasing the density and volume of monitoring and data capture on our network, it is recognised that there's a need to use relevant external data sets and services to leverage greatest value. Therefore, a key focus is to increase the volume of external datasets and services that can be used or combined with our data to deliver greater insight and improved decisions.

We already harness data, including weather forecasts to inform our operational decisions. We will be making greater use of smart meter data to inform our processes, make service improvements and minimise power cuts.

As we make more data available, we recognise that others will also have skills and capabilities to drive value from our data. By sharing more data with third parties (while maintaining privacy and compliance), we will be able to identify new improvements and will consider using these third party services to benefit our network and customers throughout RIIO-ED2.

We will also look to work across the industry to improve the data we hold about our vulnerable customers. We recognise that vulnerable customer data can be improved, and better sharing between peer organisations and across industry (for example, Water, Telco and Transport) can enable the identification of customers who need additional support services.

What this will look like for customers

Case Study

Data driven asset management

1 The case for change

We have explored a range of credible net zero pathways for the growth of our network, allowing us to adapt to support our customers' future needs.



With the decarbonisation of transport and domestic heating, our customers and vulnerable customers in particular will further rely on our service, and so the necessity of a resilient supply will continue to grow as electrification accelerates.



Increases in homeworking, electric vehicles and heat pumps mean that our customers rely on our network performance more than ever. We plan to continue improving network performance, with our customers currently on average experiencing **one interruption every two years lasting 24 minutes.**



We carry out inspections to prevent faults that can ultimately lead to supply interruption for our customers. Our network is more complex today, with two-way power flows and an increasing level of low carbon technologies. Traditional inspection methods need to be replaced with intelligent and data-driven solutions to ensure our assets can meet the challenge of increased customer demand and generation.

2 Challenges with today's challenges

We are already using Light Detection And Ranging (LiDAR) valuable inspection data for our team, including the distance equipment for our helicopter fleet, which has provided between overhead line conductors and vegetation.



LiDAR scans are currently analysed manually by local teams to guide their clearance work. We recognise the benefit of creating a consistent, centralised approach throughout the business, reducing the manual processing of inspection data to allow our team to quickly analyse scans and carry out data-driven clearance work.



What this will look like for customers

Case Study

3 Our vision for the future

Our enhanced approach to inspection will use our helicopter fleet equipped with LiDAR to detect issues such as tree and vegetation overgrowth automatically. Helicopter imagery also provides the added benefit of identifying other safety issues such as damaged poles and signage which could pose a safety risk.

Once our network has been scanned, we will use automated data capture processes to store the scans in our asset management platform, without the need for manual human intervention.

We expect that 10% of more complex clearance work will require a member of the asset management team to review the LiDAR data and approve the auto-scheduling of a job to clear the vegetation.

The job is automatically scheduled at the same time as another maintenance job at the same location, and our team is dispatched. Our team have access to the LiDAR imagery on mobile devices and perform the clearance work.

4 Benefits for our customers

Our new process will allow us to build on the current use of LiDAR, integrating with our asset management system to improve visibility of inspection data throughout the business. This will allow us to collect LiDAR data to track changes and begin to predict the distribution of vegetation throughout our network.

We aim to **predict potential issues impacting our network before they occur**, reducing the chance of power cuts and interruption affecting our customers, and ultimately saving them money by being able to deploy the lowest cost and earliest interventions on our network.

Our ambition is to **fully transition to LiDAR scanning** as our standard inspection method, replacing more manual and less optimised techniques. This approach will allow us to be more prescriptive in managing tree cutting and vegetation management so we can continue to provide the reliable service our customers expect.



2.3. Delivering for stakeholders

Our stakeholders have told us they have different needs and expectations for the same data. That is why we are committed to ensuring the right data is available in the right format at the right time to serve different users.

Dedicated engagement focused on data and digitalisation ensures our Digitalisation Strategy is focused on customers and stakeholders and our solutions provide the digitalised service our customers require. Data and digitalisation is also at the core of our internal and external wider business engagement, delivered through our ongoing innovation, network strategy and dedicated stakeholder engagement channels.

Defining needs and engaging

We understand that our customers, employees, and stakeholders have specific needs that require our data and digitalised solutions and it is key we engage and explore with customers to align to these. To ensure the development of these solutions and our customer service remains tailored to these needs, we will continue to focus our internal and external engagement on an action and benefit process. This process focuses on what actions are required to deliver the benefits customers are seeking and what data is necessary to facilitate these. To reinforce and drive this, we are also introducing specific success measures relating to understanding the needs of our customers.

Through consultation with stakeholders and customers, we build our understanding of how to present the data that is most useful for our customers. We have successfully used this process to gather extensive data use cases categorised against five internal and six external data user categories:

Internal

Design and planning

Network planning engineers, commercial flexibility managers and support staff.

Operation

Network control room functions for DNO and DSO functions.

Finance

Financial managers, finance support functions and reporting.

Regulatory

Business analysts, regulatory reporters, and operation planning staff.

Information/operation technology

System architects, communication engineers and maintenance support.

External

Energy sector

Aggregators, energy providers, flexibility platforms, network operators, electricity generators and renewable generators.

Academic and innovators

Academic researchers, entrepreneurs and innovators.

Third sector

Charitable sector, campaign groups and community energy organisations.

Public sector and regulatory bodies

Local Authorities (LA), policy makers, regulators, social work and care systems.

Commercial

Commercial energy market, low carbon technology provider, consultants, developers and EV fleet operators.

Consumer

Consumers, investors, and intensive energy users.

By sharing our current user types, we can understand from feedback and engagement where these can be developed and enhanced moving forward, ensuring we are capturing the right user types to prioritise datasets and digitalised solutions.

We continue to use a number of diverse engagement strategies, from our traditional face to face round table events to providing regular communication in digestible digital formats, such as short podcasts and videos of our latest developments and activities.

Consultation is also important to our engagement approach and we will provide opportunities for customers and stakeholders to continue feeding in to formal consultations as well as short polls on LinkedIn and Twitter, to provide quick and easy ways for all user types to readily engage.

Increasing internal access to data

Access to a single version of centralised data internally and externally is critical to ensuring that our business and operations continue to be coordinated, efficient and effective whilst providing visibility to customers to inform their decisions. To do this, we are moving away from locally owned and derived datasets to ensure that data is available as required as its importance in the delivery of digital solutions and in the eyes of our stakeholders grows.

We will build on our data catalogue and governance activity to ensure that our data is always accessible to drive consistency and system benefits internally and effectively shape the delivery of the needs of our external data users.

Additionally, we will continuously and actively look for developments and improvements both to the data itself and our access processes to ensure they are fit for purpose and support our overall Digitalisation Strategy.

Discoverable and searchable

We are committed to making sure that our data is both discoverable and searchable. We recognise that data can be difficult to find and we have undertaken a number of activities as a business and a wider industry, through the Energy Networks Association (ENA), to ensure that this is no longer the case.

In support of this, we are continuing to develop our Connected Data Portal² that is key to further improving the availability and access to our data and complementary data sets. This is a crucial part of our improved data management activity, ensuring that we first understand our data, its format, its key descriptors and other relevant information to drive value. This online data catalogue, complementary to our internal version, will ensure that customers and stakeholders are provided the right data, in the right format at the right time.

Standardised and usable

We are collaborating on an ongoing basis within our industry to increase data standardisation, with the Embedded Capacity Register (ECR) for example, but we are aware that customers need greater standardisation of data across electricity distribution network operators and wider energy system operators. We are committed to facilitating this standardisation and the provision of usable data supported by information to access, interpret and drive value from the data.

An online version of our GIS system is already available and we will continue to develop this to provide customers the information that they need to support their planning activity and beyond, and act as a basis in supporting the implementation of the network wide Digital Energy System Map³.

We will drive the standardisation of the terms used to describe data, whether that is datasets or the detail within them, across the industry so that when a stakeholder is searching our data they are provided the same detail as any other DNO. We will also continue to lead the discussion with the energy sector to further standardise data terminology through the implementation of an industry wide glossary and vocabulary.

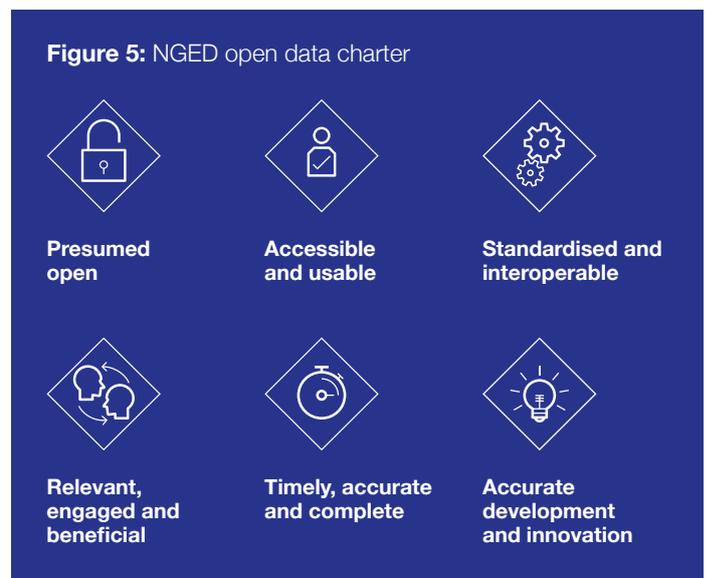
Open data charter

We understand the value of data, to us, our customers and stakeholders and are committed to our data charter to ensure we capture, manage and share our data to enable the delivery of the net zero transition.

Central to our charter is presuming data to be open and accessible to customers and interested third parties.

A company wide, centralised data sharing assessment tool has been implemented to provide consistency in the way we assess the openness of data. It is not simply the process of sharing our data but ensuring it is shared in a timely, accurate and complete manner that provides for our customers' and stakeholders needs.

This targeted approach to data sharing ensures that our delivery stays focused on effectively delivering against the expectations of our stakeholders and facilitating digitalised customer service for our customers.



² <https://connecteddata.nationalgrid.co.uk/>

³ <https://www.energynetworks.org/newsroom/new-digital-energy-system-map-shows-the-power-potential-of-energy-digitalisation>

What this will look like for customers

Case Study

Distribution system operator of the future (DSO)

1 The case for change

The energy system is evolving from large scale centralised power stations to a more decarbonised, and decentralised electricity system where our customers are empowered to play a central role in our transition to net zero.

As our customers adopt low carbon technologies or generate power more locally, we recognise the need for **enhanced network planning and forecasting data** to ensure our network can support any of our Distributed Future Energy Scenario (DFES) pathways.

We have a long established innovation portfolio under our Future network programme which has set the foundation for our DSO capabilities.



NGED is also evolving to meet our customer's needs, taking on additional responsibilities as a Distribution System Operator (DSO) to transition from a traditional passive network, to a more active regional network where demand and generation are balanced locally.

For example, our OpenLV innovation project demonstrated how data can be used to support emerging flexibility solutions.

The project gathered around 15 million data points each day and provided access to local communities, allowing customers to harness this data to advance their net zero ambitions.

2 Our vision for the future

We already publish network data including long term five-year window, and shorter-term forecasting, which is up to two years and based on a greater certainty of flexibility needs.

In RIIO-ED2 we will significantly expand our market data provision across a range of time scales to optimise short term and longer-term markets.

We will use machine learning and artificial intelligence to determine the optimal contract lengths for our market participants.



We will provide a more granular level of network data than today, including directional power flows, asset capability (design ratings and health/condition), network configuration and present and historic operation.

This granular network data will be enabled by deploying the next generation of sensors on our Low Voltage (LV) network and utilising smart meter data, which are core elements of our new Network Visibility Strategy.



What this will look like for customers

Case Study

Distribution system operator of the future (DSO)

We are investing in our Planning State Estimation and Data Historian platforms, which will enable us to consolidate all our real time data sources into one place, including SCADA, monitoring, and smart meter data.

This will equip our operations staff with 360-degree network visibility, to improve operational decision making and improve our long term network planning processes.

 This improved network visibility and insight will enable us to work much more closely with National Grid (NG ESO), ensuring that flexibility dispatch decisions are made in the interests of the whole system. We will share granular network data on timescales, network operation, flexibility procurement and flexibility dispatch with NG ESO using automated data exchange methods.

 All our improved network and market data will be automatically stored on our Open Cloud Data Platform. Market participants will access this data through a range of self-serve options including interactive maps and raw data.

We are also planning a significant upgrade to our DSR operational systems to automate process and workflow, and develop APIs which will allow market participants to interact with us using automated data exchanges.

Finally, our Innovation Hub will facilitate collaboration by enabling us to work with 3rd parties to test and trial new ways of working in a controlled environment. For DSO, this might be the provision of market support services for flexibility management.

3 Benefits for our customers

During RIIO-ED1 we have been able to utilise more than 590 MWh of flexibility, resulting in savings of over £26 million in reinforcement costs for our customers.

We anticipate a significant expansion of the use of flexibility over the RIIO-ED2 period.

 Improving the frequency and granularity of our market data will drive increased competition in flexibility markets, lowering costs for customers and increasing resiliency by providing more flexibility options.

 Closer collaboration with NG ESO will reduce costs for customer by improving whole system decision making, and reduce the risk of any conflicts. Introducing our Innovation Hub will drive the creation of new, innovative services in the future, such as vehicle grid flexibility models which will enable many more of our customers to participate in flexibility markets themselves.



2.4. Assessing where we are today

We recognise that our transition to a more digitalised and data centric business needs to be appropriately measured to understand our current position and clearly demonstrate our progress as we deliver our Action Plan.

To support this, we have implemented a standardised maturity model to enable a common approach and understand of progress is seven key areas. We have undertaken a number of internal workshops to understand our current digitalisation and data maturity, across 16 business units.

We will regularly review our position on the maturity scale, with clear detail as to what actions and developments have driven an increase in maturity. We will continually evaluate the value and benefit of assessing our maturity scale in this manner based on feedback and any approach to further standardise maturity benchmarking and assessment throughout the energy industry.

Table 1: Maturity model

| | Unaware | Aware | Developing | Competent | Leader |
|-------------------------------|--|---|--|--|---|
| Leadership | Data focus is not recognised in the business. | Some departments with recognised accountability for aspects of data exist, however are not joined up. | Aspects of leading edge practice in data management work together with established steering groups and a small amount of cross function working. | A Data Strategy has been developed and is appropriate for the business that has been adopted robustly throughout. | Senior management throughout the organisation drive new thinking and behaviour on data throughout the business. |
| Prioritisation | No company wide view of which information is key for business decisions. | KPIs developed and business critical data understood to support management reporting. | Data model linked to key data management decision processes. | The data model is use to actively prioritise IT and data investment decisions. | Business wide data model that is used to drive all key IT and data investments. |
| Value chain | No understanding of the cost and value of information. | Project costs are tracked but only qualitative benefits for data and IT investments. | The true costs of dedicated management of data and information are understood and measured. | The value chain for data and information is understood and documented from raw data to access for decision making. | Whole costs and benefits of managing data and information are understood and monitored robustly. |
| Performance management | No data quality measurement process exists. | Data quality measurements only for regulatory requirements. | Widespread quality management measurement but only limited and localised initiatives to manage quality. | Comprehensive quality measurement and process to maintain quality levels. | Data quality actively managed and optimised to meet business needs. |
| Motivation | People in the organisation only value the data they actually use themselves. | The need for quality data is clear when managed and used locally. | An appropriate system is used to incentivise behaviours around data quality within SLAs and KPIs. | The business consequences of data quality are widely understood and the long term benefits of quality data are valued locally. | Everyone in the organisation treats data and information as a core asset. |
| Data process | Process for capturing, processing and correcting data are not documented. | Process for capturing, processing and correcting data documented and improvements actioned locally. | Company wide coordination of data quality process improvement under a centralised process. | Strategy to implement data and information maintenance process to reduce one off improvement and data cleansing requirements. | Data and information managed as an asset and data quality processes integrated into core business processes. |
| Approach to IT | Data and information strategy is seen as an IR/IT problem. | Some attempt to define roles between IR/IT and data roles exists. | Some cross functional prioritisation of data and information system developments is in place and cost benefits are tracked. | Usability is the key measure of system success for IR/IT and data roles. | Strong collaboration leading to creation of solutions using appropriate technology within a Data Strategy. |

Q2 2021

Start RIIO-ED2

End RIIO-ED2

3. Our Data Strategy

3.1. Our progress against the EDTF recommendations

Moving from a legacy analogue system to a modern, digitalised energy system, is a critical step in enabling the UK's transition to net zero carbon emissions while keeping the lights on for customers. The availability and use of good quality and accessible data is key.

This means providing increased access to the right data at the right time within our organisation and through open access to our customers and interested stakeholders.

Digitalisation applies to the whole energy industry, not just the network operators like us. We recognise that our central position in the energy delivery chain – independent from energy service providers, suppliers and generating companies – means our role is critical.

Therefore, we have and continue to work proactively with the other energy network companies via our trade association the Energy Networks Association (ENA), the government's Energy Systems Catapult (ESC) and our wider stakeholder community to identify the data that should be shared across the industry, how it should be consolidated and presented, and how it can be accessed.

ESC's Energy Data Taskforce (EDTF)⁴ Report identified five key recommendations to support the transition to a modern, digitalised energy system and we have included a summary below of the latest status against each of the recommendations:

| | |
|---|--|
| <p>Digitalisation of the energy system</p> | <ul style="list-style-type: none"> • Lead role on the ENA data triage work, providing a member wide playbook learning from our POD NIA project. • Refreshed our Digitalisation Strategy and Action Plan for RIIO-ED2, taking a greater business wide approach and further focussing on customer and stakeholder outcomes. |
| <p>Maximising the value of data</p> | <ul style="list-style-type: none"> • Standardised open data licence implemented to ensure use of our data is maximised. • We are holding quarterly data science challenges in collaboration with the Energy Systems Catapult to demonstrate the 'art of the possible' with our data, and to engage new innovators. • We have a RIIO-ED2 Business Plan commitment to make 60% of our network data available via API. • We are planning a 'Gitlab' repository to share our data science insights in a usable format to demonstrate how to drive value and insight from our data. |
| <p>Visibility of data</p> | <ul style="list-style-type: none"> • We have a standard API implemented in the cloud data platform to make more available, visible and to be used more consistently. • We are the first DNO to release real time data at licence area level and now down to GSP, including demand, import and generation (by type). • We have implemented an internal data catalogue and our open data triage process which has resulted in over 150 data resources being made openly available to our customers stakeholders. |
| <p>Coordination of asset registration</p> | <ul style="list-style-type: none"> • We release all generation data, connected, offered not connected, or enquired not yet connected at all voltage levels aggregated to primary substation level to understand current and future asset picture. • We release monthly LCT enquiry and connection data, at primary substation level. • We are implementing automated low voltage LCT notifications via our connections portal • We are continuing our work on the Embedded Capacity Register (ECR), which is the agreed mechanism for sharing distributed generation data above 1MW on DNO networks, to include generation down to 50kW. |
| <p>Visibility of infrastructure and assets</p> | <ul style="list-style-type: none"> • We are the first DNO to release asset and network connectivity data in Common Information Model (CIM) format and how we have expanded this to be at specific GSP level for use of data use. • We have delivered innovation work with Wales and West Utilities (WWU) using respective data sets to support the development of multiple scenarios for South Wales net zero 2050 planning. • We are also actively supporting the National Energy Systems Map programme run by the ENA. |

⁴ <https://es.catapult.org.uk/news/energy-data-taskforce-makes-five-key-recommendations/>

3.2. Going beyond the EDTF recommendations

Our ambition is to go further than the recommendations in the EDTF. We have been proactive in identifying actions and principles that will take us beyond the EDTF recommendations.

Data is everyone's role

We are quickly moving from an approach where data was handled by a few specialist staff to a coordinated approach to data management and utilisation through all employees within the business.

This has been supported through the use of tablets with applications to view, capture and manage data more effectively out in the field and the implementation of new centralised data solutions. We are committed to continuing and advancing this principle, through systems and appropriate training to encompass a culture of responsibility and ownership of data.

We are also working on our data culture skills and training to our front line and office based employees to ensure we all understand why data is important, and that it should be treated with the same care that our physical engineering work is and how to maximise its value.

Sharing when asked to presuming open

Better customer and stakeholder outcomes across flexibility markets, new connection propositions and asset operation, will be best delivered by data being provided in a timescale and format that suits their needs.

We will continue to transition our culture from sharing data when asked to asking why data cannot be shared open and transparently in a format or formats that suit all. We recognise that this requires a significant change in mindset across our business which will take time and needs to be continually reinforced.

Best as a business to best as a sector

Supporting wider capability and capacity throughout the sector, sharing our process as well as our output moving forwards, is key to ensuring we support the advancement of the wider energy sector and not just our business. We have proactively taken this approach in the use of CIM as a mechanism to share asset and infrastructure data and will proactively seek opportunities over RIIO-ED2 to work across sectors to deliver whole systems outcomes for our customers and stakeholders.

Taking our customers on the journey

There are many data and digitalised developments we can make to support active and informed customers on their journeys, where they are perhaps ahead of us in their digitalisation journey, however, we recognise, through our user personas, that a number need greater support from us. We will deliver and demonstrate solutions and examples of how our data can be utilised, on its own or as a combination of multiple datasets to provide outputs that can improve multiple outcomes. We know that each of our customers groups have different needs when interacting with data, and we will ensure that we put in place additional support for vulnerable groups.

Structured approach to knowledge gathering

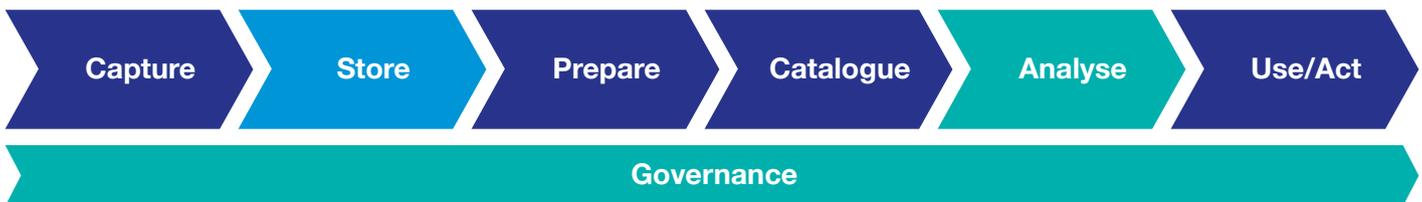
As we identify the need for development and investment, we have engaged beyond the energy sector, such as during the implementation of our data catalogue leveraging learning from other sectors who have successfully implemented such technologies. Moving to a structured and formal approach to regularly and routinely capturing knowledge of the digitalisation journey and process of wider sectors through strategic relationships to inform our longer term roadmap will move us away from tactical to strategic engagement.



3.3. Our Data Strategy

Our Data Strategy is key to delivery of our wider Digitalisation Strategy. The value of data to inform better decision making and enable action is unlocked through a consistent, well developed and managed data lifecycle. Our approach is focused on six key steps:

Figure 6: Data and value flow



Capture

Understanding the data that we need and our customers need is critical.

Our approach to data capture is focused both on our asset and network information, real time and historic energy flows and key third party data, as well as data to support our customers better, such as vulnerable customer information, channel preferences and previous interactions with us.

Implementing the right systems and solutions to facilitate this, from enhanced field tool systems, enabling our staff capture, track and verify data at source is important to capture the right data first time, every time.

Store

Ensuring that our data is stored and structured effectively will enable greatest value and insight from our data.

Our strategy is focused on the ongoing implementation and development of master data management, delivering benefits through defined master storage systems, supporting a 'single source of truth' data culture and enabling greater defined data flows between source storage systems to provide greater insight as needed.

Greater use of data lakes, warehouses, and visualisation layers as appropriate will enable the further steps of our data pipeline to deliver optimised data for our staff and customers to act through direct access to the right structured or unstructured data.

Prepare

The value of data is driven through the correct management and presentation to the right systems and users at the right times.

We recognise the value of providing well structured data to end users, both data proficient and those on the start of their data journey. Our preparation will focus on prioritised datasets being regularly and routinely extracted, described (metadata and dictionaries) and presented to our internal data catalogue.

A key element of data preparation is understanding and management of quality and completeness, presented to all along with the data. An integrated approach to data management means that analysis and action further in the process will continue to inform capture and storage techniques to enable improvements.

Catalogue

A single access repository for business data internally (and externally) drives many tangible benefits; reducing the time to access the right data, increased trust in data and greater understanding of the data as a result of it being well described.

This facilitates improved data governance and understanding of the data within the organisation to enable business wide improved operations and decision making, and also enables us to make our data available to customers and stakeholders, including better quality descriptions of what each data set contains.

3.3. Outlining the strategy

Analyse

Being able to analyse data to drive value from it by both data and business experts will ensure that we continue to maximise the value of data for us and our customers.

This means implementing market leading business intelligence tool(s) linked to our source systems and structured datasets to create highly visualised and digestible information and insight to improve all aspects of business operation.

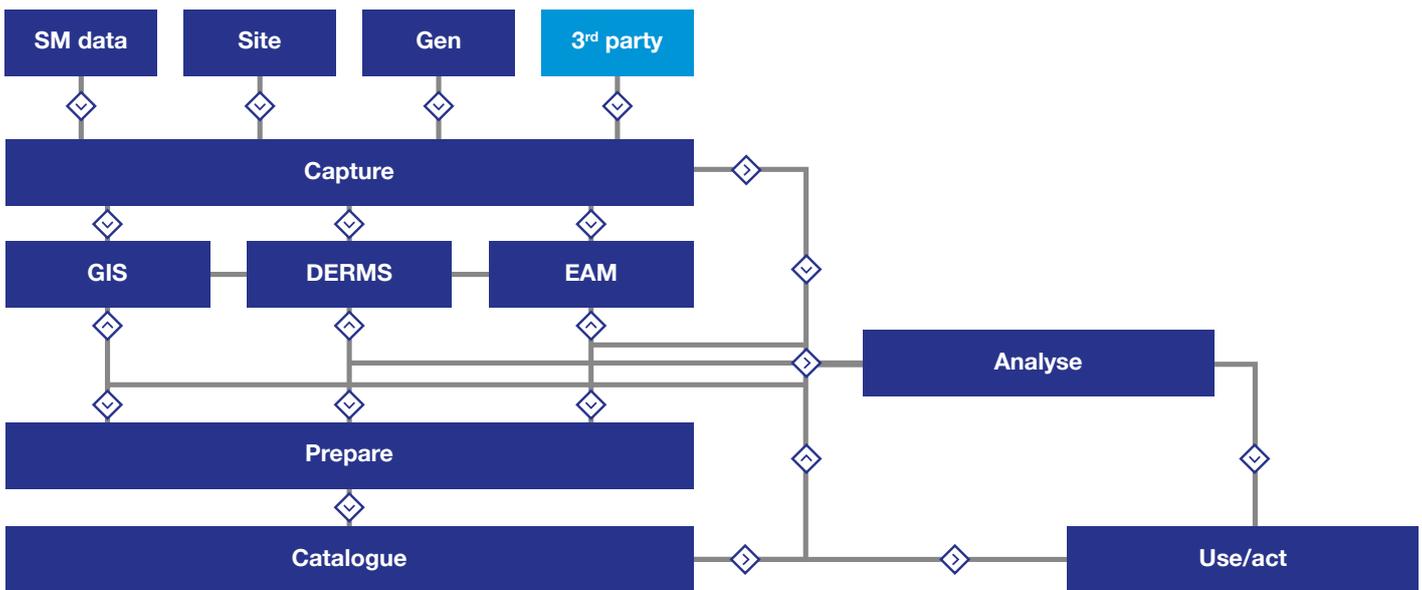
Utilising advanced data science techniques, incorporating ML and other solutions to automate the process of driving insight from data will also be a feature of our analysis activities moving forwards.

Use/act

Being able to use and act on data is the driving force behind our data strategy. Analysis plays a central role in providing the right data, in the right format at the right time to enable our employees and customers make informed and improved decisions.

An integrated and consolidated approach to data management will enable this. An example of this is highlighted below, demonstrating the possible flows of data for a subset of asset and operational data. Turning high volumes of complex data in to clear and well structured information will continue to ensure that data and insight is valued to support decision making whilst ensuring that data is suitably democratised to be shared, valued, and utilised externally.

Figure 7: Example data pipeline flow (asset and operation data)



3.4. Our approach to Data Governance

Our approach to Data Governance encompasses people, process, and technology to leverage data as an asset through appropriate data ownership, accessibility, security, quality and knowledge.

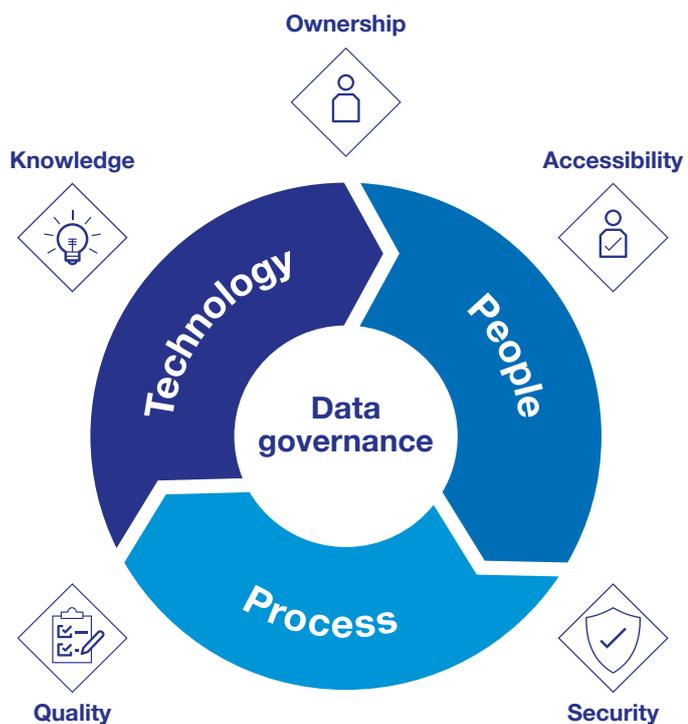
The development, delivery and implementation of these key aspects will be managed centrally, and as such data governance must span the whole business to ensure a uniformed and strategic approach.

Our data governance framework ensures the confidentiality, quality and integrity of our data and our customers' data, which we recognise is essential to meet social and legal obligations, such as regulatory compliance, data sharing and privacy policies. We use our data governance to significantly reduce the risk associated with data; both business and compliance by increasing oversight, ownership, visibility, and management.

It enables the integration and consolidation of information from multiple systems historically managed in silos throughout the business into a single source of truth, providing economies of scale and making it possible to effectively tie information policy and process to business strategy, delivery, and efficiency improvements.

Below is a summary of the key actions we are progressing and our future plans for data governance across people, process and technology:

Figure 8: NGED governance model



- #### People
- Defined roles related to data across the business consistently (for example, data owners, data stewards, data operators), including deciding to centralise data stewards in the digitalisation and data team to reflect our data maturity.
 - Drafted a business wide Data Governance Policy which will be signed off and baselined by the end of 2021, containing clear priorities and actions for the next 18 months.
 - Development and implementation of an internal data engagement process to facilitate all data users a mechanism to feedback on issues and track wider issues raised throughout the business. This will also facilitate a feedback mechanism that will publicly (internally) demonstrate steps taken to improve and progress on relevant issues raised.

- #### Process
- Benchmarked our current level of maturity for data governance and identified our future target maturity state to ensure that we take a whole business, strategic approach.
 - Created and implemented a data triage playbook to assess all data shared externally, which will be expanded to include a process for internal data access by the end of 2021 – these datasets will be classified using the ODI's Data Spectrum, where the process of classification is documented within a data classification and triage policy as standard technique.
 - Agile pilots of data capture feedback loops for data quality issues driven from dashboard insight, for example including additional data tasks on annual site inspections to improve data quality. We will run additional pilots in multiple business areas throughout the organisation in 2022.

- #### Technology
- Implemented an enterprise level business insight tool to move away from ad hoc dashboard /insight solutions, providing consistent business wide access.
 - Implementation of an internal industry leading data catalogue in recognition to centralise and organise data access throughout the organisation and reduce localised data harvesting initiatives.
 - Identification and resolution of data mastering issues between systems, for example we have reviewed and resolved discrepancies between GPS coordinates in our EAM and GIS using API technology.
 - Development and use of ML techniques to undertake asset data quality improvements, leveraging data quality reporting from the data catalogue and our INM solution.

3.5. Delivering data best practice

The need for data best practice is clear and we are committed to ensuring our activities are in line with the data best practice guidance, adopted by Ofgem, which outlines the twelve principles. We have led the energy industry in implementing data best practice through our connected data portal and Data Triage Playbook, we will continue to build on our success to address the emerging challenges of the net zero transition. This section is further expanded in the annex – data best practice - for more information on our progress and planned action.

Progress to date

Internal stakeholders have been mapped thoroughly according to their roles and responsibilities, giving us insight into data maturity, ownership and quality.

This in turn has allowed us to map data owners, operators, users, subjects, managers of data and the responsibilities. We have also used GDPR as an opportunity to understand data assets and processors.

We have led the UK DNOs in the adoption of the CIM standard for network assets and connectivity and since 2020 have used it to share network asset and connectivity data externally and have continued to work collaboratively with industry partners to agree on common terms in the embedded capacity register and other projects. We have also implemented the Dublin core metadata standard which has create consistency in the presentation of data externally, and furthermore provided a common data dictionary to help end users understand the contents of fields and units of measurement.

Our connected data portal has been the front line for making data discoverable, not only publishing highly visual datasets on interactive maps but also providing raw data for download and APIs for programmatic access, working to transition to standard formats such as CSV, JSON and XML.

We have participated in the open energy beta to integrate into the wider energy ecosystem further, including contributing our extensive stakeholder research into internal and external use cases; data quality maintenance has been guided by this stakeholder analysis.

We have developed a comprehensive set of presumed open resources and tools that form the data triage playbook. This has been built into the ENA Data Triage Playbook⁵ which draws on our approach significantly. As an organisation that adheres to the Network and Information Systems Directive (NISD) our data is held as an independent asset, rigorously triaged for security and privacy.

Planned action

As discussed in the section ‘engaging our stakeholders’, internal and external roles will be continuously iterated as digitalisation moves forward.

An internal data forum will be convened to crowdsource data knowledge from the organisation, agreeing internally on common terminology and ensuring metadata consistency as we add elements to the base of Dublin core, and expanding our ability to explain data to end users using data dictionaries.

We will maintain the approach of offering relevant services to our stakeholders, an example of this is mapping functions that remove the need for a user to download and map data themselves but allowing them to do both easily. Furthermore, we will build up our search engine ranking through regular publication of high quality data to make the data more discoverable. We will continue to use our effective and extensive engagement to drive prioritised needs and datasets. Extensions to our current feedback process on data will enable direct comment and feedback to be managed on data quality, at dataset or field level to further improve our understanding of our data users’ needs.

On the technical side, we are committed to delivering data in standardised, machine readable formats which promote interoperability and will continue to lead and participate in industry groups which champion interoperability. We will seek to ensure our data is published in a timely way, moving towards real and near real time APIs where this has value for data users. All data accessed internally is stored on premise and mirrored in a cloud environment for external access. Moving forwards we will utilise a hybrid, public and private cloud architecture to deliver improved data availability and access through enabling staff and external data users’ access to the same datasets.

As we transition increasing volumes of data to the cloud we will ensure that there is dedicated, skilled cyber resource to provide in house specialists, supplemented with expert third party resource where required, to ensure that our operating principles are optimised. The utilisation of advanced data analytics techniques will be employed to further automate our Open Data Triage process. This will continue to expand our data shared openly and to all. The expansion of the use of our data catalogue, to surface and discover data automatically will also enable this – supporting the continuing strengthening of our internal data governance.

4. Putting our customers at the centre of digitalisation

Our data, and more broadly our digital tools, have multiple different customers with different needs. We have conducted extremely thorough engagement sessions with our internal and external stakeholder groups, set out in 'engaging our digital and data stakeholders' and the accompanying annex.

Through consultation with stakeholders and customers, we have built our understanding of how to present data and create tools that are most useful for our customers. We have successfully used this process to gather extensive data use cases categorised against five internal and six external data user categories, which are expanded into user personas as demonstrated in the examples below.

Internal



Design and planning

Network planning engineers, commercial flexibility managers and support staff.

Emphasis on better data for assets, condition, and health, combining data to provide risk profiles and analysis for short term and long term scenario planning.



Operation

Network control room functions for DNO and DSO functions.

Particular emphasis on forecasting, visibility between dependent systems, enabling the DSO transition by digitalising interactions and providing them on a self serve basis where possible.



Finance

Financial managers, finance support functions and reporting.

Details of high level plans and initiatives across the business and how these affect our financial position, communication of financial position to management and executive.



Regulatory

Business analysts, regulatory reporters and operation planning staff.

Emphasis on regulated metrics, such as health and safety, network, customer and financial KPIs, status and progress on major projects.



Information/operation technology

System architects, communication engineers and maintenance support.

Emphasis on the status of IT and OT support systems, technical fixes and development roadmap, system connectivity and dependencies.

External



Energy sector

Aggregators, energy providers, flexibility platforms, network operators, electricity generators and renewable generators.

Accessing information on assets, locations, connection potential and anticipated growth of LCTs.



Academic and innovators

Academic researchers, entrepreneurs and innovators.

Information on location specific system performance, opportunities for investment, participating in local area energy planning.



Third sector

Charitable sector, campaign groups and community energy organisations.

Information to support policy change to address the needs of vulnerable consumers or promote decarbonisation.



Public sector and regulatory bodies

Local authorities, policy makers, regulators, social work and care systems.

Information that supports policy changes to enable decarbonisation or the optimisation of energy assets in a locality.



Commercial

Commercial energy market, Low Carbon Technology provider, consultants, developers and EV fleet operators.

Information that supports the business and investment cases for the deployment of LCT, local energy markets, and peer to peer energy trading.



Consumer

Consumers, investors and intensive energy users.

Information that supports the user's ability to consume energy without interruption, address vulnerable customers and provide information for energy prosumers to invest in the latest technology.

Figure 9: User persona examples

Connection Provider

Building and extending our network is no longer a task just for the DNO. Independent Connection Providers (ICPs) also help design and install network assets to supply our customers. Safety, quality and accuracy are all fundamental elements to be considered when building new networks.

Therefore, it is important that we provide ICPs with access to all our latest data to ensure the assets being installed are safe and reliable.

| | | |
|---------|--------------------------|------------|
| Annual | Frequency of data use | Weekly |
| Low | Details of data required | High |
| General | User level | Specialist |
| Low | Interaction required | High |

Typical data used

- Locations, types and specifications of equipment across the entire network.
- GIS data to locate assets when planning, installing and commissioning new connections.
- New equipment specifications to help build networks that DNOs will adopt after installation.

Goals

- A portal to allow new installations to be captured, reviewed and approved with minimal interaction.
- Use of the same portal to upload type, specification and location of new assets being installed.
- Visibility of new equipment innovations that may be deployed on the network.

Challenges

- Sign-off and adoption of assets relies heavily on manual checks and approvals.
- New records and plans for installations may be in different formats and styles across different ICPs.
- Limited view of changes to policies, specifications and standards.

We already share all of our relevant policies and standards on our website to ensure that ICPs can have access to the information they require. As we adopt more efficient platforms and systems for capturing and sharing information, we aim to improve the way we interact with ICPs. Having online data and collaboration portals to help with the review, approval and recording of new network assets will help save time and improve the way we grow our network.

“Providing customers with new connections requires me to have access to lots of detailed network data”

Prosumer

Many of our customers are actively engaged to help deliver net zero and are interested to know what they can do to accelerate this. Our website contains lots of useful data that can help our customers understand how to connect the technologies such as an electric vehicle (EV) or heat pump (HP). There is also a wide range of other tools and resources to allow customers to track outages and understand what is happening in their area.

| | | |
|---------|--------------------------|------------|
| Annual | Frequency of data use | Weekly |
| Low | Details of data required | High |
| General | User level | Specialist |
| Low | Interaction required | High |

Typical data used

- Electricity unit prices (both DUoS and Unit price).
- Real-time energy usage.
- Details of outages and network maintenance that affect supplies.
- Response time targets and level of service from DNOs (Guaranteed Standards of Performance).

Goals

- Data to show how the actions of customers are helping to reduce carbon and costs.
- Real-time outage notifications that can also predict what will happen next, when and where.
- Details of ways and options to improve energy efficiency and connect new technologies that are easy to understand.

Challenges

- Data is often not provided in layman’s terms meaning it is difficult to interpret clearly.
- Limited integration and consistency between suppliers and operators (gas and electricity).
- Data is contained across a number of different platforms meaning customers have to explore to find the data they need.

Active participation of customers is a major element to achieving the overall goal of net zero by 2050. We need to work closely with all our customers to provide them with the data they need to help us with this transition. We recognise that our customers are all different and in particular, the importance of protecting those that are vulnerable. Therefore, we need to personalise the service and provision of data according to our different customer types.

“I want to see how I can contribute to net zero whilst having a reliable and affordable service that is user-friendly”

Going forward

Our needs based approach to users will continue to adapt as the needs of the sector evolve in the transition to net zero.

We will use these personas as a basis for how we shape digitalisation but will use the methods described in engaging our digital and data stakeholders to add new user personas over time as we discover them. Furthermore, the practice of customer segmentation is now incredibly sophisticated and can further be driven by the way in which our customers interact with our digital estate. We will further segment customers according to their needs in relation to:

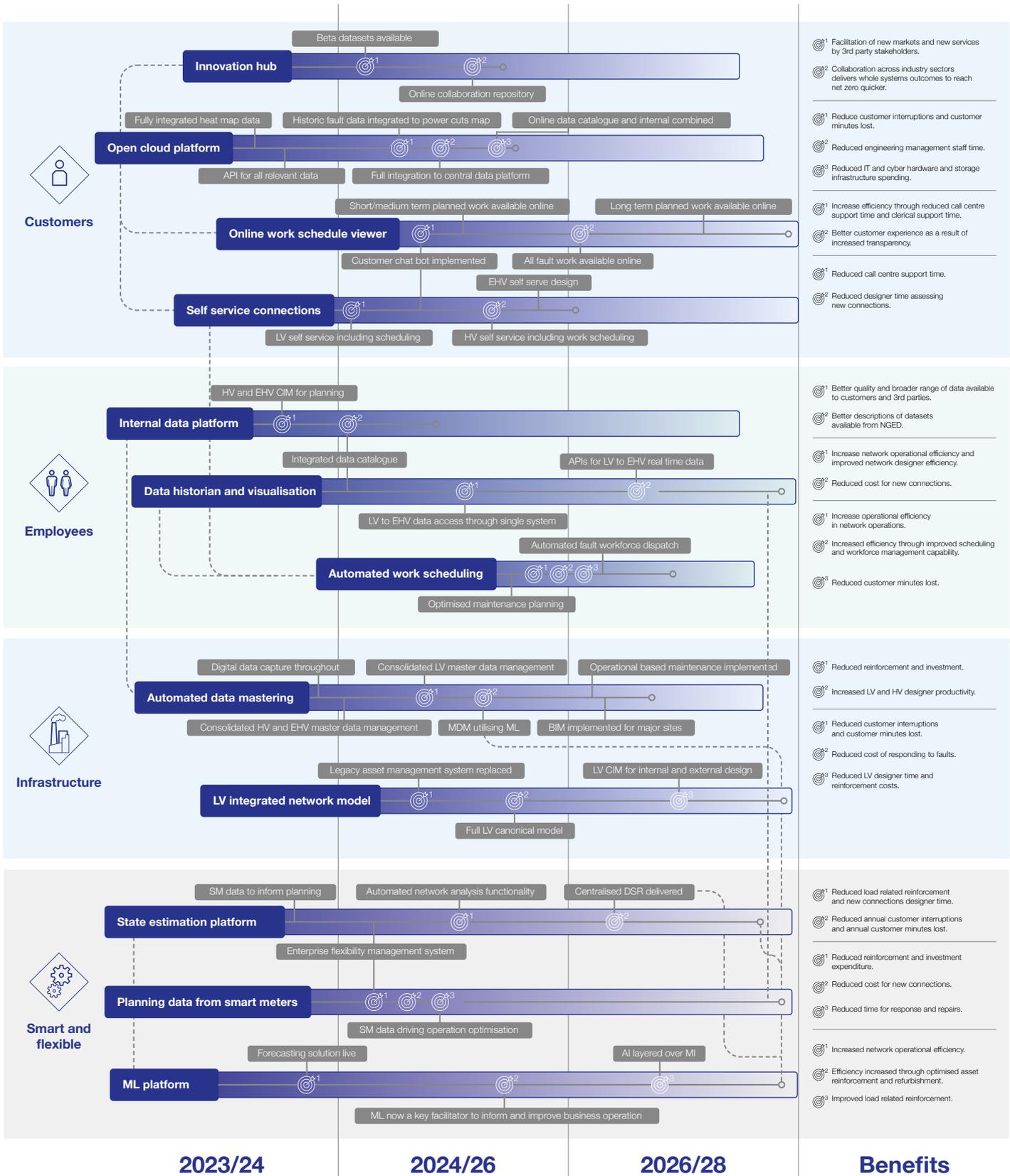
- **Geography** – segmenting user needs based on specific geographic features and conditions and supporting local energy planning.
- **Technographic** – segmenting based on the type of devices used to access digital tools, such as laptops, mobile devices, APIs, and software.
- **Behavioural** – how users interact with our digital estate, their habits, and tendencies.
- **Economic** – the value offered to a specific customer segment, for example large corporations vs SMEs.
- **Demographic** – related to (for example) vulnerable customers or energy prosumers.

By sharing our current user types, we can understand from feedback and engagement where these can be developed and enhanced moving forward, ensuring we are capturing the right user types to prioritise datasets and digitalised solutions.



5. Digitalisation roadmap

Our Digitalisation Roadmap is ambitious, revolutionary and will deliver for our key stakeholders and the business of both today and the future. It visualises the programmes and projects necessary for the delivery of our strategy and contains a view of the dependencies between them, as well as high level timelines for delivery and the customer and stakeholder outcomes they will deliver.



5.1 Engaging our data and digital stakeholders

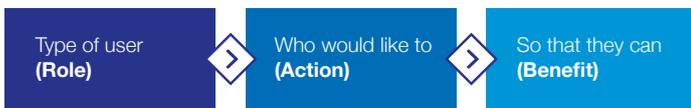
Continuous and relevant engagement with data users is key to delivering appropriate digitalisation and data solutions to serve their needs and ultimately support our net zero carbon commitments.

We have a strong track record across the business of digital stakeholder engagement, both internally and externally, to maximise the value of engagement across the organisation and demonstration of the need for further digitalisation activities.

External stakeholders

The needs of our customers and stakeholders are critical to ensuring our digitalisation and data activities are focused to deliver the most value and benefit. Identifying external data user types has been a key focus of our digitalisation activity so far; recognising that different users have varying needs and expectations of the same data. As with internal engagement and needs, ensuring the right data is in the right format at the right time is vital.

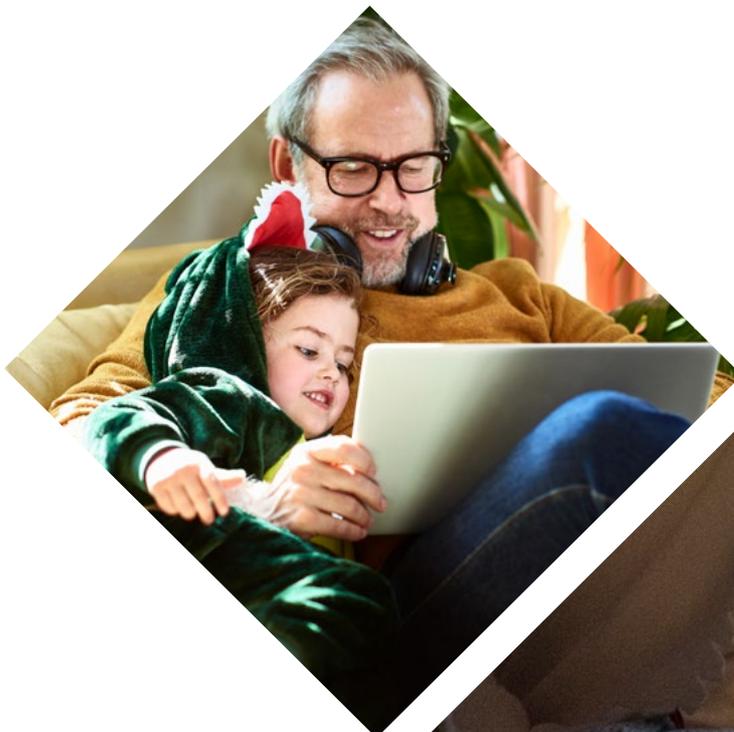
We followed an extensive engagement process to ensure we developed a robust high quality methodology to understand our different data user types. We assessed our existing datasets, some publicly available and some currently only available internally, where we identified over 100. We used this to drive a number of external workshops, providing participants an overview of the types of datasets which are and could be available. This stage of the workshop also introduced the ‘use case scenario’ structure which is set out in the following format:



This is a useful tool for structuring input so that use cases are thought out more clearly, outputs are easily ordered and prioritised, and key points can be integrated into the design process for data sharing. 104 use case ideas were collated as part of these extensive workshops to date.

In order to effectively analyse these responses there was a need to further group responses under corresponding themes to interpret which use cases were shared or stratified between different sectors, which use cases required the same data and same data access functionality, and which use cases were variants on a central point and should be amalgamated.

Going forward we will promote visibility of customer interactions and interventions between teams proceeding to omnichannel contact across the organisation. This will streamline contact and reduce duplication between key stakeholders and the contact points of the organisation, but also to provide greater visibility of stakeholder needs to more departments, encouraging collaboration between them to solve problems. In the further case this could become a ticketing system with process workflows that can respond to stakeholder needs and guide where automation can be implemented.



Engaging our data and digital stakeholders

Internal stakeholders

Our staff are pivotal to the successful operation of our business and delivering digitalised solutions that meet their needs to continue to be effective and efficient in their roles is integral to our strategy and action plan.

Enabling all levels of staff to feed into the priorities for digitalisation, highlighting their needs and expectations, is extremely important as well as making sure we 'take them on the journey'.

We use formal and informal engagement to understand their data related needs through targeted surveys on specific datasets to understand their quality and need for improvement to drive additional value and wider engagement to understand the need for additional datasets and digitalised solutions.

We initially followed a similar engagement process to that used as part of external engagement, facilitating open and interactive workshops with all departments of the business using identified internal use cases. This work to date has supported our data driven developments, such as the Integrated Network Model, providing a single source of the truth for asset and connectivity benefitting a number of internal user types as well as centralising data access.

This will be taken a step further as part of this strategy. Digitalisation will be focused internally on streamlining business processes and developing new tools and techniques to support our staff across the complete business.

The objective of this will be to ensure that our staff are able to maximise their ability to support vulnerable consumers, complex multiorganisation requirements, novel and emerging challenges, ensuring that our staff are able to spend more time on activities that benefit stakeholders and provide excellent service, and less on administration of tasks. In time these complex requests may be shaped into new digitalised workflows to enable us to evolve our systems and processes as stakeholder needs change.

Technical stakeholder support

We will continue to lead the sector in enabling innovation that supports the net zero transition and part of this will be promoting access to data and information using data portals and APIs that we have already started to build out in the connected data portal. To further support this and to respond to emerging stakeholder needs we proactively monitor the data requests that we receive directly and via the ENA data request portal to guide what data to prioritise for publication.

In addition to this we will be engaging much more closely with the innovation community in a number of ways. We will create a user community within energy, whether business, government or academia, that regularly use our data and invite them to contribute their insight into what use cases they have fulfilled and how the data can be improved.

In order to make sure that this insight also benefits emerging players in the sector and to reduce the duplication of effort, a community forum will be established with a mixture of NGED data experts and power users to support the community with frequently asked questions, best practice and how to guides. This will enable a thriving data and applications ecosystem using our digital assets with deep insight into emerging use cases and needs.

Continuous improvement is also a requirement for keeping the community engaged with our digital services, the continuous community maintenance of metadata, including wiki guides, publication of open data triage results and the prioritised datasets to publish will create unprecedented transparency for the innovation community, allow us to continue to lead the way in enabling access to data and insight to support the net zero transition.

Finally, following the success of our data science challenge in early 2021 which had global engagement, we will set up regular data science challenges with every major release of a dataset that has a high number of requests from the community.

The challenges will be set based on the needs of our external stakeholders and ensure that data scientists and business working on the bleeding edge of innovation are able to engage with us to solve the most pressing net zero challenges using our data.



6. Information technology and telecoms

Information technology (IT) is a core activity to facilitate our digitalisation transformation.

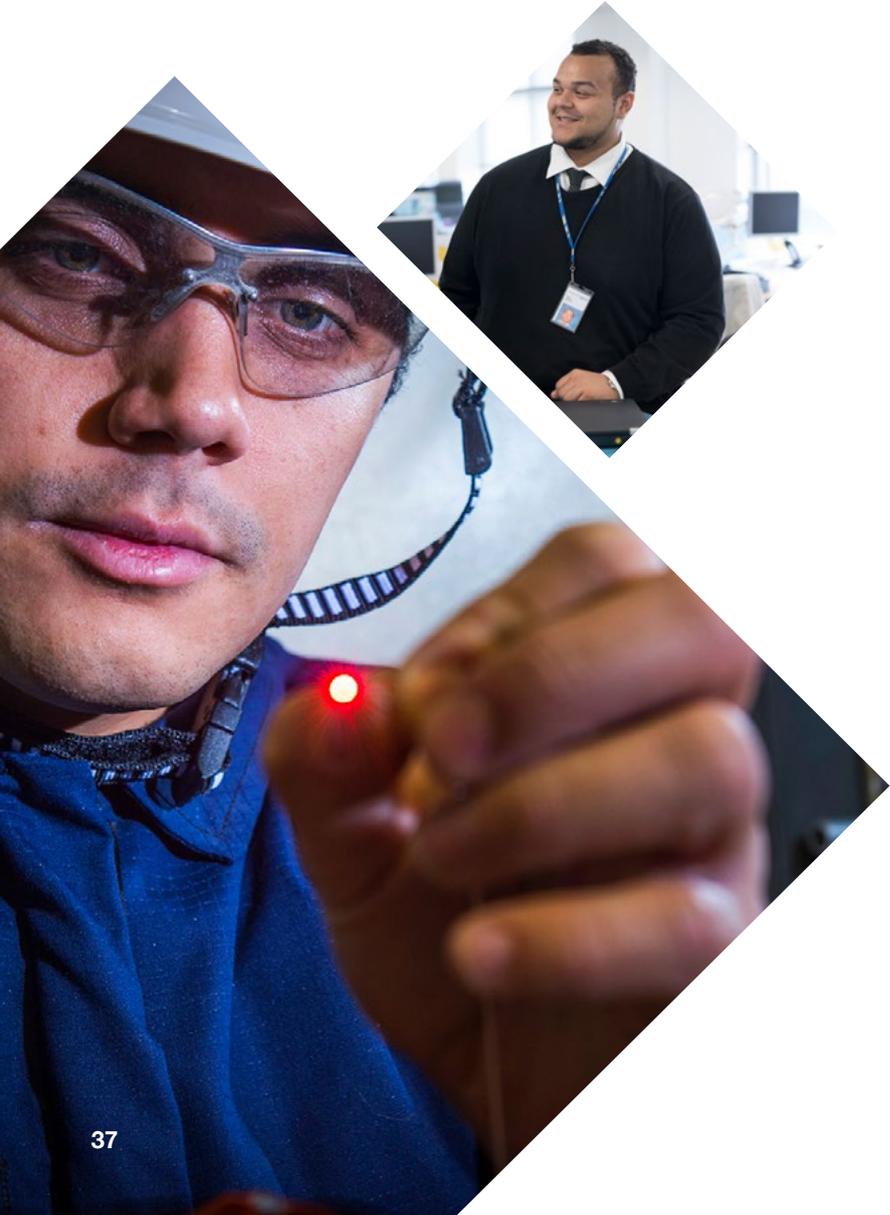
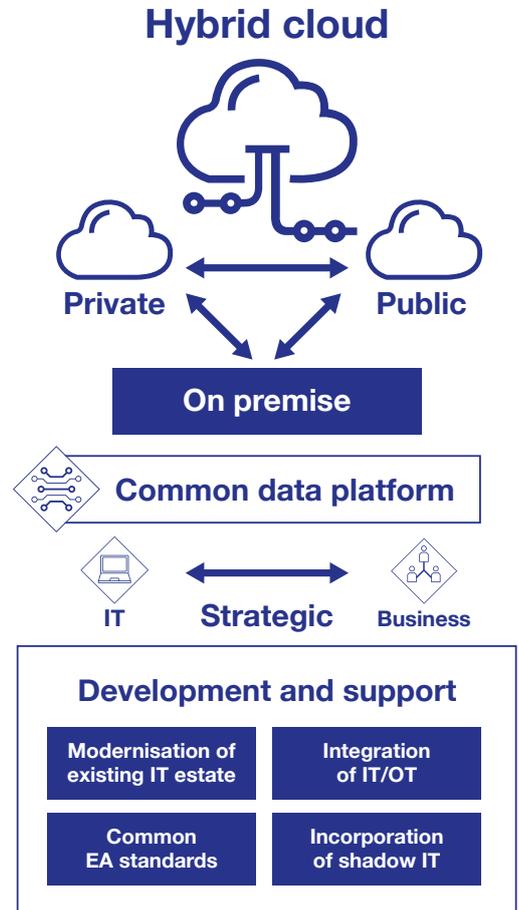
To support the transition to a fully digitalised organisation our IT systems will need to be rationalised and modernised and this will include, replacing and upgrading adhoc legacy applications, embracing and investing in new technologies, integration tools and common data platforms. IT systems will also need to be further integrated with operation technologies related to power delivery systems.

Our IT systems have traditionally been focused primarily on the core principles of security, reliability and resilience and that approach has served well, however, as we move to a culture of open data and digitalisation, we realise that we need to also make our systems more accessible, agile and adaptable to change, whilst continuing to enhance our cyber security controls.

It is likely that some of our on premise solutions today will be cloud based tomorrow to ensure that our solutions continue to be scalable, supported, flexible and cost efficient. We will continue to ensure that our solutions are appropriate with use cases driving our investment in new and augmented solutions, likely to encompass a hybrid cloud architecture, utilising infrastructure, platform and software as a service solutions (IaaS, PaaS and SaaS).

As well as IT playing a key role in the digitalisation and Data Governance Group, an IT change board will be implemented to drive the strategic planning function through the creation of a defined, prioritised and agreed project portfolio, supporting the needs of the wider business and the central IT strategy.

Figure 10: Hybrid cloud architecture



Telecommunications

In order to fully digitise our system, a modern, robust and secure telecoms system is required. Our insourced model for the provision of telecoms has served us well and will continue to do so, procuring services too where appropriate.

There are a number of key activities being trialled for future deployment, including the implementation of a Long Term Evolution (LTE) solution. As the numbers of assets and equipment connected to our network increase, the cost and capability of managing the monitoring and control using traditional radio telecoms will become restrictive.

The radio infrastructure for our future will need to be able to overcome these limitations and be scalable for future network growth and data demands, whilst ensuring efficiency, effectiveness in operation, resilient to power failure and to be at the point of need.

Coordination will be driven between our digitalisation, innovation, and telecoms activity to ensure solutions are fit for purpose and meet the needs of today, tomorrow and beyond.

7. Building a data culture and developing our people

To ensure that we realise the customer and stakeholder outcomes from our Digitalisation Strategy and deliver whole system benefits we need to further transform our culture, behaviours, skills and approach to attracting new talent to our business.

Our data culture

Investments in new technology alone will not be enough. We will continue to develop our data culture to integrate the data, the technology and our people to seize the opportunities that data presents for us. We are following three guiding principles as we seek to continue developing our data culture:

It is not about culture, but it is about observable behaviours.

We make it easy for people to interact with our data.

We make data matter for our people.

1

Culture only exists through the observable behaviours of our people, so we will take a pragmatic approach, focusing on shaping the behaviours around data.

We will develop our understanding of the way our people interact with data, carrying out interviews and design thinking workshops regularly to better understand the experiences, interactions, and challenges around data.

This is not a process which will take place once in time, we will regularly track our culture by mapping shifts in behaviours over time to understand how our culture is evolving.

2

We will make it easier for our people to interact with data, by improving the interactions with data we can better leverage data across our business.

We want to make our interactions with data as easy as possible, so we are actively seeking to simplify access to data solutions.

For instance, there can at times be a lot of information for our teams to analyse, so we are developing intuitive dashboards across our business to support our people in making data driven decisions.

3

Data literacy is not as important as making data matter for our people, so we will make sure that our people are given the opportunity to interact with data in a meaningful way.

Making data matter requires us to create opportunities for data and insight to help our people when they are in the flow of their work, wherever that work takes place. We are piloting field applications to make data capture easier for our front line employees and implementing feedback loops to monitor and improve data quality using dashboards.

Culture is inherently complex, and we see this as a long term journey that needs to be continually measured and incubated rather than something we achieve over a fixed period of time.



New talent

Attracting, recruiting and retaining the best talent is essential to ensuring we maintain and build on our reputation for excellent customer service and network performance. As our industry continues to evolve, new skills and capabilities are needed for us to continue to deliver on our customer promises. We have ambitions to transform our approach to recruitment, recruiting more graduates, apprentices and experienced hires to build the digital and data skills we need to deliver on our data and Digitalisation Strategy.

Our apprenticeships and graduate programmes are a great opportunity to attract early talent with a desire to learn, an ability to adapt to new technologies, while also providing a fresh perspective.

We will expand our new digital and data apprenticeships significantly, such as our data science degree apprenticeship which offer our apprentices an opportunity to develop a specialised knowledge of areas such as data visualisation, ML and predictive analytics whilst working towards a foundation degree as part of their training. We are also expanding our graduate schemes to develop digital and data talent across our business, including data science, mathematics and IT focused degrees. As we identify further skills our business areas need, we will expand our programmes further, building our technical capabilities in areas such as cyber security, agile and design thinking.

There is an increasing demand both within the energy industry and across the UK for digital skills, which means it is increasingly competitive and challenging to hire the specialist talent we need. Recognising this, we are targeting more diverse talent from outside our industry with transferable digital and data skills which will support us as we continue to deliver on our ambitious plans during RIIO-ED2.

Skills

We are committed to ensuring that everyone within our organisation is taken on the digitalisation journey. This involves the creation of new roles with new skills and supporting staff with the development of new skills, giving them opportunities to understand new and developing data sets, the capture of metadata and the wider language of data.

Historically, specific technical skills have been managed and contained within silos. Through the creation of our data and digitalisation team we have centralised a significant aspect of our data management resource to impact and influence the business consistently and effectively. We are developing multidisciplinary teams, bringing together a wide range of diverse skills to speed up our time from design through to build and deployment.

We are also creating communities of practice, where our teams can meet regularly to solve challenges, share knowledge and develop their skills, facilitating collaboration and knowledge sharing across our business.

We will continue to invest in the digital skills of our people during RIIO-ED2, continuing to develop an environment that prioritises and rewards learning. We will develop training plans for our teams, including industry recognised formal certification, allowing them to develop the digital skills we need both today and, in the future, positioning our people to thrive in an increasingly digital workplace.



Learning approach

The way we learn is changing, as we increasingly expect to learn in the same way we engage with content in our personal lives, bite sized, engaging and available on demand. We will seek to blend traditional learning methods with more immersive learning solutions, allowing our people the opportunity to 'learn by doing'.

Virtual and extended reality are two technologies we will adopt which provide a high quality and consistent level of training, offering the chance to simulate real life scenarios such as a power cut in a safe space.

Gamification is another highly immersive technique we will introduce which provides an exciting and rewarding environment. This will be particularly suited to refresher training to allow our people to develop lasting knowledge and habits.

Demonstrating the benefit to colleagues of the changes in their working processes, practices and training is critical to ensuring the full benefits are realised. We do and will continue to deliver this through regular formal and informal feedback on existing systems and new developments.

For every significant development we form a group of 'super users', made up of end and key users of the new systems and solutions. All levels of the business being able to feed in to and shape our digitalisation journey ensures that we maximise the benefits. Our next phase is for solutions to be utilised externally is to implement an external 'super users' group, made up of key potential users to ensure an optimised and effective solution is delivered.

Data and digitalisation are at the heart of our work during RIIO-ED2, and as such we will continue to promote our teams work and their successes across the business.

We are introducing a 'show and tell', which will help regularly connect our people with our work in digitalisation to improve both awareness and collaboration, incorporating into our wider activities within the community and as part of our careers programme to further establish NGED as a 'great place to work'.

New ways of working

We will pilot cross functional working in RIIO-ED2, which is aimed at tackling some of our biggest challenges.

For example, how we can reduce the duration of interruptions to our customers.

This method of working will reduce organisational barriers between departments, increase collaboration and bring together different skill sets to deliver better outcomes across our business and importantly will deliver a better end to end experience for our customers and stakeholders.

We anticipate that this will enable designated employees to spend 20% of their time working in this fashion, which is like a 'tribe' organisational structure.

In a tribe organisational structure, employees belong to a primary team for their day to day activities but also are aligned to a cross functional team or specialty. This model is used by technology companies such as Spotify and Google, in financial services by ING Bank, by oil and gas majors and in Utilities by Enel in Italy.

20% of time in cross functional 'tribe' role

Operations

80% of time in BAU role



Customer

80% of time in BAU role



DSO

80% of time in BAU role



Digitalisation

80% of time in BAU role



The benefits NGED expect from implementing cross functional teams are:

- more effective prioritisation across departments that were previously working in siloes
- communication and quality are better, with the removal of hand offs, assumptions, and uncertainty
- great focus on the customer experience, as a result of end to end organisation from a customer's perspective, and not in internal departments
- quicker iteration and earlier delivery to customers and stakeholders
- better use of resources and alignment around the biggest challenges facing NGED, rather than departmental priorities
- greater innovation and creativity, as different ways of thinking and experience are brought together.

8. Working collaboratively

We know that collaboration is key to delivering best value to our customers and stakeholders and vital in supporting the work we do as NGED.

We actively take opportunities to collaborate with other DNOs, cross sector partners and stakeholders, and the wider energy sector to make sure this happens. We have a number of examples of where we continue to work collaboratively and we are committed to ensuring our collaboration grows as we deliver our roadmap and Action Plan.

| | Description | NGED Role | Customer Benefit |
|--|--|---|---|
| The Open Networks Project | The Open Networks Project is a major industry initiative between gas and electricity licence operators to transform the way our energy networks operate, underpinning the delivery of the smart grid. It seeks to enable the uptake of new smart energy technologies by more homes, businesses, and communities in the UK. | We work collaboratively as part of this initiative to work towards standardised processes and mechanisms for exchanging data, between organisations, such as investigating the implementation of Common Information Model (CIM) and presenting data consistently to customers and stakeholder across organisation. | Allowing customers to take advantage of these new technologies to take control of their energy will lower their costs and help secure the energy we rely on every day. |
| Data and Digitalisation Steering Group | The Data and Digitalisation Steering Group (DDSG) is a combined gas and electricity ENA group leading on data and digitalisation, working towards common approaches to meet the key EDTF recommendations. | As a large UK DNO serving multiple regions, we are both a key contributor and beneficiary of the Data and Digitalisation Steering Group. Our contribution supports the voice of the energy networks sector and provides a vital channel of communication for the steering of data and digitalisation within the industry and the sharing of best practice. | Working collaboratively as part of this group will ensure that customer experiences with licence operator data, from the mechanisms to access it, the formats and the contents, will be harmonised. |
| Strategic partnerships with energy industry organisations | We understand that working with experts is key to delivering our Digitalisation Strategy and as such actively seek to build collaborative partnerships within the energy industry. One example of this is our partnership with the Energy Systems Catapult (ESC), the authors of the EDTF report. | Our partnerships enable us to develop greater insight in to digitalisation, help deliver value from our existing data and create appropriate new datasets. For example, ESC is our key delivery partner on our innovation project, Presumed Open Data (POD), focused on maximising the value and visibility of data and delivering our data triage process and cataloguing activity. | These partnerships provide us access to leading industry knowledge and best practice which in turn supports the generation of greater insight from data. This insight helps us improve the services we offer to customers and increases efficiency, delivering a positive impact on the costs of running our network and therefore costs to customers. |
| National energy initiatives | The national energy systems map is a groundbreaking project to develop a digital energy system map of the UK covering assets, generators and energy intensive users. Similarly, the National Underground Asset Register is creating a digital map of all underground pipes and cables to revolutionise construction and development. | Collaboration is at the heart of these national initiatives in which we take a leading role steering the direction of the initiatives and contributing collaboratively to ensure the necessary inputs are provided. We are a key supplier of the network data necessary for making the energy systems map a reality and our extensive distribution network is fundamental to the National Underground Asset Register. | These initiatives use the power of data and mapping to help support a more efficient pathway to net zero. These initiatives will provide customers with information about energy network assets including their location and ownership which will help improve investment decisions, support emerging markets and help bring on board reliable new connections. |

| | Description | NGED role | Customer benefit |
|--------------------------------------|--|--|---|
| Open energy | The open energy initiative intends to deliver key aspects of the national data infrastructure and accelerate delivery of net zero. Central to the energy transition is the data needed to facilitate the balancing of electricity supply and demand. To do this, open energy focuses upon the search, access and secure sharing of energy data through stakeholder collaboration and open standards. | Our role collaborating with open energy is key in both shaping energy data alignment and also contributing to the market for energy data. In keeping with our Open Data Principle, we provide access to significant volumes of our data for a diverse range of customers in the market to access and use to engage with energy. | <p>This collaboration helps reduce barriers to accessing data, enabling more customers than ever before to access energy market data.</p> <p>This is crucial in supporting creation of a system that automates the balancing of supply and demand, ultimately keeping energy flowing for all customers.</p> |
| Regional smart energy schemes | Given the crucial role of distribution networks in the energy transition and the breadth of the geographic area we cover, we are active participants in regional smart energy schemes across the Midlands, Wales and South West. One example of this is the West Midlands Regional Energy System Operator that is exploring the advantages new energy systems can bring to metropolitan areas. | NGED brings together its infrastructure with energy organisations to co-create the design of new operating models and smart local energy systems. Through these schemes we actively support delivery of more collaborative control and planning at local level, enabling us to tailor local energy infrastructure at an optimised level for our regions. | <p>These schemes help demonstrate the value of smart local energy systems as part of the solution to achieving national and local net zero ambitions.</p> <p>Through them, we aim to achieve designs and operating models which deliver the intended benefits at the lowest cost to customers.</p> |



Increasing our collaboration

To build upon the success of our collaborative projects and initiatives, we will undertake several actions and initiatives to further increase our collaboration in support of data and digitalisation:



Initiative sponsorship

All our externally focused initiatives will have an 'expert customer sponsor' to drive collaborative, provide initiative representation at a senior level within our business, and ensure that customer and stakeholder service and needs are placed at the project forefront.



Scope appraisal and collaboration invitations

For all of our collaborative projects and initiatives, we will release the scope of these to industry peers and partners for review to gather insights that will help these projects and provide others an opportunity to assess these for further collaboration opportunities in similar fashion to the ENA innovation process.



Data hub and portal support

Use our data and data portals, such as our innovation data hub, to support and align with collaborative projects to deliver not just for us but for the wider industry and our collaborative partners.



Data outreach and support

We will support all local authority driven community energy schemes with data and insights to advance their initiatives and increase the power and potential of collaboration.



Measuring our progress

To ensure that we are driving collaboration and building upon the success of our collaborative projects and initiatives, we have specific collaboration focused success measures to help track our progress and the impact of collaboration.



9. Programme delivery and governance

9.1 Methodology

Digitalisation is, and will continue to, involve and impact our complete business, our interactions with customers and stakeholders and the services we offer them and them us.

The developments we are employing are revolutionary and wide ranging and we need to continually drive value and improvements.

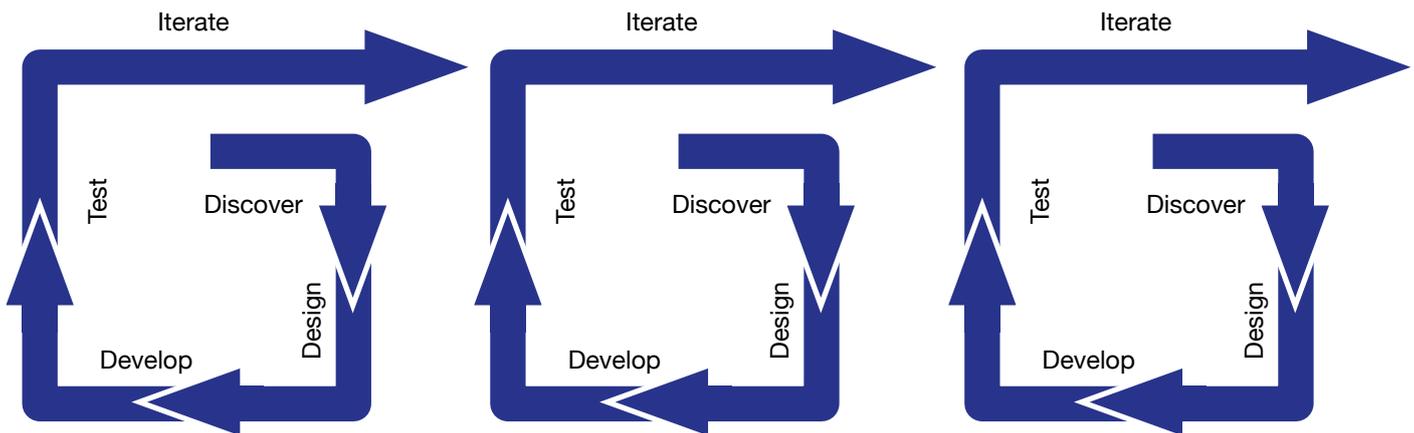
It is critical that we take an active and Agile approach to delivery, development and improvement. We want to deliver value as quickly and effectively as possible, providing output and benefit as soon as it is available, take feedback from the users' experience, iterate, develop and improve.

We recognise that this is very different from the way in which we manage engineering projects, which make use of a waterfall approach to manage risk effectively and appropriately.

It will take time to fully adapt our governance and the mindsets of our people, which we see as a continual journey rather than a binary transition from Waterfall to Agile.

Our approach will provide flexibility, helping us deliver on a variety of programme and project sizes and timelines. There may be programmes or projects for which traditional Waterfall methods are more appropriate, or hybrid approaches with Waterfall used for discovery and high level design, followed by short Agile delivery sprints. All our projects and programmes will be subject to common transformation governance, ensuring each is delivering outcomes for our customers and stakeholders.

Figure 11: Agile delivery approach



9.2. Governance

Effective project governance is critical to all projects, ensuring that the accountabilities and responsibilities are understood, providing a decision making framework that is clear, appropriate and repeatable to enable a well structured and delivered digitalisation programme.

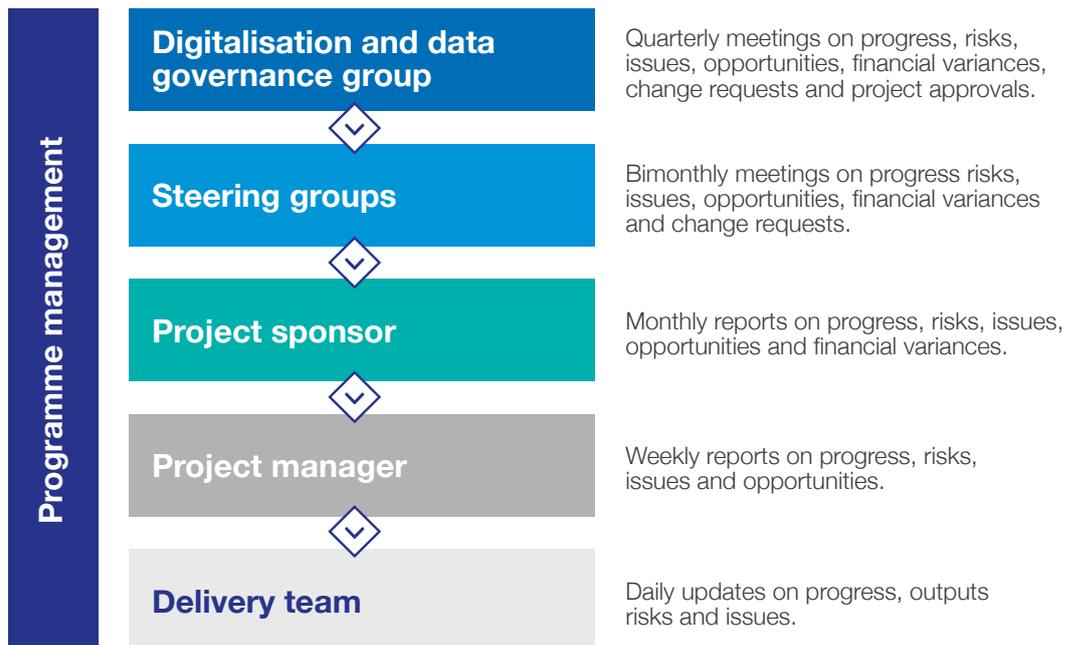
We have a well established business change governance process, developed as part of our long running innovation programme and we are utilising this to support our digitalisation project governance, with refinements to accommodate an agile way of working and to streamline longer approval cycles.

Structure

Our governance structure is driven by our Digitalisation and Data Governance Group approving the Digitalisation Strategy and Action Plan. For each of our projects there will be a guiding coalition, made up of relevant people from within the business, where their current processes will be changed as part of implementing the project’s solution, or are key to enabling the development and implementation. Where a project is driving direct external value and benefit, the guiding coalition will also have appropriate representation from a user representative; this could be a community energy group, another utility provider, or an energy aggregator as examples.

A guiding coalition will be typically made up of the project sponsor, the likely owner of solution on implementation, senior users to inform the approach and output, and suppliers, providing key inputs to support the development. The project sponsor, although part of the steering group, will also have their own explicit role to ensure that the vision and the benefits of the project are delivered. Importantly, each development will have a specific project manager to ensure that the planning, design and delivery of each project is provided to time, cost and quality. Overarching this is the programme management, governing the projects as part of the action plan and the wider roadmap activity, ensuring decisions at each level can be appropriately made through agreed tolerances and exception reporting.

Figure 12:
Digitalisation delivery governance hierarchy



Project setup

Each new digitalisation project has to follow a defined registration process in order to get approval to proceed to the delivery stage of the project. The project approval focusses on producing a Project Initiation Document (PID), outlining the project scope, the business case, aims and benefits and the key outputs and milestones. It also includes a high level project delivery outline, a list of project resource requirements, finance detail, key risks, assumptions and dependencies. The PID is developed by the project or programme manager, reviewed and supported by the project sponsor and approved by the steering group or governance group dependant on project value. This provides a clear capture to measure delivery performance and success at the end of the project effectively.

Project delivery

The project manager takes responsibility for the day to day delivery of the project using a flexible set of tools to manage deliverables, risks, issues, assumptions and dependencies effectively. Reporting is described in the digitalisation delivery governance hierarchy, ensuring that the right level of oversight and visibility of the project and its progress against the PID deliverables.

Appropriate tolerances for time, cost and quality are set for each reporting level, enabling effective delivery to be achieved whilst ensuring appropriate bounds are set to ensure the original aims of the project are delivered.

10. Measuring success

Our Digitalisation Strategy and Action Plan progress must be effectively tracked and measured to ensure we are delivering benefits for all.

Understanding our employees' and customers' digital needs

Demonstrating valuable and beneficial engagement through the continued refinement and development of our data user personas. We will clearly highlight our areas of development against these user personas to track progress and output for the variety of data users to ensure a balanced approach is taken and validate our deliverables.

How we will measure this:

- Ensuring there is an external representative for each relevant steering group.
- Carry out a periodic review of our customer data every six months.

Improving data quality

The ability to trust data is the basis for the business to transform into a data centric organisation that make decisions based on information from many different data sources rather than historical knowledge. We will demonstrate this increased engagement, interaction, and utilisation of data internally and externally to greater impact within the energy sector and beyond.

How we will measure this:

- Tracking the impact of data quality on the cost and timescales of connections.
- Make 60% of NGED network data available via and Application Programming Interface (API).

Industry leading data and digitalisation strategy and action plan

Ensuring we have an industry leading strategy and action plan is key to delivering for our customers and stakeholders. We will use maturity models to measure our progress and work with data and digitalisation experts to inform our output and next steps continuously to support this.

How we will measure this:

- Demonstrate increasing year on year digitalisation using customer surveys to indicate our progress.
- Demonstrate increasing year on year maturity using maturity models to benchmark progress.
- Achieve an upper tier score on the digitalisation regulatory benchmark.

Improving data quality

We need to measure the impact of our work, understand the value it has delivered and assess our responsiveness to customer needs. For each item captured in our action plan, we will provide insight on the benefits delivered to measure its success and impact. Utilising feedback from our data users will support further developments and new system implementations.

How we will measure this:

- Each digital service will have a defined adoption target before go live that we will measure against.
- Ensure feedback on our digital solutions is requested in 100% of customer surveys.
- Handle 20% of customer requests through self serve channels by the end of RIIO-ED2.

Collaborating effectively

Continuing to collaborate effectively within the energy sector and wider will ensure we deliver optimised outcomes. Taking a lead on collaboration in this space is important to us and we will measure this through our implementation of collaborative developments. Capturing our collaborative efforts will demonstrate our continuing commitment to collaboration.

How we will measure this:

- Use an open code repository to share the methods behind our outcomes to reduce whole system costs.
- Ensure we actively support 100% of local authority led energy data collaborations and projects.
- Share the scope of all customer facing external data and digital solutions with industry peers to stimulate collaboration.

Developing skills and capabilities

Having the right people, with the right skills is what will allow us to deliver our strategy and action plan. Sharing how our data and digitalisation team is developing in terms of staff and skills as well as the business wide training taking place, further improving our organisational data literacy and understanding will enable our success to be effectively measured.

How we will measure this:

- Measuring the number of digital skills developed and ensure 10% of hired apprentices have a digital focus.
- Ensure each member of our executive team sponsors a digital project during RIIO-ED2 to demonstrate senior commitment to digitalisation.

11. Delivery considerations

| Risk or consideration | Potential impact | Mitigation |
|--|---|--|
| Delivery of increased volume of digitalisation and data work in RIIO-ED2 compared with RIIO-ED1. | Work is not fully delivered, impacting customer and stakeholder outcomes and our business operations. | <p>We have carefully developed each of our digitalisation and data projects and considered the best delivery approach (e.g. Agile, Waterfall, Hybrid) for each.</p> <p>We will put people at the centre of our transformation to improve the chances of business adoption and use partners and the broader ecosystem to complement our own delivery capabilities.</p> |
| Increased competition for digital talent and skills within the industry and externally. | A digital skills gap in our organisation that reduces our ability to introduce digitalise and affects the delivery of the key benefits outlined in our digitalisation projects. | Ensure that we actively recruit for these skills at experience and apprentice level. Ensure our staff retention activities are suitably strong to retain talent and ensure compensation for these skills is in line or above the market. We will also upskill existing talent in the organisation with digital skills and literacy to ensure the right level of skills across the business. |
| Delivery of parts of the Digitalisation Strategy are reliant on collaboration with partners and other stakeholders. | Delays to key projects if partners are unable to meet their commitments or deadlines on collaborative initiatives. | We will play a leading role in the management of collaborative projects, bringing our risk management and project management expertise to ensure that projects have clear risks documented and mitigated and collaborative initiatives are not overly reliant on a single partner. |
| Significant regulatory or governmental policy decisions have a material impact of delivery during RIIO-ED2. | Significant shifts in policy, regulation or government intervention change the course and actions of the Digitalisation Strategy and associated projects. | Through collaboration and close working relationships with energy industry partners and regulatory organisations we will be able to allow as much time as possible to plan for significant changes and our governance approach will allow us to adapt quickly. |
| There is risk that the significant volume of digital change and transformation in the organisation cannot be handled effectively. | Poor change management can impact on project timelines and impact negatively on customer service and operating costs. | Our governance and change management frameworks, evolved over multiple years of capital project delivery, will be adapted to support delivery of digital change to our business. Dedicated digital change managers and sponsors within local teams and at executive level will ensure our Digitalisation Strategy is effectively delivered. |
| Increased use of digital technology and data increases the risk of security and cyber issues. | Serious data breaches or cyber attacks could release data unintentionally and create interruptions or problems with digital systems. | Having a dedicated security team in place to prevent and handle cyber threats and ensuring our data is properly stored and managed in line with the Data Best Practice Principles will support mitigation of threats of this nature. |
| Poor delivery of digitalisation and digital channels can impact brand and reputation. | Whilst digitalisation can have an overwhelmingly positive impact on customer service, poorly implemented digitalisation and digital channels that are hard for customers to use can have a negative impact on brand and reputation, particularly with customers whose preferences are traditional contact channels. | <p>The implementation of digitalisation and digital channels will be managed using our project management expertise and the governance frameworks set out in this document to ensure changes are carefully managed and deployed when they are ready to benefit customers.</p> <p>It is also important that our digital solutions and channels will build upon, not replace, traditional channels for our customers who still wish to use them.</p> |

Delivering data best practice



Delivering data best practice

The need for data best practice is clear and we are committed to ensuring our activities are in line with the Data Best Practice Guidance, outlined by Ofgem, which outlines these eleven principles:

1. identify the roles of stakeholders of data assets
2. use common terms within data assets, metadata and supporting information
3. describe data accurately using industry standard metadata
4. enable potential users to understand the data assets by providing supporting information
5. make data assets discoverable to potential data users
6. learn and deliver to the needs of current and prospective data users
7. ensure data quality maintenance and improvement is prioritised by data user needs
8. ensure data assets are interoperable with other data assets from other data and digital services
9. protect data assets and systems in accordance with current regulations and legislation relating to cyber security
10. store, archive and provide access to data assets in ways that ensures sustaining value
11. treat all data assets, their associated metadata and software scripts used to process data assets as presumed open.

The following section documents our current progress against each of the principles and our plans to further meet and exceed these.



1. Identify the roles of stakeholders of data assets

We are the data custodian for a wide range of data assets that have originated within our organisation, been created by our systems or been submitted to the organisation by a third party. For each data asset, we will identify and log the key stakeholders and their roles.

Progress to date

Our progress in this area has focused on both internal and external data stakeholders.

Internal stakeholders - roles and responsibilities

We recognise the critical role we play as a data custodian for the energy sector. To support our data governance approach and continue to increase our data maturity we have defined clear data roles and responsibilities, providing clarity on data, its ownership, quality, improvement and classification. This supports the overall implementation of data best practice.

Data steward

A data steward supports the business departments in the desired use of data. Their role is to be organised by data domains (e.g. customer data, asset data and system data). Data stewards evaluate requirements and problems with data, and support projects and digitalisation initiatives as experts for their respective domain. Their role is split into:

- **Business data stewards** - responsible for measuring and reporting the data quality, defining guidelines for creating and maintaining the data and documenting the data in a data catalogue (upon implementation).
- **Technical data stewards** - responsible for the data model and data lifecycle across IT systems. They provide standardised data element definitions and formats and profile source system details and data flows between systems. They shall work across domains (master data systems).

Data owners

Data owners specify the business requirements on data and on data quality. The data owner role is assigned to a senior manager in the respective business function or department.

Planned action

Internal stakeholders - roles and responsibilities

Our internal data stakeholder roles and responsibilities will continue to be assessed, developed and refined as necessary. These roles will continue in their maturity through further strengthening of our data governance and data solutions, building on the implementation of a company wide data catalogue. Expansion of our internal user personas will continue to maximise our understanding of internal needs throughout the business. These will be further informed by regular engagement, formally and informally, to meet the internal needs.

An internal data forum will be created to internally crowdsource data knowledge, discovery and insight throughout the business. This will support our continued commitment to a data and digital culture throughout the organisation rather than focused on specific teams and disciplines.

Data subjects and processors

We will extend our processes which identify and record data subjects and processors to all data across the organisation and integrate the results into our information management systems.

Data operator

Data operators will operate the data life cycle based on the defined standards. They create and maintain this data. This role is to be taken by staff in respective department of the relevant data owner, or in dedicated support functions.

Data user

Data users, as the name suggests, use the data. This can be directly as a dataset to understand a process, procedure, action or potential action or as part of a wider system or solution that utilises the data.

Executive sponsor

The executive sponsor (NGED's Director of Operations) provides sponsorship, strategic direction, funding and oversight for data management.

Data manager

The data manager (NGED's Data and Digitalisation Manager) is responsible for defining, producing and delivering a digitalisation and data management strategy and maintaining appropriate data governance. This role also manages business data stewards.

Data subjects and processors

Since the introduction of GDPR we have been systematically identifying data subjects and processors of all personal data.

We have also conducted a review of data assets to understand which systems and third parties are responsible for processing our data and to understand the subject of data assets, this feeds into our Open Data Triage processes (discussed later).

2. Use common terms within data assets, metadata and supporting information

We are committed to adopting common terms across our data ecosystem, based on regulatory resources, international standards and industry collaboration.

Progress to date

We have led the UK DNOs in the adoption of the Common Information Model standard for network asset and connectivity data. Starting with the 2016 NIA project we have developed business processes to align data to the CIM standard. In 2020 we became the first UK DNO to utilise the CIM format to share network asset and connectivity data externally.

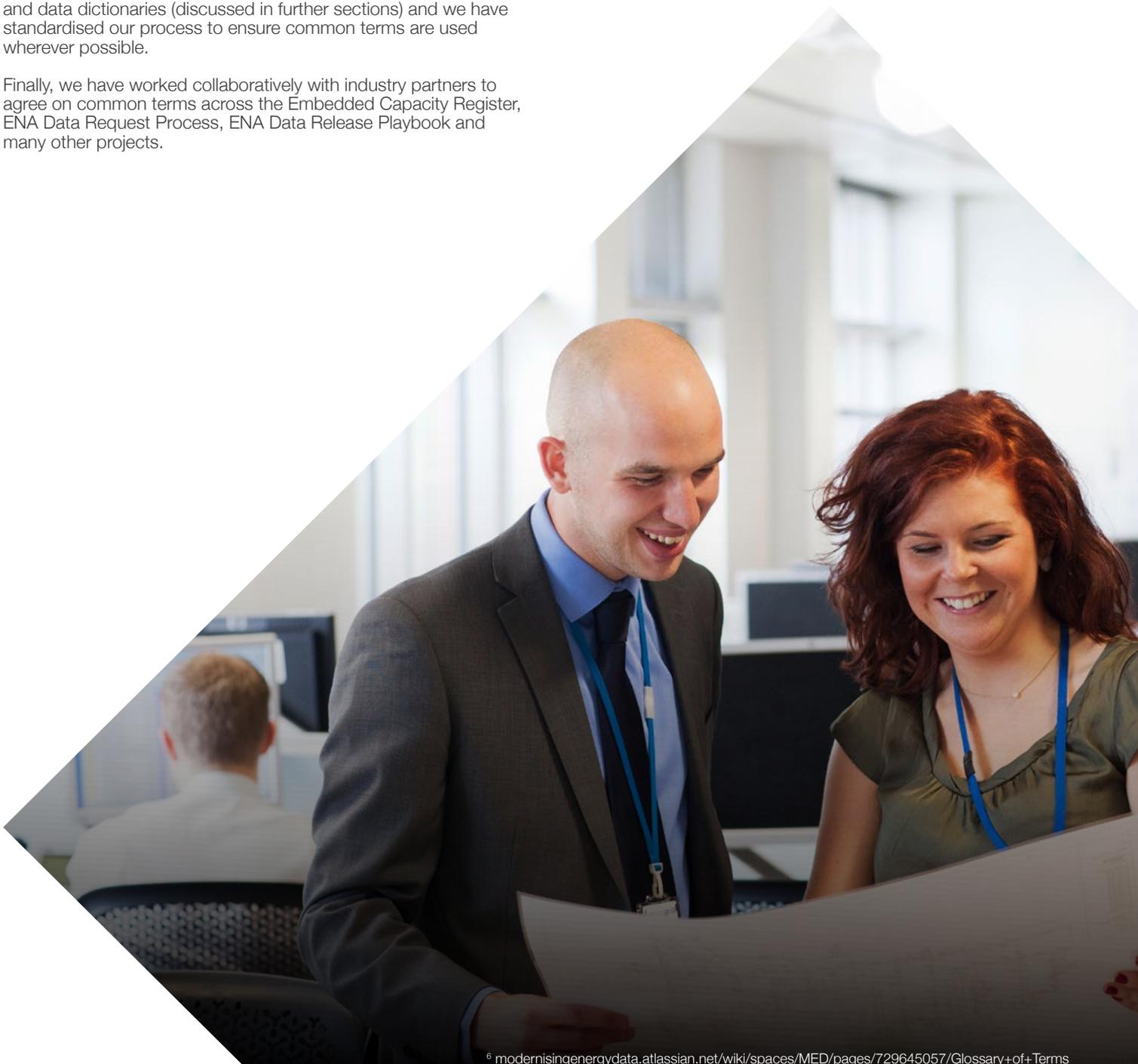
In addition, we have taken a number of critical steps to harmonise the terms used both internally and externally. For example, all data published via the connected data portal has consistent metadata and data dictionaries (discussed in further sections) and we have standardised our process to ensure common terms are used wherever possible.

Finally, we have worked collaboratively with industry partners to agree on common terms across the Embedded Capacity Register, ENA Data Request Process, ENA Data Release Playbook and many other projects.

Planned action

We are committed to extending our use of the Common Information Model to include all our assets and network connectivity and we will continue to work with industry partners to agree on common terminology wherever possible.

We will seek to identify, use and build on industry standardisation initiatives such as the Energy Systems Catapult (ESC) developed glossary⁶ and open energy.



3. Describe data accurately using industry standard metadata

We are committed to describing all data using the de facto industry standard format, Dublin core.

Progress to date

We have implemented the Dublin core metadata standard, as recommended by the EDTF. This has meant that we now consistently capture our metadata as set out in table 3. This has enabled us to drive consistency in the presentation of data externally as well as linking related datasets and common data tags to support data discovery.

Table 3: Dublin core metadata structure

| Element | Description | Dublin standard |
|--------------------|--|-----------------|
| Title | Name given to the resource. | Core |
| Creator | Entity primarily responsible for making the resource. | Core |
| Subject | Topic of the resource (e.g. keywords from an agreed vocabulary). | Core |
| Description | Account of the resource. | Core |
| Publisher | Entity responsible for making the resource available. | Core |
| Contributor | Entity responsible for making contributions to the resource. | Core |
| Date | Point or period of time associated with an event in the lifecycle of the resource. | Core |
| Type | Nature or genre of the resource such as a data group. | Core |
| Format | File format, physical medium, or dimensions of the resource. | Core |
| Identifier | Compact sequence of characters that establishes the identity of a resource, institution or person alone or in combination with other elements e.g. Uniform Resource Identifier (URI) or Digital Object Identifier (DOI). | Core |
| Source | Related resource from which the described resource is derived (e.g. source URI or DOI). | Core |
| Language | Language of the resource (selected language(s) from an agreed vocabulary e.g. ISO 639-2 or ISO 639-3). | Core |
| Relation | Related resource (e.g. related item URI or DOI). | Core |
| Coverage | Spatial or temporal topic of the resource, spatial applicability of the resource, or jurisdiction under which the resource is relevant. | Core |
| Rights | Information about rights held in and over the resource such as open licence. | Core |

3. Describe data accurately using industry standard metadata

An example of completed metadata is included below:

Table 4: Transformer detail for the South West Licence Area metadata

| Element | Description |
|--------------------|--|
| Title | Transformer detail for the South West Licence Area. |
| Creator | National Grid Electricity Distribution. |
| Subject | Transformer; rating; power; impedance. |
| Description | Key technical information for the transformers in NGED's South West region, including but not limited to voltage, impedance and ratings. |
| Publisher | National Grid Electricity Distribution. |
| Contributor | Data and digitalisation. |
| Date | 2020-12-03 08:38:00 (UTC). |
| Type | System and network. |
| Format | CSV. |
| Identifier | TX_South_West. |
| Source | National Grid Electricity Distribution. |
| Language | EN. |
| Relation | LTDS. |
| Coverage | South West. |
| Rights | NGED open data licence. |

Planned action

We recognise that the Dublin core metadata standard is useful to standardise the capture of information around data. However, we know that even greater value can be delivered through the expansion of standard metadata elements. We are supportive of delivering these expansions as a wider energy sector community to ensure consistency remains and serves customers and wider data users' best.



Digitalisation of the energy system is at the heart of our transition to deliver a smart and flexible energy system supporting the UK's clear commitment to net zero carbon emissions by 2050.

4. Enable potential users to understand the data assets by providing supporting information

Our data can only be useful to stakeholders if they are able to understand the contents and we are committed to providing both supporting information to help data users make the most of data we publish.

Progress to date

We have created a standardised data dictionary format which will be used to describe data asset fields to ensure that end users can understand the contents of each field, the type of data they should expect and the unit of measurement.

Table 5: Data dictionary structure

| Element | Description |
|--------------------|---|
| Title | Name of field (e.g. rating, name, ID) [Power rating]. |
| Type | String, float, integer, boolean etc. [Float]. |
| Description | Account of the field [The standard rating of the asset as defined in IECXXX]. |
| Example | An example of the data contents [35.5]. |
| Unit | Capture of the International System of Units or other for the field [MW]. |

Table 6: Data dictionary example

| Title | Type | Description | Example | Unit |
|--|---------|---|------------------------|------|
| Area | Text | The name of the licence area from which the data is taken. | EAST | |
| GSP group | Text | The name of the substation group that the substation is contained within. | Berkswell 132kV | |
| BSP | Text | The substation area to which the substation belongs. | Coventry Central | |
| Substation | Text | The substation to which the node belongs. | Courthouse Green 11 | |
| Node | Text | Unique node which identifies the substation/transformer. | COUG5J | |
| Voltage | Numeric | The voltage at the substation. | 11 | kV |
| Max demand 2019/20 | Numeric | The maximum demand seen at the substation between 01/10/2019 to 30/09/2020. | 13.21 | MVA |
| Max demand 2019/20 PF | Numeric | The power factor at the substation. | 0.98 | |
| Forecast load information 2020/21 | Numeric | Forecast maximum demand year 1. | 13.45 | MVA |
| Forecast load information 2021/22 | Numeric | Forecast maximum demand year 2. | 13.68 | MVA |
| Forecast load information 2022/23 | Numeric | Forecast maximum demand year 3. | 13.93 | MVA |
| Forecast load information 2023/24 | Numeric | Forecast maximum demand year 4. | 14.23 | MVA |
| Forecast load information 2024/25 | Numeric | Forecast maximum demand year 5. | 14.64 | MVA |
| Firm capacity | Numeric | Firm capacity of the substation site. | 23 | MVA |

Planned action

We will continue to seek feedback on our data dictionary template, and update it where possible to meet user needs.

To supplement the data dictionary, we will seek to publish and link to additional information that will help users interpret data we publish. This may be in the form of innovation project reports, technical standards or other bespoke data reports.

We have already demonstrated this as part of some of our innovation datasets, such as our collaborative net zero South Wales activity⁷.

We will support industry initiatives that seek to standardise terms and information structure – this will reduce the need for additional supporting information as well as making our data more interoperable with the wider energy sector.



5. Make data assets discoverable to potential data users

Our data is only useful if it can be found by the stakeholders who need it. We are committed to making our data easy to find and interpret, this means not only making it visible via search engines but also making it attractive and interactive for prospective users.

Progress to date

We have been a beta tester for the Open Energy8 platform and have integrated our data platform with the open energy search solution which helps users find our data more effectively. Our work on understanding data users and their data needs, including the specific data and the format it is shared in has been foundational to our digitalisation programme and will continue to be. We have adopted a three format philosophy:

Highly visual

Typically an interactive map or graph to provide all users high level but key information, demonstrated in our live data feed to understand the import, demand and generation in our four licence areas in real time.

Raw data for download and interrogation

Enabling the utilisation of data in multiple systems and to overlay with other dataset through the provision in standardised formats such as CSV, JSON, XML etc.

Application Programming Interface (API)

Providing data using an automated approach where access is provided through a machine interface, meaning no regular human interaction is required.

Figure 15: Real time data map

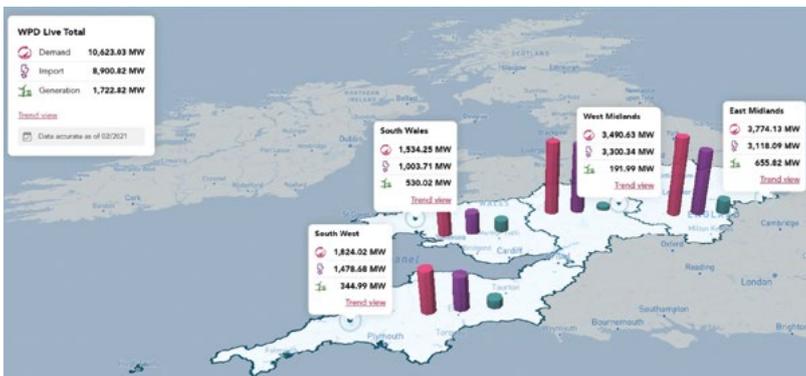


Figure 16: NGED API access

Access resource data via a web API with powerful query support. Further information in the main CKAN Data API and DataStore documentation.

| Endpoints » | |
|--|---|
| The Data API can be accessed via the following actions of the CKAN action API. | |
| Create | https://opendata.wpdsvr.net/api/3/action/datastore_create |
| Update / Insert | https://opendata.wpdsvr.net/api/3/action/datastore_upsert |
| Query | https://opendata.wpdsvr.net/api/3/action/datastore_search |
| Query (via SQL) | https://opendata.wpdsvr.net/api/3/action/datastore_search_sql |

Planned action

Making more data as visible and interactive for our customers as possible is crucial for the value of our data to keep increasing, therefore, we are committed to delivering greater data through visual means. This will include a centralised data mapping functionality with a number of overlays so the right information can be provided at the right time without the need to utilise often complex GIS systems. This will support new connections and flexibility propositions as well as data users such as local authorities; continuing to support their net zero ambitions. We will continue to make our data easier to find by streamlining our data publishing and continuing to improve our organic search engine results through regular publication of high quality data and insight on our connected data portal and other data centric pages.

Using our solutions to maximise the value of data comes hand in hand with the visibility of data and our commitment to make data open and accessible in a standardised but importantly a timely manner to inform key decisions internally and for our customers and stakeholders.

This ranges from key asset and connectivity information to better inform our customers' new connection process to providing in real time, via API, flexibility market data to inform pricing optimisation and requirements discovery.

We have a number of examples where we have provided highly visualised data:

- Network capacity map
- Real time data viewer
- Power cuts map
- ECR dashboard

Our connected data portal provides centralised access to machine readable datasets with an interactive exploratory function without the need to download the data as well as API provision for all relevant datasets.

6. Learn and deliver to the needs of current and prospective data users

We are committed to building good relationships with data users and delivering data assets and services which meet their needs and the needs of the energy system.

Progress to date

To support providing the right data, at the right time and in the right format through extensive engagement we determined high level internal and external data users:

Internal



Design and planning

Network planning engineers, commercial flexibility managers and support staff.



Finance

Financial managers, finance support functions and reporting.



Information/operation technology

System architects, communication engineers and maintenance support.



Operation

Network control room functions for DNO and DSO functions.



Regulatory

Business analysts, regulatory reporters and operation planning staff.



6. Learn and deliver to the needs of current and prospective data users

External

Understanding the needs of our customers, stakeholders and wider third parties is paramount to providing optimised digitalised and data solutions. To this point we have defined a robust set of external users by type to tailor data needs appropriately based on their proposed actions, role and benefit to be delivered. The table below describes these types by sector, their roles and a wider description. Appropriately defining data users has enabled us to ensure our data solutions, such our Network Capacity map, connected data portal and wider be delivered to meet their needs appropriately.

Table 2: User type definitions

| Sector | Role | Description |
|---------------------------------|---|---|
| Energy sector | Aggregator | Organisations including DNOs, generators, and technology data and service providers (e.g. storage and aggregators). |
| | Energy provider | |
| | Flexibility platform provider | |
| | Network operator | |
| | Data analytics provider | |
| | Electricity generator | |
| | National Grid | |
| Academic and innovators | Academic researcher | Actors and organisations focused on innovation and research both for commercial and academic purposes. There is significant cross over between work in this sector, the energy sector, and the commercial sector. |
| | Entrepreneurs | |
| | Innovators | |
| Third sector | Charitable sector | Charitable and campaign organisations, voluntary, and community groups such as community energy groups. Particularly focused on environmental issues, decarbonisation and socioeconomic equality. |
| | Campaign groups | |
| | Community energy organisation | |
| Public sector and regulation | Local authority | Predominantly dominated by local authority planning and policy, also includes regulators, government policy makers and social care. Focus on planning policy, decarbonisation and infrastructure planning. |
| | Policy makers | |
| | Regulator | |
| | Social work/care system | |
| Commercial | Commercial market | Commercial stakeholders, many of which are interrelated with energy sector. Clear focus on innovation, decarbonisation, infrastructure planning and development. |
| | Low Carbon Technology provider | |
| | Consultant | |
| | Renewable energy developer or installer | |
| | Electric vehicle charge point operator | |
| | Housing/building developer | |
| Electric Vehicle fleet operator | | |
| Consumers | Consumers | Interrelated across other sector. Focus on individual 'prosumer' habits and engagement in the energy system. |
| | Investors | |
| | Intensive consumer (large industry) | |

Planned action

We will continue to use a number of diverse engagement strategies, from our traditional face to face round table events to providing regular updates in digestible formats, such as short podcasts and videos of our latest developments and activities. Consultation is also important, we will provide opportunities to feed into formal consultations, as we do today, but also short polls on LinkedIn and Twitter, to provide quick and easy ways for all user types to readily engage.

We will continue to expand our user personas, building on our beta versions that we have published to date. These will be made interactive, where external stakeholders themselves can directly input and update to ensure that their current and future needs are directly understood and solutions delivered to meet those needs.

This will continue to place customers and data users at the heart of our digitalisation and data activities.

7. Ensure data quality maintenance and improvement is prioritised by data user needs

We strive to constantly enhance our data assets; we will ensure that data user needs are used to prioritise improvements and focus our efforts of high value interventions.

Progress to date

We have developed a comprehensive engagement strategy where we have committed to meaningfully engage with customers and data users. Implementation of the strategy has resulted in numerous engagement events with data users through a number of routes including innovation projects such as Presumed Open Data (POD). This has helped us to develop a greater understanding of user needs which has allowed us to put our focus on maintaining and improving data assets with the most value to the sector. Our data publication and visualisation work has been driven by user needs and direct requests.

We have also focused on understanding our internal data users. This helped us to identify high value datasets and enabled us to focus our investment in improvement and maintenance of data quality. The implementation of our internal data catalogue has enabled us to more robustly track, manage and improve data quality through standard metrics for our data process to effectively manage. We have a number of data improvement initiatives that are active across the organisation. One of our most significant activities is the CIM adoption project – within this project we are integrating and standardising our network asset data using an international standard.

By bringing together data from multiple systems across the organisation we have been able to identify discrepancies between sources, correct errors and fill in gaps within data assets. We know that this data is vitally important to our data users and our work will help them to work with this information more effectively.

Planned action

We will continue to use our effective and extensive engagement to drive prioritised needs and datasets. Extensions to our current feedback process on data will enable direct comment and feedback to be managed on data quality, at dataset or field level to further improve our understanding of our data users' needs.

8. Ensure data assets are interoperable with other data assets from other data and digital services

Interoperability is very important for data users and also presents opportunities for us to streamline services and procurement activities. We have made good progress in this area and are committed to building on this as a strong foundation.

Progress to date

As the first UK DNO to implement Common Information Model (CIM) as a format to share our asset and connectivity data, we recognise and value the need to standardise data for interoperability. We ensure that all data is shared in standardised format and have worked hard to transition to CSV, JSON and XML format to share relevant data. In addition, we have started to provide API access to data which is published via our connected data portal, providing yet another useful way for innovators to interact with our information.

Planned action

We are committed to delivering data in standardised, machine readable formats which promote interoperability. We will continue to adopt appropriate data standards and industry interoperability initiatives. We will seek to ensure our data is published in a timely way where appropriate, moving towards near real time APIs where this has value for data users.

We will continue to lead and participate in industry groups which champion interoperability of data across the sector and beyond.



9. Protect data assets and systems in accordance with security, privacy and resilience best practice

Security, privacy and resilience are top priorities for us as a custodian of critical national infrastructure and customer data.

Progress to date

We have implemented appropriate security standards to meet the requirements of Network and Information Systems (NIS) regulations 2018, which includes robust industrial control systems and operational technology security plans have also been implemented.

Our data publishing platforms are physically separated from operational systems and managed as an independent asset to minimise cyber risk. All data that we publish is rigorously triaged to understand potential security risk and mitigate these issues as they arise.

We have implemented a suite of measures to ensure we appropriately manage personal data and guarantee GDPR compliance across the organisation. In addition, we have an approved Data Privacy Plan which governs how we access and manage smart meter data in the interest of all energy system stakeholders.

Planned action

We will continue to focus on maturing our cyber security metrics and continuing to assess security posture against industry recognised benchmarking standards to ensure industry best practice is maintained. This will involve the continued standardisation of scalable technology solutions for both IT and OT to improve security and gain economies of scale.

As we transition increasing volumes of data to the cloud we will ensure that there is dedicated, skilled cyber resource to provide in house specialists, supplemented with expert third part resource where required, to ensure that our operating principles are optimised.



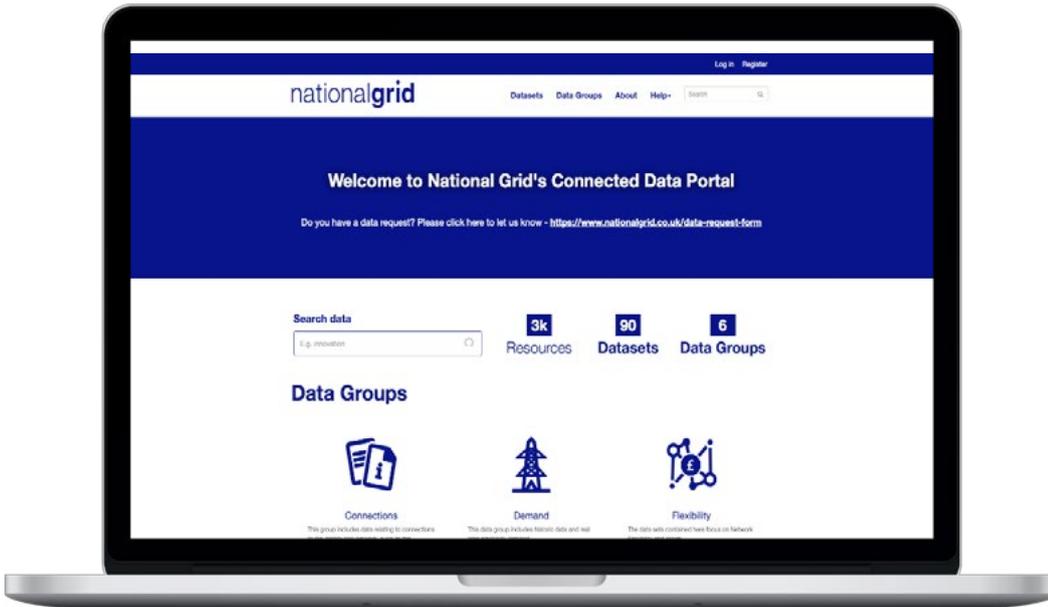
10. Store, archive and provide access to data assets in ways that ensures sustaining value

Our data has value both for internal use but also for external stakeholders and we are committed to ensuring that it is stored, archived and access in a way that maximises the value.

Progress to date

Our connected data portal facilitates centralised external access, where our data is mirrored on cloud services to provide a vast amount of access to customers and data users:

Figure 17: Connected data portal



As well as the latest data being stored, historic data is maintained and made available where possible to provide a greater understanding of the data's 'story' and carry out further analysis and investigation to drive insight. An example of this is included below.

Our connected data portal published our data assets in a variety of access methods and formats which make it easy for users to utilise it.

From flat CSV files which can be used with commonly available, user friendly data software to APIs which facilitate machine to machine access for our most advanced users.

Figure 18: Archived data availability

| Data Files | | | | |
|--|--------|--------------|----------|-------------------------|
| Name | Format | Last Changed | Download | |
| Embedded Capacity Register - December 2020 | csv | 1 month ago | | Explore |
| Embedded Capacity Register - February 2021 | csv | 1 month ago | | Explore |
| Embedded Capacity Register January 2021 | csv | 1 month ago | | Explore |

Our internal data catalogue facilitates a centralised data access point for our staff with access to the latest and archived data to meet their needs. The lineage of the data is also captured to ensure the greatest understanding and context for our data is provided.

Planned action

All data accessed internally is stored on premise and mirrored in a cloud environment for external access. Moving forwards we will utilise a hybrid, public and private cloud architecture to deliver improved data availability and access through enabling staff and external data users' access to the same datasets. We will continue to expand our internal and external data catalogue functionalities and assess them against our and our customers' needs.

11. Treat all data assets, their associated metadata and software scripts used to process data assets as presumed open

We have fully adopted the presumed open approach; we are focused on both proactively publishing information and responding to data access requests from industry.

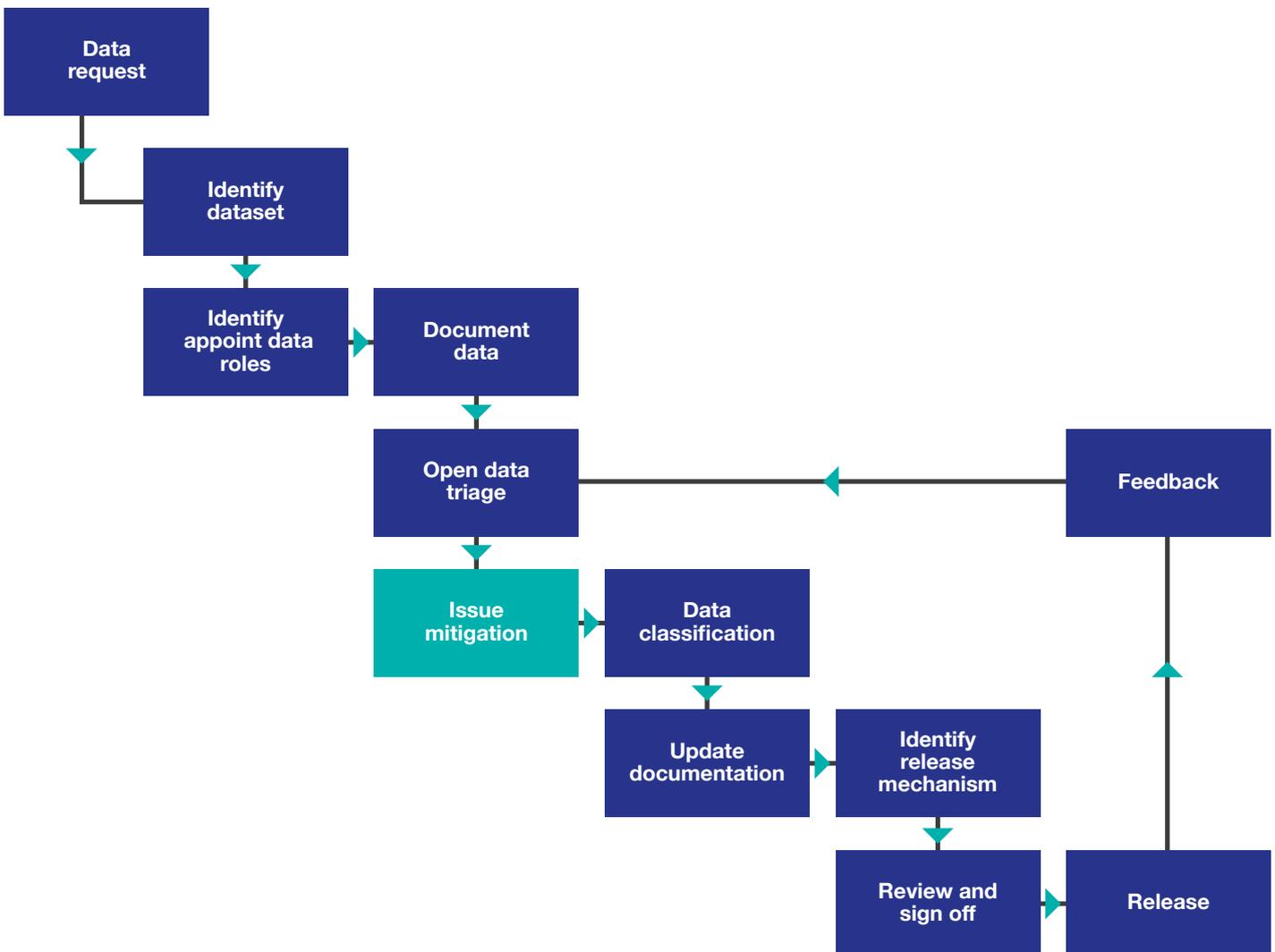
Progress to date

We have made significant progress on the adoption of presumed open both in terms of company culture and tools. We have developed a comprehensive set of presumed open resources and tools which are consolidated in our Data Triage Playbook. This was developed as part of our industry leading innovation project, presumed open data. We have established a data process team internally that coordinates this throughout the business, working closely with data owners, operators and stewards. This has seen us deliver our prioritised datasets and more to this point consistently.

In addition, we have shared our knowledge and experience with the wider industry through the Energy Networks Association (ENA) Data and Digitalisation Steering Group (DDSG). This has resulted in the publication of the ENA Data Triage Playbook which draws on our approach significantly.

The Data Triage Playbook provides a coherent process for the identification, assessment, preparation and publication of data assets. We have included a high level overview of our data triage process below.

Figure 20: High level Data Triage Playbook process



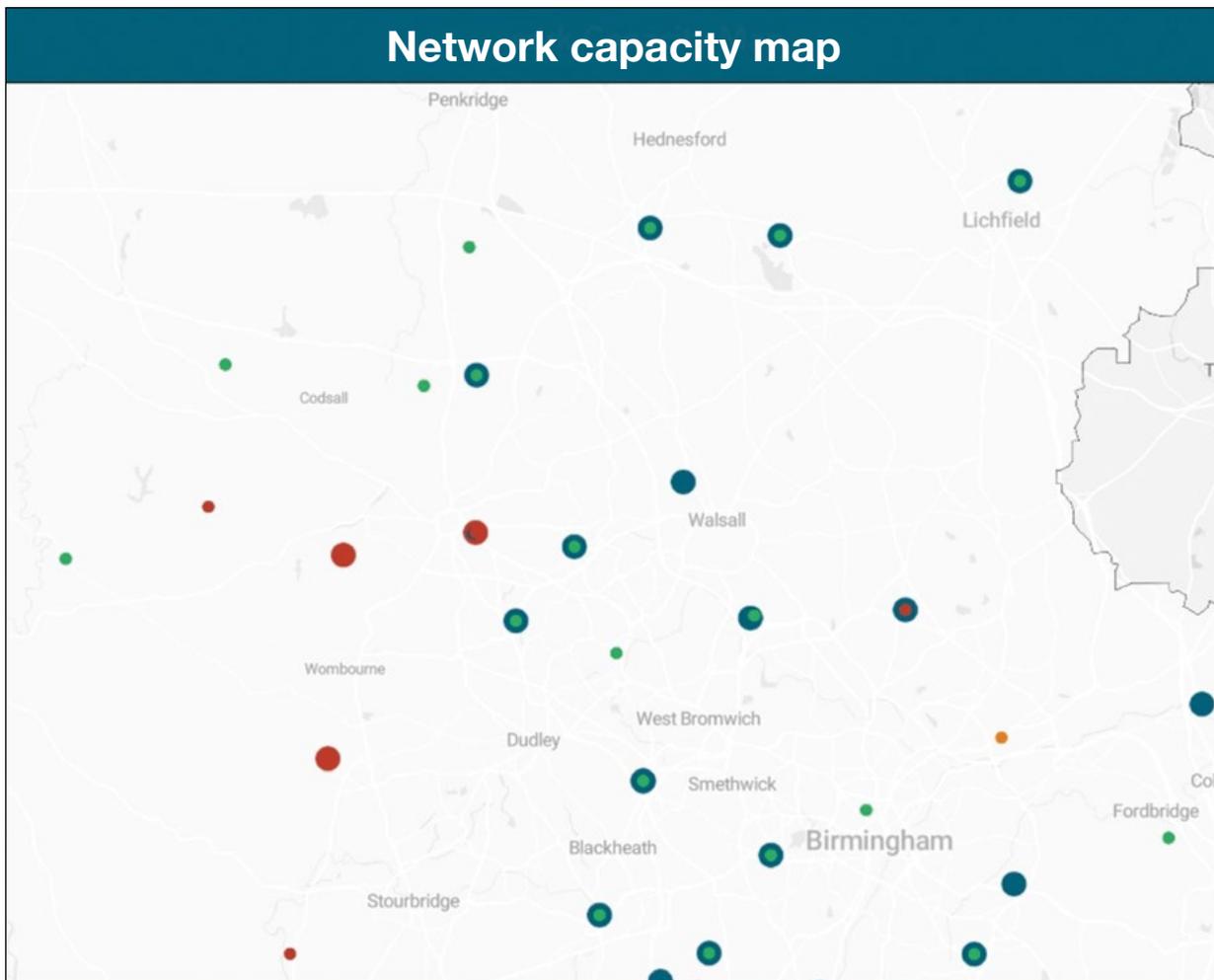
11. Treat all data assets, their associated metadata and software scripts used to process data assets as presumed open

We have put these tools to good use and have taken significant steps to ensure that our asset information is presumed open.

Our asset and connectivity data is made available for our HV and above assets in CIM format for use in all power system analysis tools to further remove barriers to data access. Our work to make our network data in shapefile format has also been significant, making this available through our connected data portal at the same granularity as our CIM data.

Mapping our data through our network capacity map has meant that customers as well as understanding the geographic location of assets can also understand their key capabilities to support new connection and flexibility offerings.

Figure 19: NGED network capacity map



Planned action

We will continue to share our data assets as open, increasing the granularity of data and in increasingly dynamic and interactive formats, providing wider supporting information to provide greater context and understand of the data. The frequency of our dataset refresh and update will increase to ensure that the transparency of our data is further increased.

The utilisation of advanced data analytics techniques will be employed to further automate our Open Data Triage process. This will continue to expand our data shared openly and to all. The expansion of the use of our data catalogue, to surface and discover data automatically will also enable this – supporting the continuing strengthening of our internal Data Governance.

Summary

We have made significant progress in the adoption and implementation of the data best practice principles and we have a clear roadmap of actions which will benefit the sector as a whole.

We are meeting and in many cases significantly exceeding the twelve principles in the data best practice guidance through our continuous improvement work on the connected data portal, application of open data triage and the presumed open principle in particular.

The utilisation of advanced data analytics techniques will be employed to further automate our open data triage process.

This will continue to expand our data shared openly and to all. The expansion of the use of our data catalogue, to surface and discover data automatically will also enable this – supporting the continuing strengthening of our internal data governance.

We have made significant strides in establishing data governance through our data triage playbook and will continue to lead the sector in our approach to digitalisation and data.





Engaging our data and digital Stakeholders

Engaging our data and digital stakeholders

Continuous and relevant engagement with data users, both internal and external, is key to delivering appropriate digitalisation and data solutions to be serve their needs and ultimately support the net zero carbon commitments.

We have a strong track record across the business of stakeholder engagement and we have ensured that this is leveraged to support our digitalisation activities.

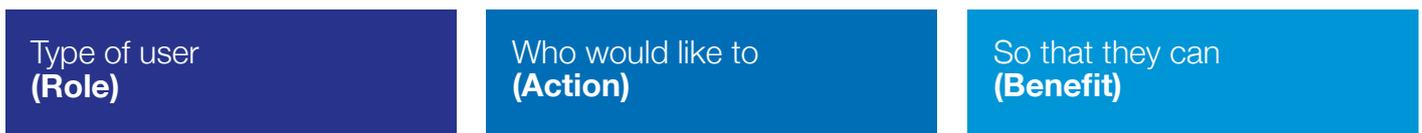
External engagement

The needs of our customers and stakeholders is critical to ensuring our digitalisation and data activities are focused to deliver the most value and benefit.

Identifying external data user types has been a key focus of our digitalisation activity; recognising that different users have varying needs and expectations of the same data. As with internal engagement and needs, ensuring the right data is in the right format at the right time is vital. We have a number of examples where we have ensured that this is the case, specifically our interactive maps that provide users easy to navigate geographic based data to information on aspects such as network capacity and future energy scenarios, where the more detailed source data is also openly available for more technical users to build their own analysis.

We followed an extensive engagement process to ensure we developed a robust high quality methodology to understand our different data user types. We assessed our existing datasets, some publicly available and some currently only available internally, where we identified over 100. We used this to drive a number of external workshops, providing participants an overview of the types of datasets which are and could be available.

This stage of the workshop also introduced the 'use case scenario' structure which is set out in the following format:



This is a useful tool for structuring input so that use cases are thought out more clearly, outputs are easily ordered and prioritised, and key points can be integrated into the design process for data sharing.

An example use case scenario using this format is detailed below:

Table 7: Example of an external data use case scenario

| Type of User (Role) | Who would like to (Action) | So that they can (Benefit) |
|----------------------------|--|--|
| A local authority. | Access data about the network capacity for new EV charging points. | Implement appropriate development management policies to target new EV charging points as part of new housing development, and enable appropriate retrofits to existing development. Thereby reducing carbon emissions, and increasing likelihood of developers delivering on planning requirements. |

As part of our workshops, participants provide focused input as part of small breakout sessions, working through a range of use cases. This approach ensures we generate a high volume of potential use cases which would be refined in the subsequent session.

Building on the input and use cases identified further focused time is then given to answering the following two questions:



This ensures both the use cases and data access requirements are suitably identified to deliver optimised solutions.

104 use case ideas were collated as part of these extensive workshops to date. In order to effectively analyse these responses there was a need to further group responses under corresponding themes to interpret which use cases were shared or stratified between different sectors, which use cases required the same data and same data access functionality, and which use cases were variants on a central point and should be amalgamated.

In this context, use cases are analysed using a process of formal coding. Coding is a qualitative inquiry process in which a word or short phrase is assigned to a portion of data (in this case the use case scenario) in order to create a summative representation of the content. To aid analysis these themes are further grouped into categories.

Table 8 sets out the categories and corresponding themes that use cases have been grouped under. The use cases are grouped into seven core categories: connections, capacity and constraints, policy and planning, decarbonisation of buildings and transport, research and modelling, customer vulnerability and support, DNO operations, and tariffs and trading.

Table 8: Categorisation of use cases

| Category | Theme | Description |
|---|---|---|
| Connections, capacity and constraints | Connections, capacity and constraints | Use cases which seek to understand where sufficient capacity exists to connect energy assets to the NGED network and what constraints exist. Use cases in this theme often explicitly or implicitly discuss flexibility and renewable generation. |
| | Equality and advocacy | Use cases which aim to ensure that vulnerable or under represented consumers benefit from the opportunity of decarbonisation. |
| Decarbonisation of buildings and transport | Decarbonisation | Use cases which aim to decarbonise individual buildings or through community based collective action. Use cases focus on energy efficiency, low carbon heat and carbon intensity at time of use. |
| | Enabling EV charging | Use cases which focus on enabling the deployment and operation of electric vehicle charging infrastructure. |
| DNO operations | Improving data quality and interoperability | Use cases which focused on improving the quality of NGED's data in some way. |
| | Improving fault diagnosis | Use cases which aimed to reduce the time it takes NGED to diagnose issues on its network (power or telecoms). |
| | Optimising network strategy, planning and operation | Use cases which aim to improve the way NGED invests in and operates its network (power or telecoms) to maximise efficiency or performance. |
| Policy and planning | Local area energy planning | Use cases which focus on developing a plan for the development of the local area and energy network. Many use cases are written from the perspective of a local authority (14) planning a decarbonisation strategy for an area. |
| | Policy | Use cases which use data to inform policy making. |
| | Environment | Use cases which seek to use data to improve environmental conditions such as air quality and ecology. |
| Research and modelling | Education and research | Use cases which aim to improve the understanding of the energy system through community education or academic research. Note, whilst there were many use cases in this theme they were often more loosely defined and many focused on opportunistic data exploration or increasing understanding NGED rather than specific actions. |
| | Cross sector | Use cases which look at the cross sector opportunities of data sharing. |
| Tariffs and trading | Tariffs and trading | Use cases which look to use data to improve trading strategy or develop more intelligent tariffs. These use cases are generally interested in time or location specific value. |

Engaging our stakeholders

In parallel to developing categories and themes to group and analyse data there was also a need to clean the raw qualitative data which had been collected to ensure terminology and wording was consistent across use cases to enable appropriate structuring and grouping of use cases.

In this context, the data was reviewed and refined so that individual stakeholders were referenced using a unique name (e.g. local authorities can also be referred to as local government or local councils).

Table 9 outlines the stakeholder descriptions used within the use case scenarios and sectors within which these have been grouped.

It is important to note that groups are inherently interrelated and there is therefore cross over between different sector and different themes.

Table 9: User type definitions

| Category | Theme | Description |
|------------------------------|---|---|
| Energy sector | Aggregator | Organisations including DNOs, generators, and technology data and service providers (e.g. storage and aggregators). |
| | Energy provider | |
| | Flexibility platform provider | |
| | Network operator | |
| | Data analytics provider | |
| | Electricity generator | |
| | National Grid | |
| Academic and innovators | Academic researcher | Actors and organisations focused on innovation and research both for commercial and academic purposes. There is significant cross over between work in this sector, the energy sector, and the commercial sector. |
| | Entrepreneurs | |
| | Innovators | |
| Third sector | Charitable sector | Charitable and campaign organisations, voluntary, and community groups such as community energy groups. Particularly focused on environmental issues, decarbonisation and socioeconomic equality. |
| | Campaign groups | |
| | Community energy organisation | |
| Public sector and regulation | Local authority | Predominantly dominated by local authority planning and policy, also includes regulators, government policy makers and social care. Focus on planning policy, decarbonisation and infrastructure planning. |
| | Policy makers | |
| | Regulator | |
| | Social work/care system | |
| Commercial | Commercial market | Commercial stakeholders, many of which are interrelated with energy sector. Clear focus on innovation, decarbonisation, infrastructure planning and development. |
| | Low Carbon Technology provider | |
| | Consultant | |
| | Renewable energy developer or installer | |
| | Electric Vehicle charge point operator | |
| | Housing/building developer | |
| | Electric Vehicle fleet operator | |
| Consumers | Consumers | Interrelated across other sector. Focus on individual 'prosumer' habits and engagement in the energy system. |
| | Investors | |
| | Intensive consumer (large industry) | |

Table 10 highlights the percentage of use cases for each stakeholder sector that fall within the different identified use case categories.

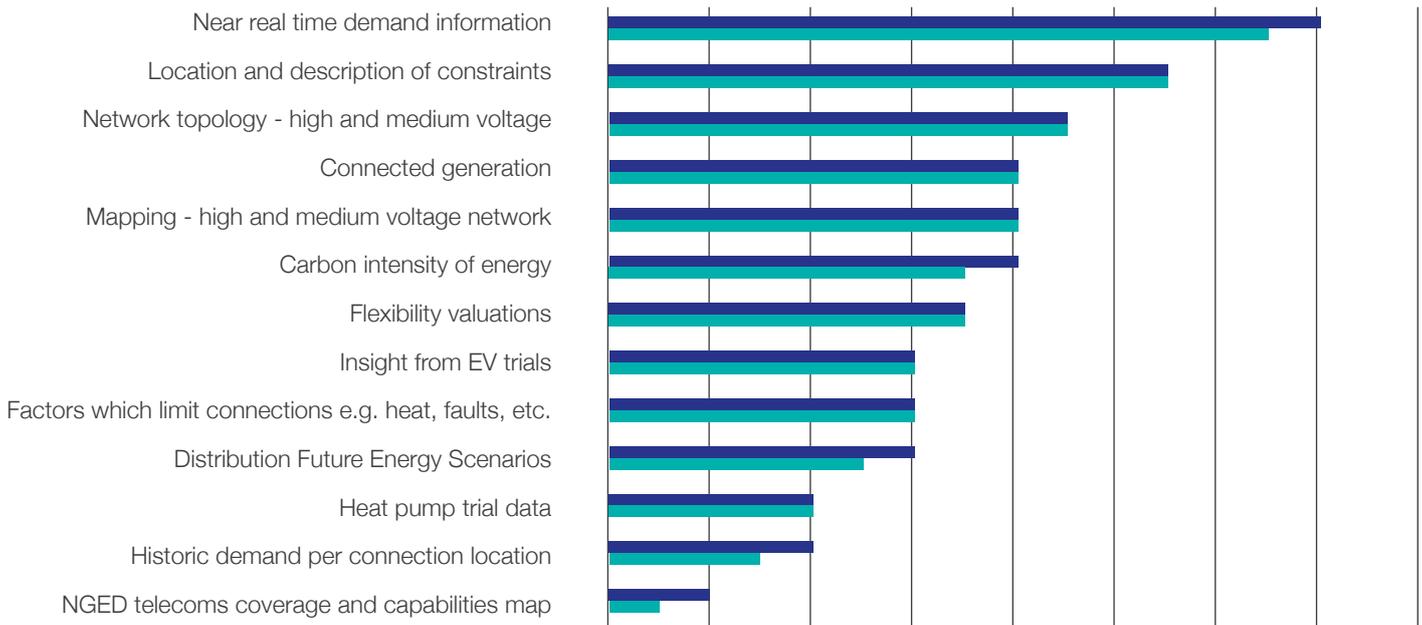
Table 10: Percentage of use cases for each stakeholder sector that fall within each use case category

| | Energy sector | Academics and innovators | Third sector | Public sector and regulation | Commercial | Consumers |
|---|---------------|--------------------------|--------------|------------------------------|------------|-----------|
| Connections and constraints | 20% | 16% | 19% | 14% | 21% | 33% |
| Customer vulnerability and support | 0% | 5% | 10% | 12% | 0% | 0% |
| Decarbonisation of buildings and transport | 15% | 21% | 25% | 28% | 38% | 33% |
| DNO operations | 22% | 5% | 3% | 5% | 7% | 0% |
| Planning and policy | 24% | 11% | 16% | 37% | 24% | 0% |
| Research and modelling | 5% | 42% | 19% | 5% | 4% | 0% |
| Tariffs and trading | 15% | 0% | 10% | 0% | 7% | 33% |

Utilising this approach has allowed us to develop an understanding of the different user types and the focus of their needs, through the categorisation of use cases. This has provided a robust basis for continuous engagement.

We continue to use this engagement methodology to understand the data and access needs of external data users. This process is particularly useful as it allows the focus to remain on the action and benefit from improved and increased data access around user types and use cases, enabling us to translate that to our data sets and prioritisation future activity and feed into future engagement.

Table 11: External dataset prioritisation



Engaging our stakeholders

Sharing our developments and progress is also key to success. We provide a six monthly update of our Action Plan but also provide online access to our digitalisation programme, providing regular updates on the projects' progress through blogs and videos. This ensures that all user types can easily access and understand our process and importantly enabling feedback and engagement at every stage.

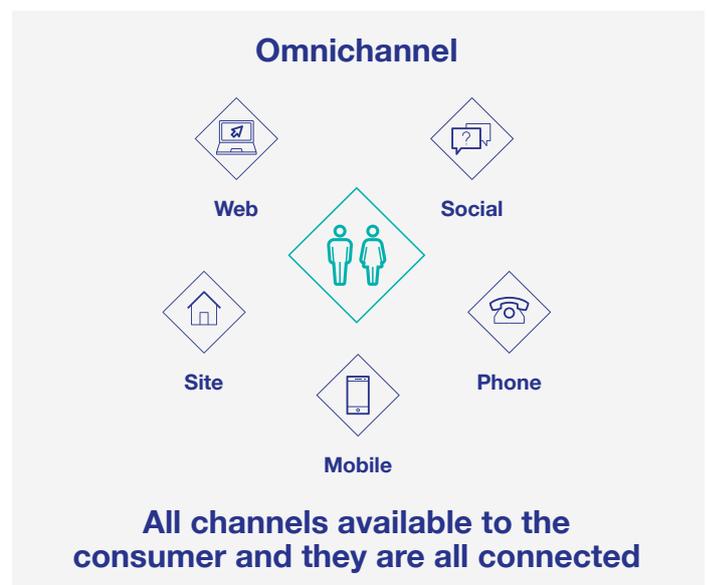
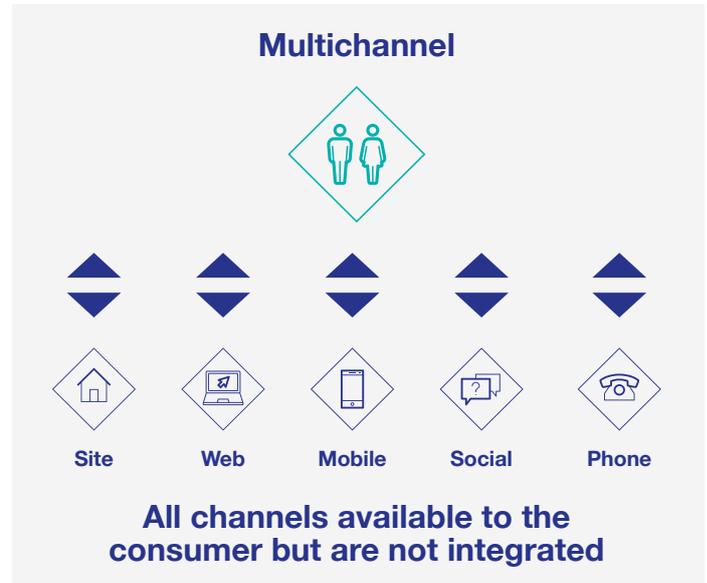
Going forward

This mechanism to engage and drive feedback is formal and we recognise a number of engagement mechanisms are needed. Within our business wide stakeholder engagement, digitalisation and data is routinely included to capture the latest data and access requirements. We also include frequent informal engagement through online survey, which take only a few minutes to enable a wide range of stakeholders to prioritise use cases and specific datasets, which has informed our prioritised use case and dataset development activity as part of our Digitalisation Strategy.

We will continue to enhance how we deliver against stakeholder needs, by further codifying digital tool development and data publication into a roadmap that is prioritised to and responds to stakeholder needs. This will be managed in an Agile way according to mature product management practices, releasing major versions and builds of stakeholder needs when there are significant changes to needs and minor changes within those established builds.

The extensive workshops described above will function as major updates to stakeholder needs and will form the basis for high level prioritisation of digital tool development and data publication for specific needs. Using the informal engagement to continuously iterate on the tools that are being delivered will form the minor updates to the data we provide or the digital tool features that are prioritised. This informal engagement will also be sourced from known stakeholders across Twitter and LinkedIn, not just in their direct interactions with NGED but also in public discussions.

NGED already collects huge amounts of information about interactions with customers and stakeholders across the whole organisation. A further key tool which has radically transformed organisations approaches to customer interaction is omnichannel communication, where communication with customers is consistent whether they interact by email, phone, in meetings, through portals, or any other way in which there is a communication channel.



Omnichannel engagement has three major benefits that we will harness. The first is that customers will spend much less time restating the same information across different channels and overall reduces the time that the customer spends getting to the point at which they can communicate what their needs are.

The second major benefit is that teams that currently operate or provide services in silos will be able to gather information on the wider needs of the customer outside of their own workflow.

This will enable teams to collaborate on new features and gain a greater visibility of the justification for major and minor stakeholder needs releases. Thirdly, as the needs of customers will continue to cut across multiple different functions with multiple teams having to work together to deliver on them, omnichannel communications will enable the development of complex multi department workflows to solve problems.

Eventually this will move to a workflow ticketing system, with clear responsibilities for each department and a full auditable record of how the communication with the customer has evolved over time and how their needs have evolved over time.

Internal engagement

Our staff are pivotal to the success of our business and delivering digitalised solutions that meet their needs to continue to be effective and efficient in their roles is integral to our strategy and action plan.

Enabling all levels of staff to feed into the strategy, highlighting their needs and expectations, is really important as well as making sure we 'take them on the journey'.

We use formal and informal engagement to understand their data related needs through targeted surveys on specific datasets to understand their quality and need for improvement to drive additional value and wider engagement to understand the need for additional datasets and digitalised solutions.

We initially followed a similar engagement process to that used as part of external engagement, facilitating open and interactive workshops with all departments of the business using identified internal use cases as shown in **Table 12**.

We engaged to understand specific use case based on these themes and examples and identified a number of internal data users:

- **design and planning**
- **finance and resourcing**
- **information and operational technology**
- **operation**
- **regulatory.**

We recognise that a number of user types require the same data in different formats to suit their needs and ensuring centralised access is key to provide the right data in the right format at the right time. Identifying these user types enabled us to understand their data needs in more detail, track the suitability and prioritisation of current and future needs through data access information.

This work to date has supported our data driven developments, such as the Integrated Network Model, providing a single source of the truth for asset and connectivity benefitting a number of internal user types as well as centralising data access.

Table 12: Internal use case and examples

| Use cases | Examples |
|--------------------------------|---|
| Network and assets | Infrastructure Monitoring Constraints Planning Sites |
| Network and assets | Works Faults Costs and pricing Flexibility Customers contact Forecasting Procurement |
| Third party connections | Generation and storage resources Generation and demand Smart Meters Low carbon technologies Electric vehicles |
| Others | Environmental Community |

Engaging our stakeholders

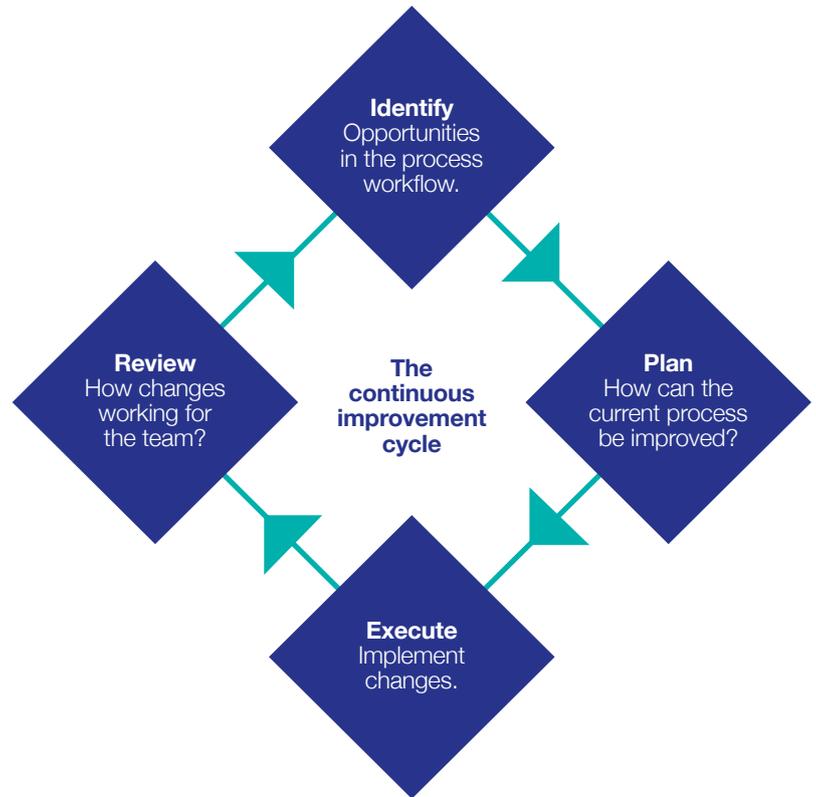
Going forward

The integrated network model has demonstrated the value in aligning data across the organisation, departments are able to synchronise their assumptions. Internally digitalisation will focus on this element, streamlining workflows within the organisation.

This will be achieved in a few ways; the needs of internal stakeholders will be prioritised in a similar manner to the manner discussed above to set the objectives for what digitalisation needs to tackle.

This could take the form of new business processes, new tools to support their work or data related needs where specific datasets need to be generated or aligned between departments. This is key to take them on the journey towards digitalisation.

Our digitalisation strategy will therefore follow a procedure aligned with the continuous improvement process shown to the right:



Specifically, this process will enable workflows to be automated where appropriate for the benefit of customers. Automating simple processes gives the existing labour force more time to cover more complex topics.

For example, staff could spend more time tackling issues related to vulnerable customers and how they interact with us, addressing complex multi department or multi organisation requests, or tackling novel and emerging challenges.

The objective of this will be to ensure that our staff are able to spend more time on activities that benefit stakeholders and provide excellent service, and less on administration of simple tasks. In time these complex requests may be shaped into new digitalised workflows to enable us to evolve our systems and processes as stakeholder needs change.

This process as applies to the development of new tools, or aligning data internally, it reduces the administrative burden on staff and allows them to redirect their efforts to where there is a greater need for them.



Technical stakeholder support

We will continue to lead the sector in enabling innovation that supports the net zero transition and part of this will be promoting access to data and information using data portals and APIs that we have already started to build out in the connected data portal. Doing this has brought us into contact with sets of stakeholders that have needs specifically related to data.

We will learn from established best practice across the tech sector to enable our data users to continue to engage with us in productive ways.

We are already using the requests from the ENA data request portal to prioritise datasets to be produced, documented and published, but we intend to go much further in how we provide data to the sector and how we collect feedback from technical stakeholders.

The first will be to establish a working group with a set of trusted data stakeholders around the energy sector. These will primarily be users who use data in their day to day work and are very literate in the application of data to solve problems.

These could, for example, be data scientists that work for an SME, or a research group at an academic institution.

This stakeholder group will be encouraged to collaborate through a group that connects internal data experts with external users. The objective of this group will be the alpha and beta testing of datasets before they go live, to understand if the data is useful, if it is in a suitable format, and what kind of applications the data can be used in.

This stakeholder group will also be key in producing further ways in which support is streamlined and remove the duplication of effort. Firstly, a wiki will be available which contains everything a user needs to know about the published data on the connected data hub. The purpose of this wiki is to answer basic questions about how the data has been generated, the coverage of the data, and a running record of updates to the dataset that have taken place. Secondly, a set of how to guides will be developed with the stakeholder group based on common or overlapping workflows.

For example, two researchers from an academic institution may develop a solution for a research question using our data. This method would then be published as a how to guide so that the next person who needs to apply that method can do so straight away.

Finally, the stakeholder group and our internal experts will operate a forum style community where new users can ask questions and the community can participate in providing the answer. This will lower the burden on NGED to answer questions that already have solutions and promote community participants as experts. This will enable a thriving data and applications ecosystem using our digital assets with deep insight into emerging use cases and needs.

We will be able to direct the efforts of our internal data experts to wiki maintenance, metadata maintenance and improvement, triage of new dataset and reviewing the triage of existing datasets, and data engineering new datasets to be published.

This will create unprecedented transparency for the innovation community, allow us to continue to lead the way in enabling access to data and insight from NGED.



Engaging our stakeholders

Technical stakeholder support

The final part of this technical stakeholder support is via data science challenges. NGED has already started running data science challenges as part of the Presumed Open Data NIA project and will take them into BAU for major dataset releases.

A key outcome of this challenge was the encouraging engagement, and positive response from participants. This illustrates the value in making energy data more open, the numerous individuals and institutions who are keen to engage in these sorts of problems, and the innovative solutions which can be developed the data science and energy community.

From the start of the challenge participation was strong and remained that way throughout the seven week challenge, with low dropout rate and a wide variety of participation: from very experienced energy forecasters to data science newcomers.

Although there have been many data science challenges such as the global energy forecasting competitions and those hosted through competition websites such as Kaggle, they often focus on a particular ML problem with less focus on the application. Our challenges will focused on a realistic problem within the energy sector and will be developed to understand performance for a specific application rather than on the complexity, or accuracy of the individual models.

The chosen challenge was from the theme of 'maximising asset utilisation' and the problem would focus on developing a schedule for the control of a distributed network storage devices to support the network and avoid capacity excursions. The problem had the advantage of satisfying multiple selection criteria for the challenge.

Firstly, security of supply (i.e. ensuring demands do not exceed network cable constraints) is a common issue identified by both internal and external stakeholders. Secondly, the organisers of the challenge had strong experience in the areas of control for distribution networks. Thirdly, it could be posed as a well defined problem with objective scoring criteria (such as percentage peak reduction) and finally, there was strong likelihood of finding a suitable dataset since distribution network demand was the only core requirement for implementing the challenge.

Going forward we intend to run more of these data science challenges on a regular basis to tackle decarbonisation. We will also encourage participants to publish the code they use and the outputs of the challenges in a public repository, as may did for the previous challenge. This again will enable data scientists tackling similar challenges to learn from the work that has already been conducted in the sector and provide opensource tools and techniques to build engagement with our data and make it more useful for data users.

Summary

Continuing to effectively engage is a priority for us to ensure we continue to deliver a Digitalisation Strategy and Action Plan that suits our staff and our stakeholders needs.

Our engagement has served us well to this point, enabling us to establish an initial strategy, roadmap and programme of digitalisation activity delivering tangible benefits to a wide set of users.

As we increase the number of digitalised solutions and datasets, we recognise the need to widen our approach beyond understanding the needs that do not currently exist but also how to maximise the value of what's already available.

Both internally and externally we ensure that direct routes for feedback to teams and individuals is available at each point of data access as well as analysing the frequency that data is accessed, and where appropriate, by what user types.

This allows us to provide targeted engagement, understanding the need to develop both low and highly utilised datasets and digitalised solutions to ensure best value continues to be delivered.

As well as the format different customers and stakeholders want to interact with our data, the same is true for how they want to engage and provide feedback. We ensure that there is a balance between formal, large scale, engagement, which often suits larger organisations and entities, in the form of face to face or online sessions and smaller, more regular informal engagements.

These regularly take place as quick and interactive online surveys, promoted through our social media, such as Facebook and Instagram, which ensures we get as wide a level of feedback as possible from all user types.

We also understand that some user types are harder to target than others and as well as utilising as diverse an engagement approach as possible we utilise expert external resource to provide input to represent user types, such as CSE to inform as to the needs of vulnerable and fuel poor customers and Regan for community energy groups. By sharing our current user types, we can understand from feedback and engagement where, moving forwards, these can be developed and enhanced to ensure that we are capturing the right user types to prioritise datasets and digitalised solutions.

We have worked to provide greater insight into our data stakeholders through the creation of user personas. We have developed profiles for specific roles within our user types to ensure our investments and developments are aligned to meet and exceed their needs.

Continuous interaction with our Stakeholder Engagement Team ensures that we take all opportunities to engage customers and stakeholders in our current and planned digitalisation and data activities to shape, input and feedback.

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