Digitalisation Strategy

MARCH 2024

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national gas

Foreword | Jon Butterworth

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... our digital capability is absolutely essential for this system to operate effectively to heat homes, supply businesses and power heavy industry

It is a pleasure to introduce our digitalisation strategy to you, following our first full year as National Gas

When people think of our National Transmission System – including many in the energy industry – the first association they have tends to be with our physical infrastructure: the network of terminals, compressor stations, 7,660km of pipelines and more than 500 above-ground installations that transport natural gas across Britain. And indeed this remains essential, generating a third of electricity and meeting the needs of eight in every ten households.

However, our digital capability is absolutely essential for this system to operate effectively to heat homes, supply businesses and power heavy industry. Digitalisation is and will be fundamental to our future; we are updating and refining our approach continually as we plan our asset management strategy, both for natural gas resilience and for the longer term with hydrogen.

Our digitalisation strategy will help us to make the right decisions and support the real-time operation of the network through the current regulatory period to March 2026 and the following one which runs to 2031.

It will incorporate a new platform that will bring together data from across our business units into a highly capable system - improving how we analyse, handle and share data, accelerating our operations and unlocking operational efficiencies and benefits to customers.

Needless to say, none of this will happen without the endeavours of our 2,000-strong workforce, and we pledge to grow their skills as we continue to onboard new technology, and create the environment in which they will continue to ensure energy security and create the clean energy networks of the future.

We look forward to continuing to engage with you as we refine and implement our strategy. We really value your feedback – if you'd like to get in touch, you can find contact details towards the end of this document.

Jon Butterworth
CEO, National Gas

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National Gas

What we do

National Gas serves as the backbone of Britain's energy system. We help transport gas to ~23 million homes, 0.5+ million businesses, and 35 power stations that keep the lights on in Great Britain.

To fulfil our licence obligations under the Gas Act 1986, we build, maintain, and operate an efficient and economical network, National Transmission System, transporting gas quickly and safely to wherever needed across Great Britain.

Our Gas System Operator performs the role of Network Emergency Co-ordinator (NEC), acting independently to prevent or minimise safety consequences in the event of a supply emergency.

Our National Gas Metering business manages and maintains ~6 million gas meters across UK, while National Gas Services provides nationally important pipeline repair and maintenance services to ensure uninterrupted gas flows.

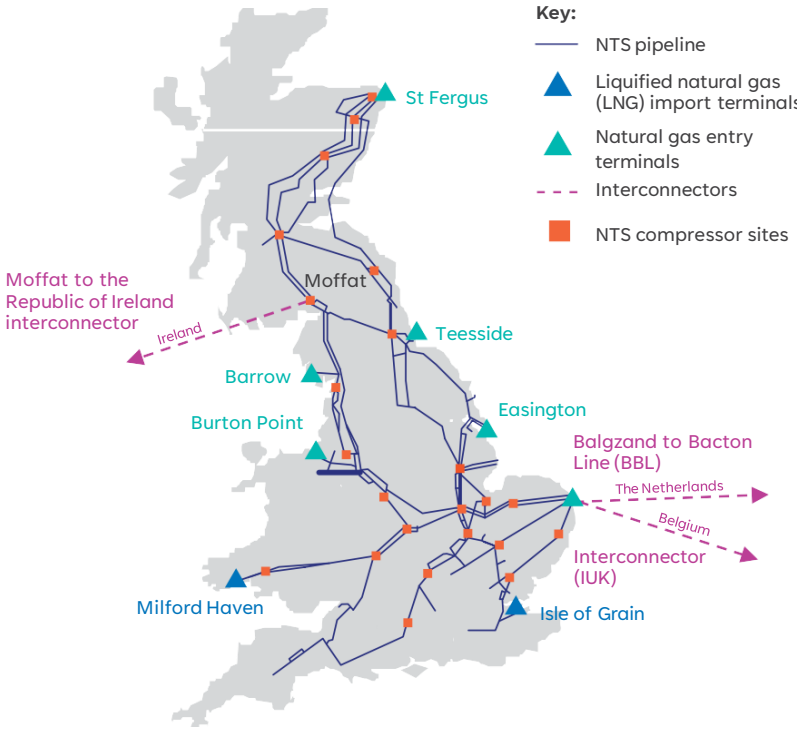
We now look to play a key role in the UK's transition to a clean energy future leveraging our track record of innovation and expertise in operating critical energy infrastructure.

Our network

The National Transmission System is 7,660km of pipelines and 65 compressors, currently operated at pressures of up to 94 bar. Our network transports natural gas from entry terminals and storage facilities to exit offtake points, playing a vital role in the secure transportation of gas and facilitation of a competitive gas market. At exit offtake points, gas is transferred to four distribution networks (DNs) for onward transportation to domestic and industrial customers, or to directly connected customers including 9 storage sites, 35 power stations, 15 large industrial consumers and 3 interconnectors.

We are currently also testing our network's capability to be converted for transporting hydrogen in the future.

The National Transmission System



Note: LNG import terminals are not owned by National Gas

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Our new purpose and need for a refreshed digitalisation strategy

In 2023, we separated from National Grid and wrote our own strategy for the first time, redefining our identity and purpose. We are updating our digitalisation strategy, in line with the corporate strategy

Our Purpose and Values

In 2023, we separated from National Grid and wrote our own strategy for the first time, redefining our identity and purpose.

We play the role of a platform for the gas industry, serving customers, coordinating the market, and orchestrating regulators, governmental authorities and suppliers. Thus we have set our purpose to be

"Leading a clean energy future for everyone"

To guide our people, we have also defined 5 values: 1) Ownership 2) Simplicity 3) Progress 4) Belonging and 5) Safe everyday. We want to use these values in decision making across the business, including digitalisation.

Today, we face the uphill task of leading decarbonisation of the energy system while continuing to maintain security of gas supply and supporting our separation from National Grid.

Need for a refreshed digitalisation strategy

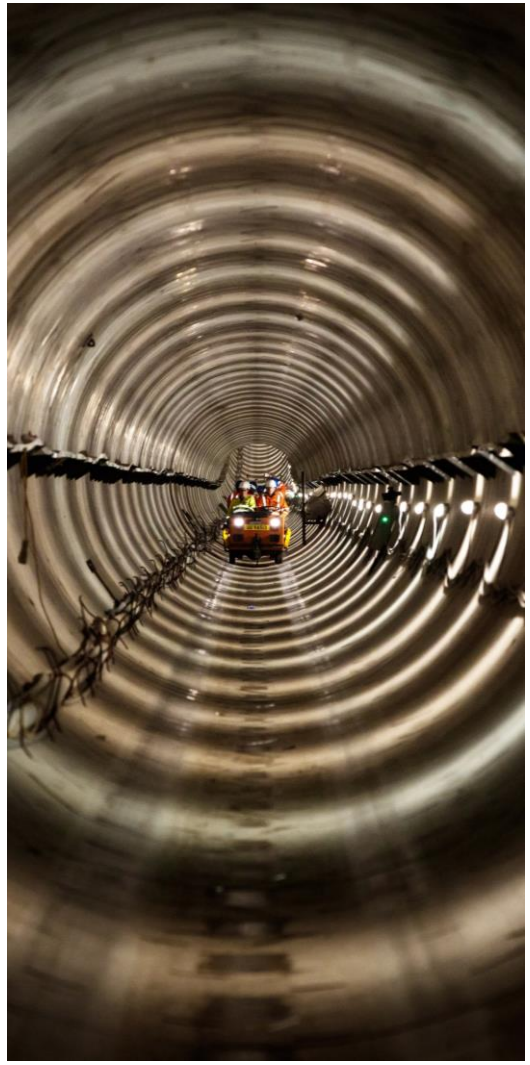
We are mobilising our new corporate strategy via an operating model transformation.

We consider digitalisation a key enabler for the future of our business. Thus, as we seek to reinvent our business and operating model, it is critical for us to review our digitalisation strategy.

Overall, we will continue to exploit data to make the right decisions, such as guiding our asset management strategy and supporting the real time operation of the network across remaining RIIO-2 and in RIIO-3.

We have refreshed our digitalisation strategy objectives and focus areas such that these are not only in line with our new corporate strategy but also meet evolving stakeholder needs including Ofgem customer priorities.

Our approach: We have been engaging with stakeholders to understand their needs and have shaped our digitalisation strategy accordingly [Page 13]



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Our digitalisation journey to date

Pre 2014

2007: Launched Data sharing platform and since then have continued to work with stakeholders to expand the data sets available

2016

2016: Introduced CRM systems into the business

2018

2018: Established a Data Team - a multi-disciplinary COE supporting agile product model and value stream delivery

2019: Migrated to **Copperleaf** for investment planning and **laid foundation for Data Management -** adopting best practices, training data practitioners, and creating data catalogues

2020

2021: Introduced Phase 1 Digital Work Management for digitalised field operations and **engaged with energy networks and organisations** from other industries to share knowledge on technology, skills and culture. Produced materials and held events to support stakeholders use of data, such as the 'Data Webinar – Your data, today & tomorrow'

2022

2022: Rebuilt our core data sharing platform (MIPI) incl. front end and published new data, **launched Digital Construction POC** and 1st phase of enhancements in Digital Work Management (DWM) and **introduced Phase 2 Digital Work Management**

2023: Developed new corporate data strategy and complete first phase of enhancements in Data & Insights platform

2024

2024: Consolidated our key asset management systems and datasets, providing a unified understanding of our assets health

▶ **DSAP or Digitalisation Strategy submission**

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We have been engaging with various data stakeholders on our latest strategy and plan to continue the efforts post Digitalisation Strategy submission in March

Our Customer & Stakeholder (C&S) team is primarily responsible for engaging with stakeholders across all topics, including data and digitalisation. Some engagements are also undertaken by different parts of the business such as Innovation, IT and Asset. The C&S team is currently executing an extensive stakeholder engagement plan to help prepare our RIIO-3 draft. As a part of this plan, detailed requirements are collated not only from external stakeholders but also from our own staff.

Since publishing our last strategy, we have engaged with our stakeholders on an ongoing basis via the following forums:

- **Gas Operation Forum [~60 participants]:** To share product development roadmaps, e.g. for Gas Data Portal, and regular updates on progress and launches with wider stakeholder groups
- **Gas Data Portal User Community**: To share progress including feature launches and provide visiblity of upcoming features and plans
- **Meetings with regulators and other government bodies:** To share progress updates, e.g., in DESNZ Data Meeting, and to understand latest thinking on digitalisation, e.g., in SSMC response discussion with Ofgem and RIIO-3 Policy Working Group on Data and Digitalisation (CSWG11)
- **Dedicated Webinars [~50-70 participants] and Customer visits:** To share product specific information with select group of stakeholders, e.g., Ops liason customer visits
- **Customer workshops [~5-10 participants] and 1:1s [~30 completed to date]:** Most recently, we are using workshops and 1:1 with various stakeholder personas to gather specific inputs on current and future use of data
- **Industry groups such as ENA, and IUG:** Collaborate across the industry to gather inputs on current and future use of data

In the near future, we are planning 2 key engagements amongst others:

- **ISG, May:** Planning to engage on current digitalisation strategy and future use of data
- **Data sessions in collaboration with GDNs, April/May:** Planning to engage with the data community collaboratively with GDNs [More details on slide 34]

Further details of recent engagements until Dec'23 are provided in our latest DSAP: **https://www.nationalgas.com/document/144986/download**

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Our stakeholders want services that are good value for money and are safe and secure to use, quick resolution of complaints and that current demands are met without jeopardising the needs of future generations

Through our stakeholder engagement we have been working towards understanding priorities of our stakeholders. We aim to use these priorities to shape our digitalisation strategy.

We regularly engage with our stakeholders via a dedicated Customer & Stakeholder team to gather inputs on latest product releases and their evolving priorities. This is communicated internally to all digitalisation teams for incorporating suitable feedback into their products/services.

6 key priorities...

An accurate and affordable bill that fairly reflects what I use...

To clearly understand where my energy has come from...

To use energy when I need it without concern...

I want to know I am doing my bit for the environment in a sustainable way...

Be seen as a valued customer through quality pioneering service...

To feel supported in an uncertain future energy market...

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Stakeholder Personas

We have 4 personas for active users of our data based on varying needs, allowing us to fully consider needs of all our data using stakeholders. We have re-engaged with these stakeholders to understand their latest data needs

Regular review of personas helps us evaluate the needs of different user groups, ensuring that we embed requirements of our stakeholders into our digital strategy and focus areas that we explore.

They also help us evaluate the relative benefits and costs of meeting different users' needs, ensuring we can balance transparency and the benefits of digitalisation initiatives against the cost to consumers to meet these needs. We have identified four key persona groups.

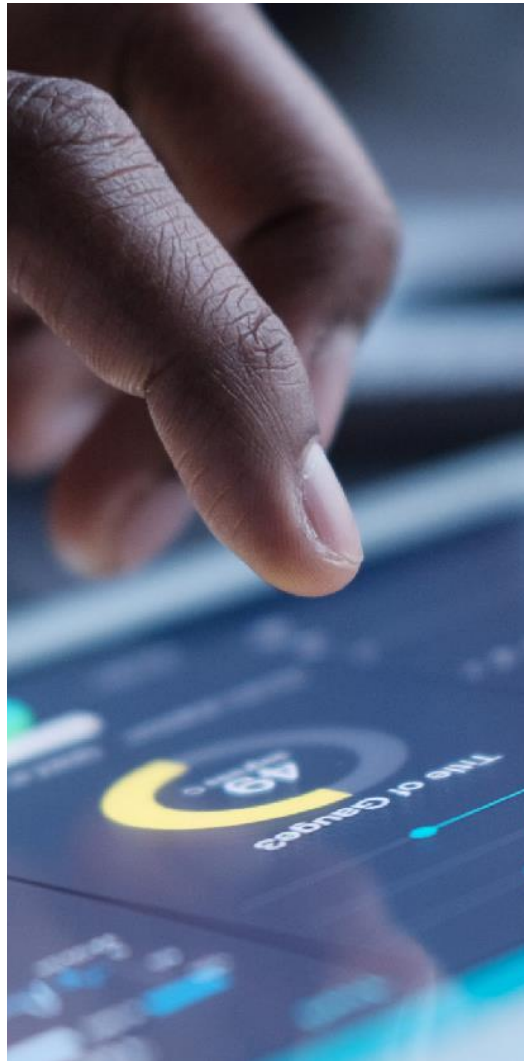
Further we are mindful of our digitally excluded stakeholders and use relevant medium to communicate with them. For example, we communicate annually with our land owners using post letters which is their preferred mode of communication.

Energy Industry Participants

Network and Asset Decision Makers

Enquiring Minds

Policy Influencers



Stakeholder personas I/II | Detailed attributes

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Energy Industry Participants

Who are they?

Groups working in the energy industry, including other network companies and immediate users of our assets and systems. They are technically savvy about energy data and utilise it in their own activities.

What motivates them?

Use data to inform their day-to-day operations, long-term investments and decision-making. Newer entrants use our data to help compete in the market

What data do they want?

- Details of their connections to our networks
- Our asset locations, development plan and implications for them
- Operational data on how our network is running (offtake capacity, gas quality at entry points etc) and winter outlook etc.
- Details on CCUS, hydrogen and Project Union

Behaviour and preferences

Most of these participants will have technical needs because of their familiarity with the industry. They range from participants that can handle complex datasets and may require Application Programming Interfaces (API) to retrieve data directly to smaller/newer entrants to the market. Some will know how to request new datasets, while others may need signposting. They will often need named contacts in the company to talk directly with

Network and Asset Decision Makers

Who are they?

Stakeholders who are often part of NGT or companies that work closely with us (e.g. distribution companies, traders, system operators and our contractors). They are responsible for making decisions about assets, work on those assets and the operation of the network.

What motivates them?

Use data in their day-to-day operations and business decisions, and/or to fulfil their obligations towards us i.e. maintain/construct assets

What data do they want?

Require access to a large number of different datasets to support their activities, including details on assets and their condition, investment records, operational data (including live flow data), and business performance and risk data

Behaviour and preferences

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

Stakeholder personas II/II | Detailed attributes

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Enquiring Minds

Who are they?

Stakeholders, such as members of the public, academia and wider energy innovators, interested in our assets and networks, often with unique needs for accessing our data

What motivates them?

Use our data, often combined with other data sources, to answer wider questions that they are exploring

What data do they want?

- Detail about our assets and operations of our networks including asset locations
- May want access to novel datasets that are not currently published

Behaviour and preferences

This group may not know where to start, with more guidance and sign-posting required to available datasets. They want our data to be easy to combine with other data sources. Innovators and academia may want to gather large historical datasets and have access to APIs. Non-technical language is required to explain what datasets are, where they come from and any potential limitations. They may not be familiar with how to talk to us or be sure how to request new data. Enquiring Minds might find our datasets through search engines instead of coming to us directly.

Policy Influencers

Who are they?

Stakeholders who tend to work in regulatory organisations and other government departments that focus on energy industry or who works with other influential organisations such as consumer groups

What motivates them?

Use data for strategic oversight of the energy industry, long-term policy making and in their wider service to the general public. Recently, they also want to facilitate digitalisation of the energy sector and unlock value of data

What data do they want?

- Access to regulatory reporting data to ensure we're meeting the requirements of our regulatory framework
- May also be interested in larger and longer-term datasets to help inform their analyses and decision making, e.g., asset information and increasingly hydrogen blend information

Behaviour and preferences

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

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Our Digitalisation Strategy

In the current strategy refresh, we have worked to refine our objectives with a digital lens as well as expanded our aspiration to leverage frontier technologies such as AI. Digitalisation is not only about systems but it will fundamentally change how we operate, resulting in meaningful positive impact for our people and culture

Our previous digitalisation strategy

Our previous strategy focussed on sharing our data with our stakeholders and using external data to optimise our investment and run our networks.

- Enable a shared understanding of gas as part of a whole energy system, providing transparent data about our network and how we run it
- Optimise the delivery of energy for today, ensuring a continued reliable and flexible network
- Underpin the decarbonised energy system of the future, optimising our decisions to drive value for money

In the current strategy refresh, we have worked to further refine our objectives with a digital lens as well as expanded our aspiration to leverage frontier technologies such as AI, in line with DSAP's feedback on making objectives more concrete.

Our Vision and objectives going forward

"Utilise data and technologies to better serve our customers and stakeholders, safely operate critical infrastructure and facilitate faster and data-driven decision making"

Our key objectives:

- Facilitate **access to** complete, accurate, trusted and wide range of **datasets** to support analytical capability development
- Enhance **visibility** of our **assets** through their lifecycle to improve asset management capabilities
- Leverage digital technologies to simplify and improve effectiveness of **processes** and/or improve efficiency of our **workforce**
- Selectively utilise **frontier technologies** incl. analytics and AI to enable enhanced and automated data-driven decision making
- Implement simple and consistent data **architecture and system** design to improve data quality and enforce data security

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Operationalising our strategy in FY25-26

We have identified 5 focus areas for the remaining RIIO-2 time period, FY25-26, to work towards our objectives. We have mapped our RIIO-2 initiatives under these new focus area, providing stronger links of initiatives with our strategy.

Focus Areas for FY25-26	Relevant to RRP	Objectives: Access to datasets	Asset Visibility	Process/ Workforce	Frontier Tech.	Architec. & System
1. **Data Foundation**: Continue building a strong and trusted data foundation to access wider range of datasets, especially for RRP	✓	✓				✓
2. **Data sharing platform**: Continue updating data sharing platforms	✓	✓		✓		
3. **Digital Twin**: Leverage IT and OT for select areas of asset management, operations and automated data capture	✓	✓	✓	✓	✓	
4. **Enhanced decision making**: Continue to utilise frontier tech. for building enhanced decision making capabilities	✓			✓	✓	
5. **Efficient Enterprise Essentials**: Review infrastructure and systems for improving simplicity and efficiency						✓

Our focus areas in FY25-26 will also help us prepare for Ofgem's digital RRP

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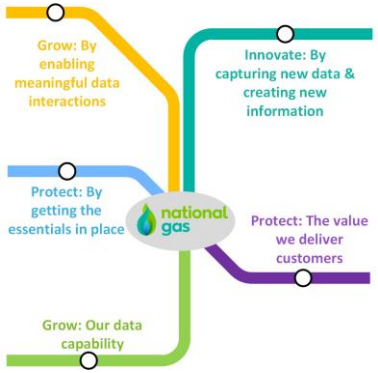
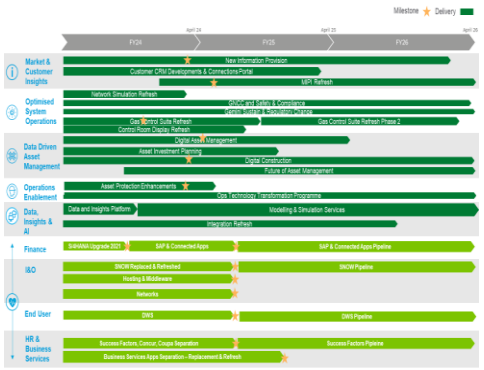
We are using Ofgem's feedback to guide our action plan and strategy

Our digitalisation strategy is underpinned by our IT delivery plan and technology roadmap and a strategic customer engagement plan. Our delivery plan currently summarise initiatives for remaining RIIO-2 period i.e. FY25-26. However, we will extend this to cover RIIO-3 initiatives as and when we receive our next PCD. We will continue to adhere to Ofgem guidance and best practices and incorporate the feedback from Ofgem in October 2023



We have aligned our Data Strategy with Ofgem Data Best Practice and Dublin Core standards

Illustrative



We aim to share more transparent updates on completed products and future plans in RIIO 2 via DSAPs

We have developed a targeted and strategic approach for customer engagement- 100+ questions and reaching out to 10,000+ customers and stakeholders

ofgem
Making a positive difference for energy consumers

RIIO – T2 – T3

For next regulatory period, we are developing initiatives to Protect our estate, Grow with enhancements and efficiencies, and Innovate to be more interoperable, while progressing net zero, and embracing new technologies including AI / ML

Our Digital Strategy Action Plan archives can be found here: **https://www.nationalgas.com/contact-us/stakeholder-resources**

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Governance

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

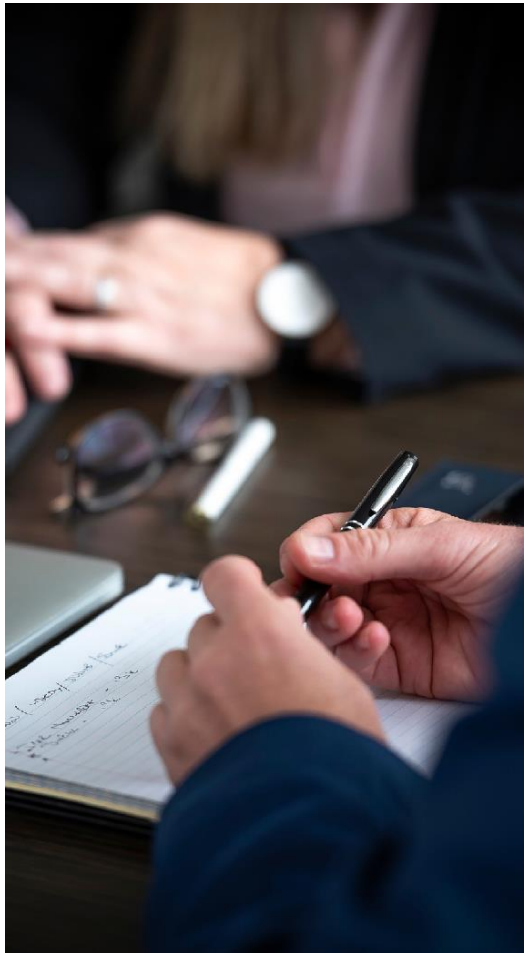
Our Digitalisation Strategy and Action Plan were previously governed under the larger National Grid framework. Separation from National Grid has resulted in creation of a dedicated governance structure, with our strategy and action plan now being owned at National Gas Board level by our Chief Information Officer. It is a core component of our overall business strategy and will be reviewed and updated at least every two years, with Action Plans updated on a six-monthly cycle in December and June.

The digitalisation strategy is developed centrally by the Corporate Strategy team, ensuring coherence with our corporate strategy. The team gathers inputs from all relevant teams across the business as well as from external stakeholders while refreshing the strategy.

The focus areas outlined within the strategy are owned at Senior Management Level and align with our IT investment plan. As part of the governance framework, risks are managed through the organisation at project level, with escalation routes to senior management where required.

We coordinate investments closely with our digital product development, whilst recognising that given the scale and nature of these systems they are typically more efficiently delivered by individual programmes with dedicated governance.

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



"We are only at the beginning of the next generation of computing and as a new standalone business we are uniquely placed to deliver impactful and lasting change across the energy sector by driving our digitilisation strategy to simplify how industry and the consumers connect to the energy in our pipes. The next decade will bring about a new age of AI & Data that will not just transform the way we work, but also transform our business and sector at a pace not seen before. We are excited to see the opportunities this will bring...."

-Richard Murphy, Chief Information Officer, National Gas

Funding

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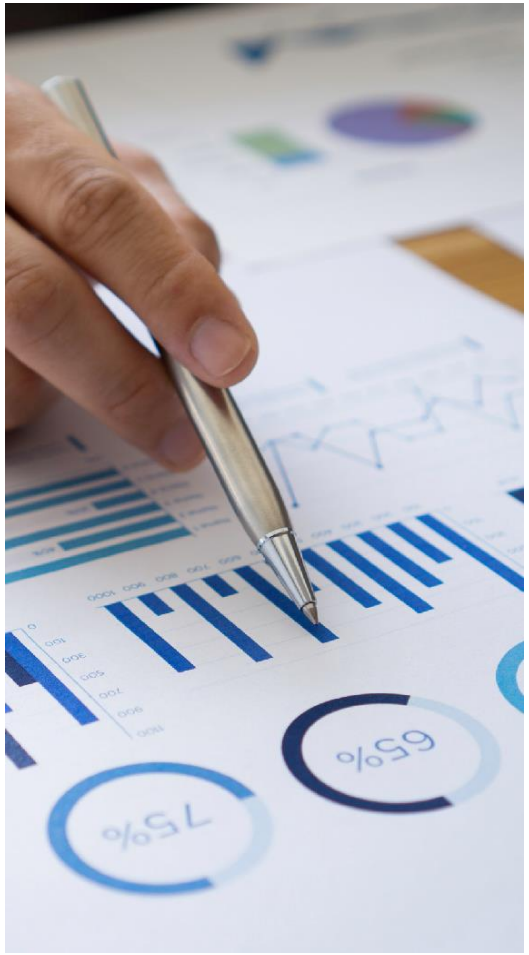
Delivering value for consumers through our investments in digital is extremely important.

Our current digitalisation strategy action plan is funded via our RIIO-GT2 framework. This includes funding via SIF, NIA and IT reopener for Construction transformation programme.

Our plans focus on both unlocking new value for stakeholders and consumers through our digital investments as well delivering on our ongoing efficiency commitments with our core IT systems.

Having access to timely and appropriate funding is key to delivering on our digitalisation.

Our current focus is to deliver the RIIO-GT2 plan within budget and draft the RIIO-GT3 investment plan to further secure funding from FY27 onwards.



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Our focus areas for FY25-26

Our digitalisation strategy will be executed by defining focus areas every 1-2 years. These focus areas will aim to work towards meeting our objectives, progressing on RIIO-2 investments and preparing for RIIO-3 while addressing the stakeholder priorities. While our digitalisation strategy will remain the same in the initial years of RIIO-3, our focus areas will evolve, in line with evolving stakeholder priorities.

	Stakeholder Personas	FY25-26 expected progress	RIIO-3 continuation
Data Foundation Continue building a strong and trusted data foundation to access wider range of datasets, especially for RRP	All internal and external stakeholder personas benefit from this work	Phase 1 of our data literacy program and policies rolled out along with a set of curated data assets	Extend datasets and data quality work to support predictive modelling and APM
Data sharing platform Continue updating data sharing platforms	Focus on all external Stakeholders- Industry, Regulator and Educational use cases	Implementation of Dublin Core metadata catalogue and re-platforming to allow ease of integration with other participants.	Continued enhancements into granular data security and extension of available datasets.
Digital Twin Leverage IT and OT for select areas of asset management, operations and automated data capture	All stakeholder personas to provide details on asset heath, finance, system operations etc.	Test on select assets to demonstrate potentials and benefit	Continue expanding to more assets and data landscapes
Enhanced decision making Continue to utilise frontier tech. for building enhanced decision making capabilities	Network and Asset Decision Makers to better manage uncertainty and for security of supply	ML & AI used for GSO to improve probabilistic forecasting	Explore ML & AI use cases for asset management
Efficient Enterprise Essentials: Review infrastructure and systems for improving simplicity and efficiency	Enable NG to serve all personas better and faster	Standing up green infrastructure and reducing technical debt	Continue modernisation to improve user experience

Focus Area | Data Foundation

Data fuels our business. Consistent, accurate and trusted data assets are foundational for delivering process automation, advanced analytics and reliable data exchange with industry partners. As we are separating from National Grid and migrating applications into our new National Gas domain, we are also taking the opportunity to cleanse some of our data

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Overview:

Our Data Foundation has three aspects:

- **Teach:** Increase data literacy throughout the organisation so that data policies and key regulation are well understood, with resources upskilled to perform critical data tasks
- **Prepare & Manage:** Define, classify and catalogue data assets in line with Ofgem's Data Best Practice Guidance so that data is trusted and understood. A focus on improving data quality through simple and effective processes is key
- **Analyse & Publish:** Create a curated set of data assets to drive analytics and reporting, driving value both internally and, with appropriate controls, externally

Business Areas:

Our T2 commitments have prioritised improvements to Operational Asset and Gas System Operator data. Further work is planned to include our Construction and Capital Investments data over the remainder of the PCD. This will not only offer efficiencies in running the NTS, but also ensure that data is curated in a more effective way with the application of industry agreed standards such as ISO14224 and Dublin Core ensuring accuracy and consistency when we report and publish.

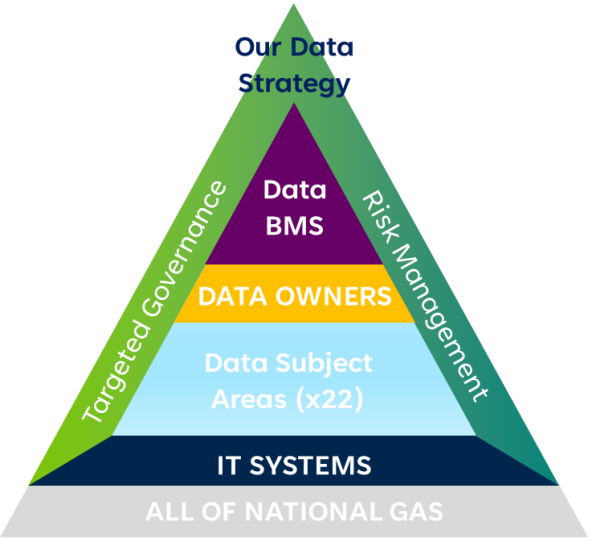
The ability to align our Operational Assets to the ISO14224 standard allows for easier industry benchmarking and granular reporting.

Impact:

Trusted data is required in all aspects of our business as well as desired by all external stakeholders. These foundations will simplify and enable digitalisation processes so people can access high quality data through an appropriate digital medium driving efficiencies and improving decision making.

Key Stakeholders:

The largest area of interest in our data assets will be from parties working on the transformation hydrogen and net zero. This community of users will be required to collaborate and share data to produce an efficient and transformed network.



Relevance to T3:

Trusted curated datasets provide the foundations that can be easily consumed both internally and externally through interoperable APIs. These foundations are also to be used to drive further complex use cases for predictive analytics and hydrogen modelling. The new standards implemented in the Operational Asset area will provide a baseline which will feed the predictive asset maintenance and analytics initiatives which will be part of Asset Performance Management.

Example Initiatives | Data Foundation

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Data Strategy

Overview: We delivered an encompassing piece of work which focussed on our approach to data and where we see it delivering strategic value, a target operating model that is fit for purpose and a plan for targeted data governance to ensure that we meet our commitments. The data governance review has provided a framework including required data policies, standards, guidelines and templates for compliance with Ofgem Data Best Practice Guidance which are being developed.

Expected Impact: The Data Strategy serves as a communication tool to help employees understand the importance and impact of data in their daily tasks. It provides a guide to all of the data aspects to be considering in our initiatives. It also allows for IT projects to embed industry standards right from initiation of a project ensuring that all data assets produced are interoperable with the industry moving forward, leading to improved data quality, trust in our data and invariably better decision making.

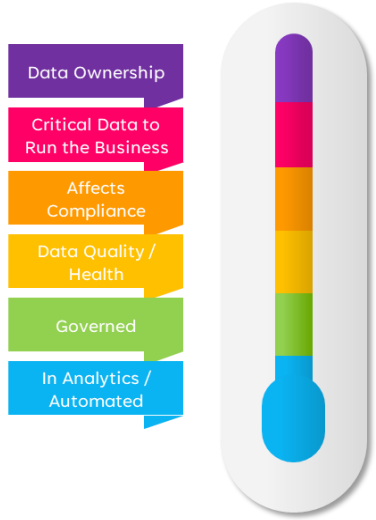
Evolution in T3: The future phases of the Data Strategy focus on wider industry cooperation and how we move towards more complex use cases for our trusted data.

Completed

Data Quality Management

Overview: Guided by the policies and principles from our Data Strategy, the implementation of data quality management will be further developed through our data quality framework. The goal is to provide a framework so that we can objectively baseline and quantify data quality issues and automate where possible ongoing monitoring and data corrections to maintain our data quality.

Objective and quantifiable



Expected Impact: Understanding data quality issues and risks will ensure that we are prioritising the correct areas for investment and that we can mitigate data risks appropriately. Understanding our data quality issues will also allow us to identify problematic process areas that could benefit from re-engineering to allow for better data capture at source creating an efficiency and trusted data.

Evolution in T3: As we roll out the data quality framework, we will also increase the data literacy and evolve the operating model of who and how we monitor and manage the tool and data quality management processes ensuring a wider coverage.

Planned

Focus Area | Data Sharing Platform

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Data Sharing for National Gas is two pronged - for internal and external stakeholders as appropriate. It is critical that the shared data is catalogued, understood and meets industry standards to ensure ease of collaboration amongst partners

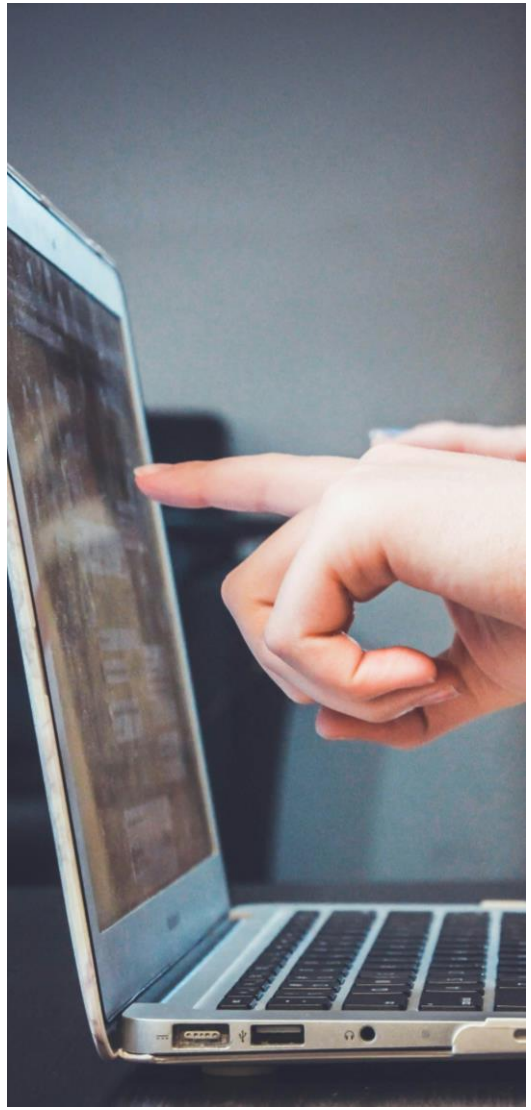
Overview:
Gas Data Portal is our public facing information provision tool, that serves market participants with a range of within day and after the day view of Gas Transmission operational data. This is achieved through web pages and automated programmable interfaces (API). We delivered a new Gas Data Portal, where stakeholders can view near real time status of the gas system as well as view, interrogate and download both raw data and reports. The Gas Data Portal houses over 12000 data points which are regularly updated and enhanced. The portal also allows for ad hoc data requests to support new data items, which can be triaged and managed. For remaining RIIO-2, we will continue to update the features, to improve data quality, make data more discoverable and enhance customer engagement. We will also look to improve our interoperability and system.

Business Areas:
A key proportion of National Gas is represented in the data published. Example data include Ofgem reporting obligations, reports of value for industry, near real time operational data, environmental data and innovation projects.

Impact:
Users, internal and external, can now find and access data more easily. Data is now also published via a mobile app channel allowing for users to view the latest supply and demand within Great Britain for an enhanced user experience and interaction.

Key Stakeholders:
External network partners, industry, customers, the Regulator and anyone in the public domain can access our published data.

Relevance to T3:
The data published via this portal is being standardised to more industry standards and will eventually allow for greater flexibility in terms of integration options, ability to search more granularly and provide a method to also link up and integrate into wider network models through increased interoperability.



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Example Initiatives | Data Sharing Platform

Gas Data Portal

Overview: The Gas Data Portal launched in the summer of 2023 with a renewed look and feel offering better access to 12000 data points for users to query and download. The portal now offers a flexible mechanism to query data and also download more traditional pdf reports as well as send ad hoc specialist data requests through the portal

Expected Impact: The ability to interact with datasets is so much easier, better organised and allows for more interactive querying of the data as well as a downloading facility.

Evolution in T3: The Gas Data Portal will be connected directly to our Data & Insights Platform allowing for direct integration and no manual steps will be required to update the Gas Data Portal ensuring up to date information. We will also enhance the backend security and processes to streamline our triage process.

Completed

Migrating the Gas Data Portal data lake backend into our Data & Insights Platform

Overview: We will migrate our Gas Data Portal backend into the Data & Insights Platform. This work will reduce data duplication, create efficiencies in the IT landscape and reduce data conflicts between multiple platforms.

Expected Impact:
All users will benefit from an enhanced user experience and an increase in the data quality of the outputs.

Evolution in T3: This initiative creates an efficiency for T3 by removing infrastructure and cost in maintaining our data estate. We will of course continue to invest in the overall Gas Data Portal but the investment will be reduced due to the consolidation exercise.

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Focus Area | Digital Twin

This advanced and intelligent model will enable National Gas to visualise and understand asset changes due to the effect of existing operations and Hydrogen, and enable us to be more efficient and predict future areas of concern

Overview & Impact: Our vision of digital twin is to connect and visualise real-world assets, data & system that covers its whole lifecycle and is updated using real-time and historical data. The platform would use simulation and Machine Learning to help with decision-making.

Our Innovation Project Collaborative Visual Data Twin (CVDT) is set to enable us to have enhanced data visualisation. CVDT phase I has developed the potential use cases of Digital Twins in our business and refined initial use cases to be demonstrated in the business.

By utilising use cases from CVDT phase I, CVDT phase II has developed to demonstrate the potential and benefits of Digital Twins on our FutureGrid assets. The developed first-of-its-kind Digital Twins platform provides easy access and greater understanding of the large datasets seen in both today's gas network and the network of the future, and also provide training and development opportunities.

Key Stakeholders: The key stakeholders for CVDT projects has been internal National Gas functions as well as external stakeholders including network and assets decision makers, GDNs and Regulators.

Roadmap to the future: With a solid foundation built on top of and progress towards achieving our Digital Twin capabilities, we will invest in the expansion of technologies, such as data analytics, artificial intelligence, and machine learning to achieve an integrated and harmonised network that enables future interoperability for a distributed energy network. Our investment initiatives will focus on process optimisation, enhancing our digital platform experiences and advancing asset design.

The outcomes from these investments will help prepare us for the next level of challenges and progress their maturity on various capabilities required to improve productivity and resilience, achieving standardisation to enable us to operate a harmonised NTS for gas.

Our investments in these areas will allow flexibility in system operations for the introduction of greener sources of energy. National Gas can achieve faster operational readiness and be data-oriented.

FutureGrid

Our partners on Collaborative Visual Data Twin (CVDT) Phase II:

DNV Premtech ENGINEERING EXCELLENCE cfms Coventry University Enterprises Limited

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Non-operational IT Capex – Enhance Asset Design (Jan 2023)

Overview: Project to implement building information modelling and management (BIM) and establish a common data environment (CDE) platform enabling drawing and data management and collaboration. Digitalisation of construction project lifecycle within RIIO-2 period.

Expected Impact: This project will enable construction projects to achieve standardisation and system integration to allow consistent and accurate data flows, addressing the opportunities and challenges within RIIO-2 period as well as establishing a solid foundation for digital twin in the future through the internal capability of using BIM and CDE.

Evolution in T3: Gas Enhanced Asset Data Value and Scale
Expanding the Common Data Environment (CDE) to accommodate more datasets from asset design and major delivery projects and aligning our transmission and system operations-related datasets and systems of record with the Asset Information Model (AIM). Together with output from CVDT project, other analytical models and Network data, enabling the creation of virtual environments that replicate the natural world and our network, simulate various scenarios, and support risk modelling and management capabilities.

Ongoing

CVDT III - Integration into Core Systems

Overview: The success in CVDT II has demonstrated potentials and benefits as part of FutureGrid and driven the digital twin activities of the wider business and core systems that the business is currently utilising. The project aims to link developing Digital Twins platform with our data clouds and live data and ensure the integration is aligned with data quality and security requirements.

Expected Impact: The expansion of Digital Twins and their data landscape will provide virtual representation of boarder NGT physical assets, processes, data exchanges within business systems enabling users to understand and model their performance, optimise operations, test scenarios, and manage maintenance regimes of physical assets, systems, and business processes both for current and future networks.

Evolution in T3: Increasing the number of connected systems to provide further detail on finance, project delivery and system operation. Early demonstration of AI and ML with Digital Twin; enabling more business use cases and supporting more efficient deployment of analytics and AI. The project will also be built into the Enhance Asset Design Project Delivery.

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Focus Area | Enhanced Decision Making

Advanced analytics, Machine Learning and Artificial Intelligence enable the enhancement and automation of decision making, however, to be effective they must be backed by high data maturity and policy driven controls around ML & AI algorithms in use

Overview: Since 2023, NG has focused on increasing data maturity and has adopted its first ML and AI Policy, enabling use of ML & AI within productionised National Gas systems for business decision making.

A number of prototypes and proofs-of-concept have been built and demonstrated during the development of the Data & Insights platform using classical statistics, ML, and AI.

Work continues to productionise probabilistic forecasting, long term supply & demand scenarios, and automate hydraulic modelling to enable future optimisation use cases.

Business Areas and Impact: Due to the high data maturity of the Gas System Operator caused by daily operations and regular feedback loops, a higher focus has been placed on decision making within the GSO. Key decision making digital assets have been developed around predicting system constraints to enable both day to day operations and T3 business case planning, and security of supply.
Azure ML Studio has been leveraged to enhance the point gas demand forecasting.

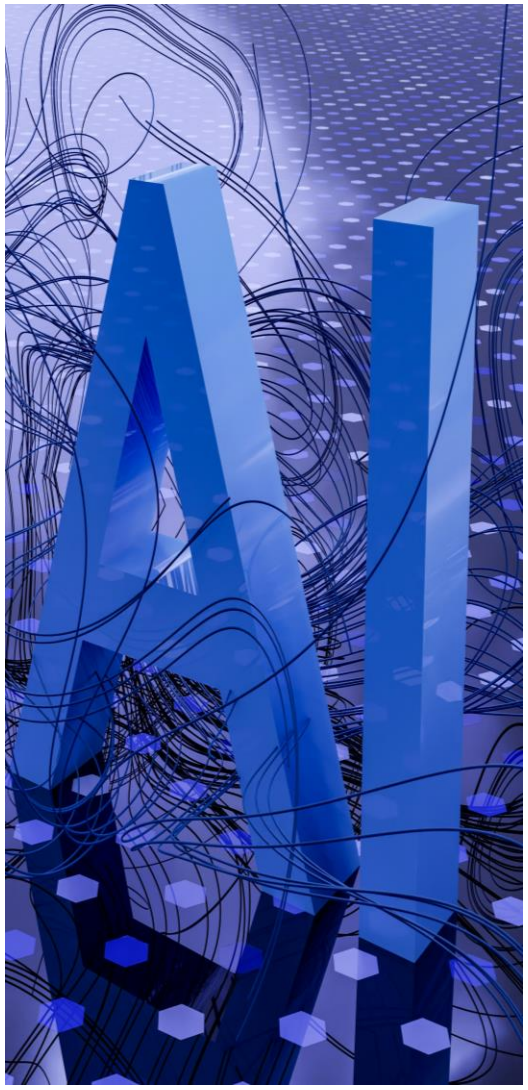
Work is ongoing to build short term probabilistic forecasts of supply and demand, which when combined with the automation of our hydraulic modelling tooling will enhance risk based decision making.

This can enable "what-if" analysis to occur with solved system starting points proposed to identify optimal solutions for decision making.

For Asset Management, common outputs can be applied, exploring outage windows for maintenance, compressor running hour forecasting, and other predictive work to enhance asset maintenance and replacement decision making.

Key Stakeholders: GSO, Network and Asset Decision Makers, Academic partners, Gas market participants, DESNZ & Ofgem for security of supply solutions.

Relevance to T3: The enhanced decision making being built and proven during the T2 period presents an opportunity to consolidate decision making datasets and create a single source of analytics truth to drive common decisions across system operations and asset management.



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Example Initiatives | Enhanced decision making

Probabilistic Forecasting of Supply & Demand

Overview: Existing agreed forecasting methodologies and incentive structures provide a single number at each time step for demand, however this does not provide decision makers with a quantitatively backed view of the upcoming uncertainty in supply and demand. This initiative creates probabilistic spreads of various components of supply and demand from the day ahead stage and out, with a specific subset forecast for power stations within day to handle overnight uncertainty.

Expected Impact: This programme is helping the Gas System Operator to quantitatively size risk at short term forecasting horizons to enable enhanced risk based decision making and automation of downstream analytics processes. Similarly to sharing our current point forecasts to external stakeholders, we will explore data sharing best practice to share this enhancement.

Evolution in T3: This programme will help us learn lessons around decision making for the new risks and uncertainties on the system as the whole energy system transitions to net zero, to enable us to enhance our control room, system risk decisions, security of supply decisions and create more flexibility in our asset management decisions.

In flight

Intelligent Network Modelling

Overview: The MASS (Modelling, Analytics, and Simulation Services) programme began in 2024 and leverages the capability offered by the Data and Insights platform to automate key steps in network modelling & analysis, alongside risk based decision making. This is an opportunity to use probabilistic forecasts of supply and demand with an automated version of the existing hydraulic modelling solution to enable "what-if" analysis for operational decision making, and further extend this to asset management decision making. There is potential to apply optimisers to recommend solutions via ML/AI algorithms, dependant on progress in gas system optimisation in academia.

Expected Impact: This will increase the number of scenarios modelled, enabling GSO to optimise system configurations by exploring "what-if" analysis options, and help us understand where we can apply optimisers to autonomise decision making and operate the system more efficiently to the benefit of our external stakeholders.

Evolution in T3: Within the T3 period we want to replace our hydraulic modelling solution, however, as this is a critical operational tool we want to learn lessons in T2 around how we can best automate and enhance our decision making processes to de-risk this future procurement activity.

In flight

Focus Area | Efficient Enterprise Essentials

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Separation from National Grid has given us the opportunity to set up our own greenfield infrastructure, removing technical debt and improving user experience

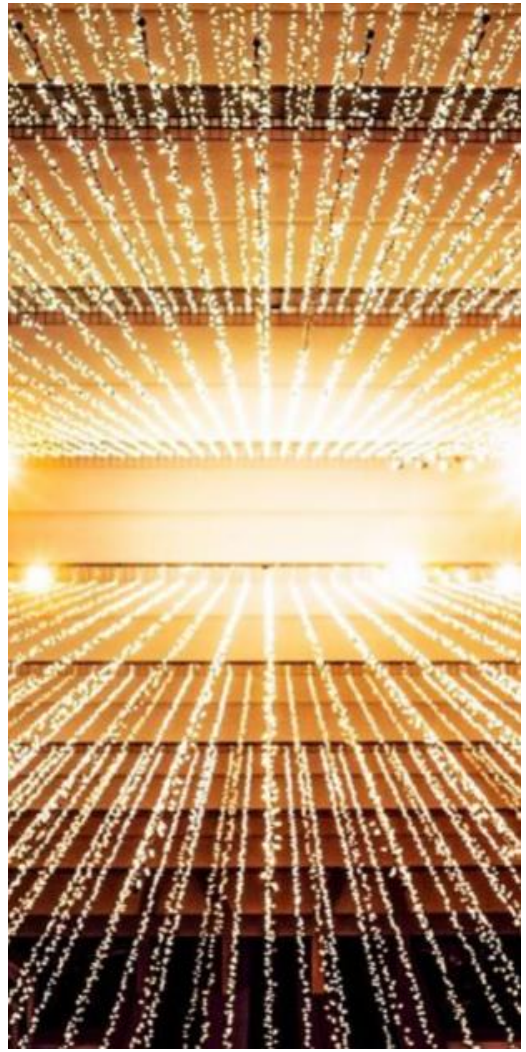
Overview: We are currently separating our enterprise systems from National Grid, as a result of which we have been able to stand-up a lot greenfield infrastructure. This has meant that we have been able to remove a significant amount of technical debt from our systems. For the remainder of T2 and moving into T3 we will be looking to transform these systems to improve the user experience.

Business Areas: As the focus is on the enterprise it brings benefits to all business areas, delivering the foundational systems to support business processes.

Impact: It empowers the National Gas business to leverage the full potential of modernised digital systems that are secure, up to date and scalable in order to carry out their functions. Once updated, it will enable the organisation to serve all its stakeholders better and faster.

Key Stakeholders: The key internal stakeholders are IT, Security, People Services, Finance and other support services in the business. Engagement takes place via workshops, interviews and regular communication.

Relevance to T3: T2 has allowed us to continue the modernisation of our technology landscape. The separation from National Grid has, in a number of cases, accelerated this journey as a result of greenfield solutions. In T3 we are then going to be able to further transform our systems and build on these successes.



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Example Initiatives | Efficient Enterprise Essentials

SAP & Connected Apps Separation

Overview: Separation of our enterprise systems includes our SAP (S/4 Hana, Success Factors, Concur) and connected application estate. Our approach to SAP separation has been 'transition over transformation' however, we have looked to refresh and simplify these applications by de-commissioning a legacy SAP ECC application for payroll & absence management and migrating S/4 Hana to a Google Cloud Platform in preference to on premise data centres.

Expected Impact: Improved user experience focused on the key services that National Gas require.

Evolution in T3: During the RIIO-3 period we plan to continue to modernise our enterprise applications. This will be done by transitioning our systems from on-premise to the cloud, introducing new SaaS services, and enhancing our existing applications. Our main objective is to continue simplifying our systems to meet National Gas's unique requirements while reducing complexity and increasing efficiency. By modernising our systems, we aim to streamline operations, enhance decision-making processes, and reduce operational failure risk.

Ongoing

ServiceNow Improvement

Overview: We have implemented a new ServiceNow platform for the IT Service Management team as part of separation. This system was selected as it is already in use in National Grid, maintains the user experience received today and it is also a Gartner Magic Quadrant Leader for IT Service Management. This is a greenfield solution with a focus on out of box functionality to put us in a strong position to maintain and scale the platform.

Expected Impact: Through the implementation of a new ServiceNow platform the user journey has been accelerated. Users benefit from the latest version of the tooling and latest functionality, such as a unified user portal experience. It will allow for the upgrade of the platform to be done with less downtime and user impact.

Evolution in T3: During T3 we will enhance the platform further and implement the future roadmap of the tool, examples of this include AI capabilities for case summarisation to make incident resolution more efficient.

Ongoing

Enabling our digital transformation

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Our digital strategy is implemented using the Digitalisation Strategy Action Plan (DSAP) and wider IT Delivery Plan. Enablers are the foundational elements or capabilities critical for the success of digitalisation. We have 6 key enablers for our digital transformation. We either use these enablers to deliver our action plan or use focus areas to establish these enablers.

Data & Insights Platform

Advanced Analytics & AI

Agile Value Delivery

Collaboration

Skills & Culture Development

Secure by Design

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Enabler | Data & Insights Platform

Our Data & Insights Platform is integral to our digital transformation strategy. It provides curated data sets for all communities of users to come and consume for their reporting and analytics as well as being the source from which we publish out to the industry and regulator.

We have built a foundational Data & Insights Platform that is now being optimised and scaled to handle more complex use cases. The Data & Insights Platform uses a canonical model to ensure a common version of our data creating a single source of truth for reporting and analytics.

The Data & Insights Platform is being aligned to Dublin Core metadata standards and we are harmonising key categories and classifications of data ensuring we are secure and can share data responsibly. We are also adopting industry standards such as ISO 14224 for our asset data which will simplify integration of systems and publication or our operational asset data.

Simplifying our data architecture and creating a single source of truth will provide a platform on which we are able to build more robust data governance and management which will provide the basis for us to share more of our data in the future as we move toward a 'presumed open' energy data future.

The curated data assets which are published from the Data & Insights Platform will be the trusted source to feed the Digital Twin as data will be structured and ready for consumption into applications, models and dashboards upon which our workforce can rely.

We are building a new platform that will bring together data from across the Gas Transmission estate together into a single, highly capable platform

Case Study

The Gas System Operations area of the company has moved reporting to the Data & Insights Platform. From here, data is also being made available to our Data Scientists so that analytics can be performed on a consistent source as well as be augmented and modelling into more complex use cases.

The next two years will see us continue to upskill the workforce as we further extend our Community of Practice to include Citizen Data Scientists allowing for more people to have the ability to model and extend their data use cases.

Enabler | Advanced Analytics & AI

The automation of advanced analytics, ML, & AI enables robust and auditable decision making within the business.

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Being able to leverage the functionality of the Data & Insights platform enables the business to increase the maturity of its bespoke analytics toolset that represent a core of our differentiating intellectual property, while enabling audit and tracking of data sources, analytics models, and resulting datasets.

By being able to reverse engineer spreadsheets constructed by power users into Python or R and change controlling via Azure Repositories we open up the ability to automate analysis pipelines and track data manipulation during analysis, to mitigate the existence of data silos and errors during manual analysis.

This is a critical enabler to the business to enhance and autonomise its decision making based on common analytics results datasets available from within a central platform.

The rich library of data available then enables the effective deployment of Machine Learning and Artificial Intelligence solutions, which are reliant on a mature data infrastructure to perform effectively.

Our focus on Machine Learning & AI can be grouped into 4 domains:

1. ML Time series forecasting for point values of demand, being modernised into probabilistic supply & demand forecasting to enhance downstream risk based decision making.
2. Building on probabilistic forecasts and automation of hydraulic system modelling to explore automated analysis and optimisers (narrow AI) at three time horizons:
   - Day to week ahead energy system scheduling.
   - Season ahead energy system outage for maintenance.
   - Decades ahead energy system layout for future energy system design.
3. Understanding how we can risk mitigate the use of generative AI in applications that include the interpretation of highly cross referenced maintenance policies and procedures, and the ability to provide a query system for employees to discover other National Gas domain knowledge & IP.
4. Understanding how we can use ML/AI for the identification and classification of assets, including degradation and optimisation of maintenance scheduling.

Case Study: Constraint risk modelling

The modelling of the risk of system constraints used to occur manually in Excel spreadsheets with add-ons.

We have rebuilt the logic into the R language and provided access to the models via an R-Shiny webapp, and have demonstrated a migration of this tool to our Azure cloud.

We are shortly due to deliver the re-hosting of the analytics pipelines that act as the supply & demand data source for this tool into the Azure cloud, and our goal is to drive decisions from dynamically updated datasets whilst using the same data source to feed automated hydraulic modelling.

This is a critical enabler on the route to smarter outage windows and modernising maintenance, alongside other system operations scheduling decisions.

Enabler | Agile Value Delivery

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We have embedded agile ways of working, specifically the Scaled Agile Framework (SAFe), to accelerate our digitalisation and innovation opportunities.

SAFe is an agile methodology for organising teams and delivering work that enables us to deliver maximum customer value in the shortest sustainable lead-time, whilst providing the highest quality IT product delivery.

We have structured ourselves as a multi-disciplinary team, which supports our agile product model and value stream delivery. Additionally, we have embedded platforms and tooling, such as Azure DevOps (ADO) (a software development tool to easily plan, track and release work from ideation to deployment).

We have agile teams aligned to each of the themes outlined in this strategy, which provide continuous flow of value to our customers, whilst collectively focusing and delivering on our cohesive digitalisation vision.

These cross-functional teams are made up of IT personnel, internal & external business experts and vendor partners, allowing for continuous co-creation, collaboration, and innovation. This is further supported by maintaining focus on the 'Minimal Viable Product' to deliver value quicker and receive user feedback as quickly as possible to iterate and improve the product, removing risk early and ensuring rapid development; helping to successfully meet our stakeholders needs and their expected outcomes.

Being product centric allows us to focus on the product in total and the value it delivers to the end-user or consumer, as opposed to individuals or groups of components delivered through a project. This approach has helped to deliver many of our successes as mentioned in the use cases within this strategy and will continue to be used to accelerate the benefits for all future initiatives.

We have agile teams aligned to each of the themes outlined in this strategy, which provide continuous flow of value to our customers

Case Study: Sustain Plus

Sustain Plus is a digital transformation project that enhances the reliability of the Gas System Operation Platform. This project showcased the power of Agile Value Delivery by applying its principles to enhance the Platform, focusing on delivering exceptional customer value. The initiative brought together 180 experts from National Gas, industry partners and system integrators in an Agile Release Train (ART), transitioning from traditional project methods to a product-centric approach. At its core, it prioritised continuous integration and continuous deployment (CI/CD) and continuous improvement through Minimal Viable Product (MVP) and Proof of Concept (POC) strategies. This was facilitated by distributed teams synchronising ceremonies, engaging in iterative planning, and fostering continuous feedback loops during retrospectives. The key to this project's success was the collaboration between onshore teams and offshore partners, exemplifying effective diverse teamwork.

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One area that came out very strongly during our digitalisation-specific engagement with stakeholders, was the desire for us to coordinate activities across the industry and adopt common approaches.

We recognise the value of collaboration and the way it shapes how we achieve all the other priorities, so have actively considered that throughout the development of our strategy.

We are part of the ENA Data Working Group and have been discussing topic areas with other networks and are actively involved with the industry working groups e.g., Digital Data Strategy Group, Virtual Energy System Forum.

We have created the Gas Operational Data Community, an online platform which enables collaboration within the market. This provides further transparency of gas operational data and allows us to test concepts and gain feedback. It also allows stakeholders to speak directly to us, which allows us to support those with less technical understanding of our data. We are also collaborating with organisations inside and outside of the industry, sharing ideas for the application of new digital tools and technology, ensuring that we are following best practice approaches and identifying opportunities to innovate.

ENA Data Working Group- Deep Dive

The ENA Data Working Group was set up as an outcome of the Energy Data Taskforce report and is designed to ensure network companies work together to meet the recommendations.

It coordinates delivery of industry-wide data initiatives and conducts related stakeholder engagement. We are focusing our involvement on the cases where stakeholders have made it clear that industry-wide standards are of particular importance to them – for example we are actively involved in workstreams on Network Mapping ("We want a single map of the entire network") and Presumed Open / Data Triage ("We want it to be easy to access / request data from multiple energy networks and combine it"). Stakeholder feedback has continually been solicited on the proposals being developed in these areas.

During our recent regular engagement sessions with the GDN's in March 2024, it became evident that everyone is struggling with feedback on data and digitalisation. Thus, a collaborative engagement piece with stakeholders is planned in April/May 2024 and it is agreed that the group would build questions into this piece of research with our shared stakeholders to request feedback about their pain points in accessing data from us all and data sets they would like to be able to access or use in the future.

Enabler | Skills & Culture Development

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We know that ability to execute our digital strategy and harness the opportunities that our data offers depends on more than simply investing in technology

It is our priority to make users a part of the digital transformation. We understand the need for our people to have the right skills and environment to take advantage of our investments in technology and enable digital transformation. We are committed to growing our capability, ensuring that our people have the skills needed to lead our digital transformation, and as we continue to onboard new technology on our digital journey, we will grow our people capability.

We recognise that future workforce trends show social learning to be an effective way of upskilling the workforce, so as part of our digital transformation we will create communities of practice to encourage and embed a culture of lifelong learning. We have already brought together data experts from across the business to establish a dedicated Data Team, a centre of excellence for all things data, and a driving force in our delivery of digital transformation. There is also a drive to enhance data literacy across the business in all areas empowering people to interact with data through digital means making them more efficient and allowing better decision making.

We are committed to growing our capability, ensuring that our people have the skills needed to lead our digital transformation

Examples

1. As a part of our agile delivery approach, we appoint end user of the technology to be product owners for supporting the delivery process. This approach empowers users to make critical decisions and prioritise what should be delivered, given they will be the users of the product. Furthermore, they become an advocate for the product leading to faster adoption
2. Our digital transformation is focused on 'user experience' i.e. our technology products are designed with the user in mind such that the products are simple, clear and intuitive. This implies that if we deliver a new technology product well, then there shouldn't be any need of training or user manuals.

Enabler | Secure by design

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Secure by Design (SbD) is a framework we adopt to embed Security into our services and ensure solutions are developed to be free of vulnerabilities and impervious to attack wherever possible

We are committed to protect our critical national infrastructure against those with malicious intent. We have a dedicated business function, led by our Chief Information Security Officer, focussed on physical, OT and IT (Cyber) security.

The criminal world is creative and the nature and mechanisms of attack evolve quickly in the digital sphere. Constantly updating our security capabilities enabled by new skills and technologies is central to our safety.

In an increasingly distributed technology world, incorporating cloud services and many types of devices, security has to look at the big picture, protecting every aspect of our digital operation and interaction with others.

In the same way that safety is inherent in, not added to, our operational processes, our systems are secure by design. Security considerations are up front in option selection and continue through the design process.

Security is not just fences and technology. We are investing in awareness and skills across our colleagues to ensure good practice is the norm and our "human firewall" is effective.

WHY

- Prevention of Vulnerabilities
- Cost Effective, Mitigating Risks
- Compliance & Regulation
- User Trust & Confidence
- Continuous Monitoring and Adaption
- Reduction in Time delays
- Protection of Critical Assets
- Enhancement of Resilience
- Cultural Shift Towards Security

HOW

- Cyber process took P1 to support separation.
- Developing other elements to include Physical, People & Vendor
- Using Influence team to promote both externally and internally
- Embedded within Hydrogen team- established monthly working groups to apply the correct Security measure right from the Innovation stage

WHO

- Security PMO under the OCISO will own the process
- Depending on the ask involvement may be required by one, some or all functions
- Buy in from all business function

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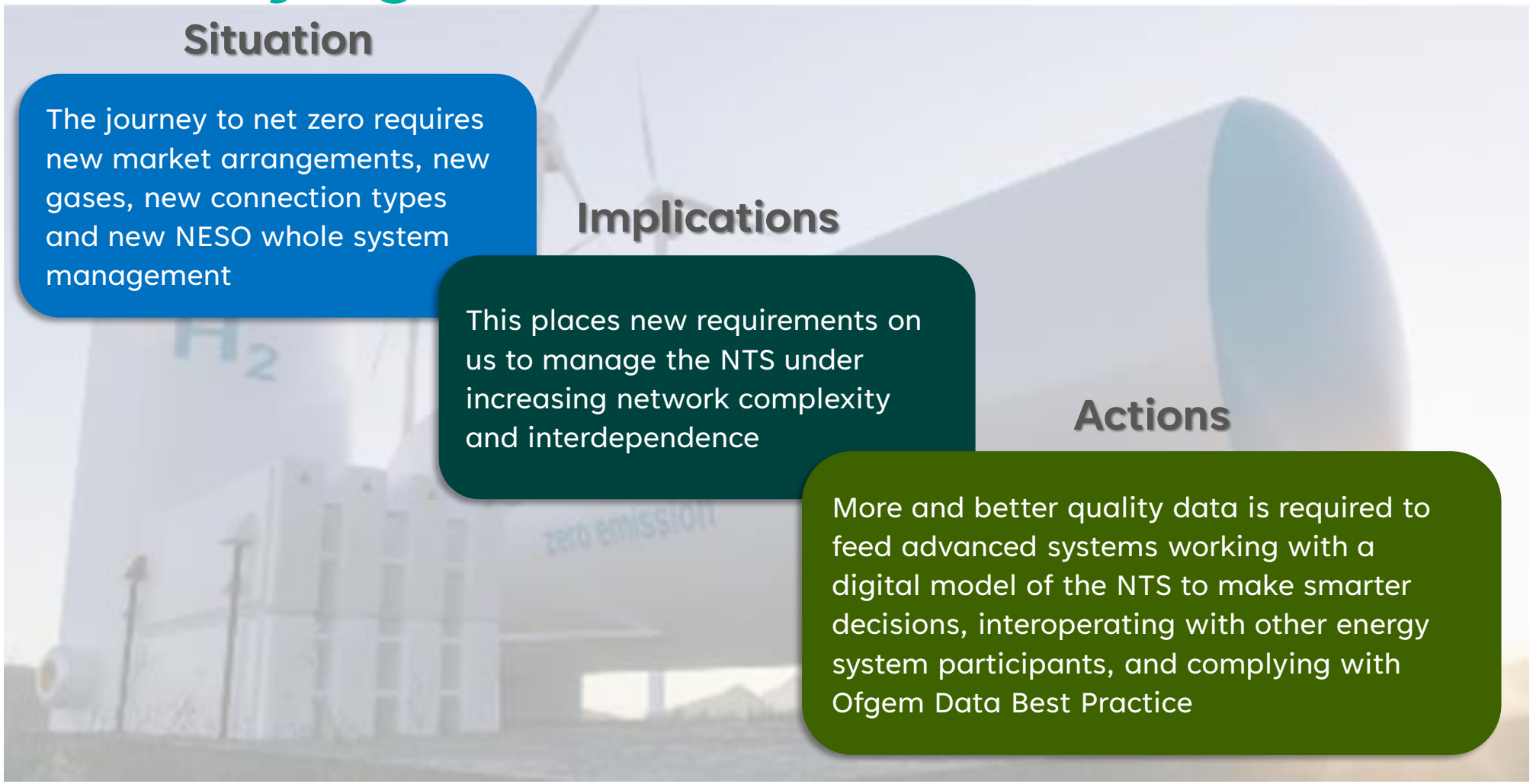
Outlook | The need for digitalisation is intensifying



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Outlook | Themes for the future

Our digitalisation strategy will evolve as requirements change, expectations rise, the single energy market establishes and technology capabilities move on. We will continue to be led by consumer and stakeholder priorities and respond to the regulatory framework.

The Digitalisation Strategy Action Plan published in December 2023 sets out actions for the remainder of the RIIO-2 period and we will extend this into RIIO-3 as the business plans and allowances for that period are confirmed.

The themes that are driving our planning are shown below. The period will see us **protect** our digital capabilities, **grow** them to enhance capabilities and **innovate** to add new capabilities and exploit new technologies. Digitalisation will continue apace as the enablers delivered to date are exploited and extended to drive even more value in our products and services.

Regulatory Framework

- Infrastructure fit for low-cost transition to net zero
- High quality of services from regulated firms
- Secure and resilient supplies
- System efficiency and long-term value for money

Protect

- New information provision (external)
- Data best practice – Ofgem guidelines
- Safety – assets, workforce, 3rd parties, the public
- Legislative and regulatory compliance
- Security and business continuity
- Asset Health – system supportability

Grow

- Enhanced modelling and decision support
- Data driven processes, insights and interoperability
- Enhanced data breadth, depth and management
- Extended information provision
- Enhanced customer / stakeholder service

Innovate

- Innovative field force technologies
- Advanced analytics using AI / ML
- System operations for a single energy system

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THANK YOU

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