Annex

NGET A14.07 ET IT Investment

December 2019

As a part of the NGET Business Plan Submission

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RIIO-T2

Electricity Transmission

NGET_A14.07_ET IT Investment
Value For Money
(December 2019)

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Contents

Introduction

This Annex provides a consolidated 'view' of our proposed IT investment, bringing together the Direct, Indirect and Business Services IT investments referenced in our BP submission chapters. As such, this annex is supportive and complimentary to the chapter narrative, with specific detail provided in the relevant investment decision packs.

Business Plan submission chapters referenced are:

Safety and reliability driven IT investments are included in chapter 9 – 'We will provide a safe and reliable network'.

Customer driven IT investments are included in chapter 8 – 'We will make it easy for you to connect to and use the electricity network'.

Investments to digitalise and transform our business are referenced in chapter 12 – 'We will be innovative'.

IT infrastructure and shared Corporate and Business Services investments are included in chapter 14 – 'I want you to provide value for money'.

Business IT Cyber investments are included in chapter 10 – 'We will protect the network from external threats'.

Detailed narrative and costs for our proposed IT investments are provided in the following investment decision packs:

NGET_A14.03_Hosting

NGET_A10.04_Business IT Security plan (Confidential)

NGET_A10.09_ Cyber Resilience plan (Confidential)

NGET_A14.10 IEMS (SCADA) Replacement

NGET_A14.11 Ellipse

NGET_A14.12_IT System Health Replacement

NGET_A14.13_IT Transform

NGET_A14.15__Business Services

NGET_A14.18_Enterprise Network Refresh

NGET_A14.19_End User Compute

NGET_A14.20_IT Operations & Tooling

Our IT Strategy and supporting narrative is set out in: NGET_A14.08_IT Strategy

Benchmarking of our IT investments is included in: NGET_A14.01_IT Benchmarking

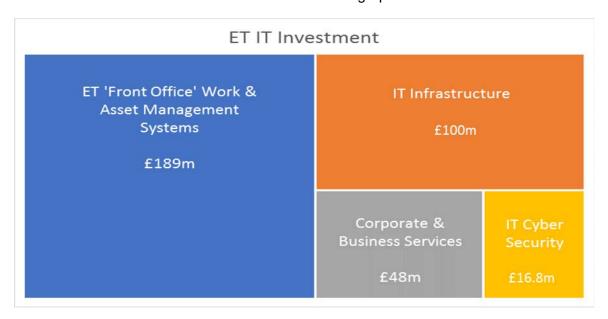We have separately published our Digitalisation Strategy, which is available on the National Grid web site.

Executive Summary

In RIIO-T2 we will invest £354m to rationalise and modernise our IT systems and infrastructure to provide a reliable and cyber secure environment. This environment will be flexible and agile, and will enable us to continue to maintain and operate a safe and reliable network and provide a foundation for us to digitally transform our business to meet the needs of our customers and stakeholders.

The key drivers for our IT investment are:

- Asset replacement of aged applications and infrastructure to maintain reliable and secure services
- Enhance enterprise IT cyber security capabilities in response to an increasing level of cyber threat
- Replace and separate core CNI systems, eg separate Integrated Energy Management System (IEMS) capabilities for an ET specific solution
- Capability enhancement and foundation for digital transformation, eg exploit artificial intelligence (AI) and Digital Experience Platform to enhance services provided to both employees and external customers and stakeholders

Our IT investment will be allocated as outlined in the graphic below.

Our RIIO-T1 IT investment forecast is £306m, with the increase between periods being driven primarily by the growing dependence on reliable and efficient IT solutions and the need to replace applications and infrastructure as they reach end of life. In addition, following legal separation of TO and SO, the costs for the IEMS system are now shared, where previously they were picked up entirely by ESO.

IT is playing an essential role in delivering our core business capabilities in RIIO-T1

IT is increasingly enabling us to deliver our stakeholder priorities in a safe and effective way; providing sustainable improvements in value for money for our customers. Throughout the T1 period, we have made significant progress in improving business performance through investments in technology. We have mobilised our operational field force through investment in work management applications and infrastructure that has enabled us to digitise key processes around the way we carry out work and capture data. This data is processed through new technology and analytics platforms that enable efficient day-to-day decision making based on the health of our assets. Through this approach, we have delivered both operational and capital savings in the period.

IT expenditure of £194m in our asset management systems has enabled us to:

- maintain the health of our core work and asset management systems that enable us to provide a safe and reliable service to our customers and stakeholders; through our TFO – Scheduling & Mobile and Ellipse 8 upgrade projects

- improve our safety and operational efficiency, maintenance compliance and NOMs delivery through targeted use of automation, workflow and analytics capabilities; through our Strategic Asset Management (SAM) and Asset Management Planning and Delivery (AMPD) driven projects

- migrate successfully from legacy network and communication systems, delivering both opex efficiencies and network performance improvements

We will also invest £112m in our broader IT infrastructure, cyber and back-office systems. At the start of T1, we responded to the efficiency challenge by extending the technical lives of our IT infrastructure assets, accepting higher levels of risk whilst maintaining levels of availability. However, as we continued through T1, our employees fed back that IT was becoming a significant blocker to their effectiveness at work. The increased levels of frustration with IT was evidenced through a dip in our June 2019 cNPS score. This was also one of the causes for the Enablement score from our 2019 Employee Opinion Survey dropping to 57 compared to a score of 73 for a high performing norm. IT equipment and IT systems were two of the top three areas commented upon.

Over the same period, the escalating threat of cyber-attack on our IT systems meant that we had to look again at how we managed our infrastructure so that we could proactively monitor and remediate cyber threats. This led us to revise our asset health policies for IT and make targeted investments to help our people work more productively, and to extend our cyber monitoring.

Our challenges for RIIO-T2

Our main responsibility as a transmission owner is to ensure a safe and reliable electricity transmission network. Our network needs to be available to our customers when they need it, to provide secure power supplies for consumers.

To fulfil this role, we need to maintain high safety standards that protect our employees, contractors, stakeholders and the public. To achieve the level of reliability expected by our stakeholders, we need to keep our assets in a healthy condition. This means monitoring their condition, and intervening at the right time to maintain, refurbish or replace them.
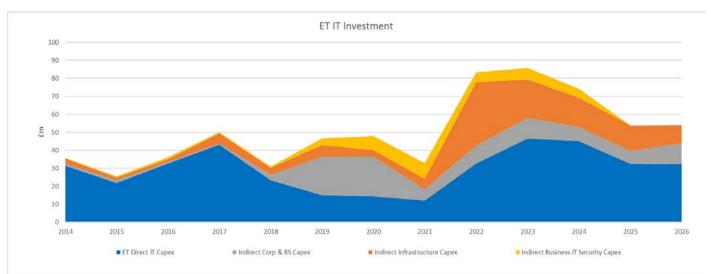
We have many customers who want to connect to and use our electricity transmission network. We provide them with network connections, services related to the connection, and ongoing services once they're connected. We want to make it easier for customers to connect to and use our network. We aim to achieve this by becoming a more customer-centric business.

Reliable and effective IT systems are key to enabling us to operate a safe and reliable electricity transmission network and to making it easier for our customers to connect to and use our network.

Our proposals for RIIO-T2 mainly reflect required IT asset replacements and cyber

Our proposed investment in IT for the RIIO-T2 period is £354m. A significant element of this investment is to replace existing systems and infrastructure as it reaches end of life. Our forecast IT expenditure for RIIO-T1 together with our proposed investment for RIIO-T2 is illustrated in the chart below.

Proposed investment on ET work and asset management related IT for the RIIO-T2 period is £189m, which includes £176m for the upgrade/replacement of core information systems as they reach end of life, and £10m on customer solutions. In addition, we propose investment of £18m to implement digital platforms as part of our digitalisation strategy, to help us to better meet and exceed our customers' expectations. As it is unlikely that all the digital transformation investments will deliver a return for the consumer within the regulatory period, we propose funding through the Network Innovation Allowance (NIA), with a 10% contribution from ourselves, to deliver benefits in T3 and beyond for the whole energy system. Our proposals are included in chapter 12 'We will be innovative'.

Alignment of our system replacement decisions will enable the simplification and consolidation of our work and asset management solutions and overall IT infrastructure. We will also invest in additional capabilities that will enable us to transform our business to cater for the evolving needs and expectations of our customer and stakeholder groups, whilst continuing to maintain high levels of business performance and cost-effectiveness.

Our proposals for RIIO T2 ET specific IT investments

This section considers ET 'front-office' systems, which are required to support the planning, development and execution of work on the electricity transmission system. Some of these systems may be shared with Gas Transmission or Electricity System Operator where it is economic and efficient to do so. Where we are

proposing investment on shared systems, the scope and timing of the investment has been co-ordinated with the other entity.

Operational and asset management information systems are essential in enabling us to provide a safe and reliable network. They provide a registry of all of our assets and hold a record of all work undertaken and planned. They also store drawings and documentation and hold geographical information about our current and future planned assets. The transmission network is controlled and switched from the central control room (TNCC) using an integrated energy management system.

The key driver for our IT investment in the T2 period is to upgrade and/or replace our core work and asset management systems as they reach end of life, whilst at the same time simplifying and rationalising our systems landscape. Our forecast investment on safety and reliability related IT is £176m. This investment is required to ensure that we maintain the capability to deliver capital investment and maintenance activities for our customers in a safe and efficient way. Specific investment areas are summarised in the table below.

Description	Investment activity	T2 cost £m
Control centre and network management systems	The Integrated Energy Management System (IEMS) is a shared Critical National Infrastructure system with ESO, which is used to manage and control the electricity transmission system. Investment is planned to separate the system into ESO and ET specific components. The ESO requires an energy management system, whereas ET requires a SCADA and safety management system in line with other TOs and DNOs. This will benefit customers and stakeholders by; assuring physical separation of ET and ESO systems and data, and facilitating process efficiencies in the management and control of network access and safety. IEMS cost is £50m with £8m for other critical TNCC control room systems.	██ ██
Asset registry and work management systems	End of life replacement of our asset registry and field force scheduling and mobile working systems. This investment will enable us to implement an industry leading solution and further enhance our ability to develop asset management strategies based on 'monetised risk', delivering benefits to customers through reduced IT system costs and enhanced risk based maintenance/refurbishment/replacement planning.	£47m
Condition monitoring and analytics	End of life refresh of our Insights Platform, and extension to cater for an increase in the amount and diversity of data we capture from our assets. This will enable advanced analytics to be used to model the performance and condition of our assets, delivering customer benefits through improved asset intervention planning.	£36m
Portfolio and plan optimisation capabilities	Development of our portfolio optimisation capabilities and rationalisation of supporting systems to converge on an integrated asset investment planning and optimisation solution. Customer benefits will be realised through lower IT system costs, process efficiencies (through not having to work in multiple systems) and optimised asset intervention decision making.	£13m
Other asset health driven investments	End of life replacement of systems: **Network analysis and design** – complex network analysis and modelling for new connections and infrastructure investment decision making. **Project controls** – scheduling, delivery and supplier collaboration capabilities to ensure efficient delivery of our capital projects. **Content management and geo-spatial information** – replacement of secure and auditable drawing and document management systems to safeguard ET, customer and stakeholder intellectual property. Replacement of our geospatial information system and development of 3D capabilities to improve hazard visualisation, risk management and visual amenity.	£22m

The investment decision packs that underpin this are included in Annex A14.10 – IEMS (SCADA) Replacement, A14.11 – Ellipse Replacement & A14.12 – IT System Health Replacement

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Our customers have told us that to achieve our vision of exceeding their expectations, we must listen, understand and consistently anticipate and deliver against their needs. When we do this well, they will feel as though they are 'treated like a partner' – this is our UK customer ambition and forms the basis of our UK Customer Strategy to become a customer centric organisation. Our Customer Strategy provides a multi-year roadmap, with measurable proof points against 4 key enablers; people, systems, customer journeys and insights and analytics, that will support us to move from market lagging to upper quartile.

To achieve this, we will invest in IT systems to support our interactions with our customers, using flexible and agile IT to tailor our approach for different customers. Our IT investments to facilitate our customers through the 'connect and use' journey is detailed in the table below.

Investment area	Description	T2 cost (£m)
Customer Relationship Management (CRM) system for connecting customers	In the T2 period, our CRM system will underpin how we manage our entire customer connection process. We will need to invest to include more parts of the journey within the CRM system, we will use the customer insights and data to make sure we can offer a more tailored, bespoke and flexible end-to-end service to different types of our customers. Our research has found the CRM system to be the most efficient and effective way to manage customer data and processes, enabling us to manage complex multi touch-point relationships with an increasing number and diversity of customers. The CRM system will also underpin our website and proposed Customer Portal investments.	£5.0m
Customer Relationship Management (CRM) system for non-connection customers	There are areas of our business that interact with customers outside of the connection process, such as asset protection, the transmission network control centre (TNCC), outages and land management. Each type of customer expects a different service and experience from us. This investment is to bring these interactions into the CRM system so that we can provide a more complete customer experience, this is as a result of direct feedback from our customers.	£2.5m
Self-service website for connecting customers	This investment will improve our customer experience with a self-service website. The portal will provide customers with a digital channel to apply/manage and interact with National Grid – streamlining interactions with National Grid, allowing customers to self-serve for elements of the connections process and customers will be able to use the functionality to design their own connection. This is in direct response to customers identifying multiple frictions with the existing connections process e.g. customers find the process of managing connections too manual and applying for a connection is inefficient and hard to understand.	£2.4m

The investment decision packs that underpin this are included in A14.12 IT System Health Replacement

In addition to our asset health driven investment in IT systems, as part of our broader Digitalisation Strategy we will invest in new and innovative technologies that will help us to digitalise and transform our business to meet our key customer and stakeholder priorities more effectively. Proposed investments to be funded via the NIA process are summarised in the table below.

Investment area	Description	T2 cost (£m)
Innovation and whole energy system digitalisation Artificial Intelligence Virtual/Augmented Reality Digital Experience Platform Digital Engineering/Digital Twin	The future energy system will interact and be more dynamic than ever before. To respond to these challenges, we want to transform our business through digitalisation to deliver: Tools and techniques to allow the digitisation of all maintenance, monitoring, and testing of equipment with automated archiving and analysis of information. Algorithms for the mixture of data with various levels of accuracies and time-frames. Risk prioritisation in real-time to maximise asset performance and value. Potential use of artificial intelligence, robotics and sensors.in asset management. Explore how Artificial Intelligence can be applied to our asset, financial and other data sets Share data across the whole energy system (heat, transport, energy)	18.25

The investment decision packs that underpin this are included in Annex A14.13 IT Transform investment

Our proposals for RIIO T2 general IT investment

This section considers general shared infrastructure and 'back-office' systems that are shared across the organisation as this is the most economic and efficient means of providing the service, with costs allocated back to ET. These services are grouped into; Corporate and Business Services, IT Infrastructure and Cyber Security.

The key drivers for our other IT investments are:

- Asset health policy driven replacement of our aged infrastructure, as further life extension is not achievable without a reduction in service levels
- Essential improvements in cyber security, to address an increasing level of cyber threat and to protect our users and customers
- Replacement and maintenance of core back-office systems

Digital transformation to provide enhanced customer services and experience

The forecast cost of our plan for the T2 period is £165m. We will leverage our global network to deliver efficiencies and ensure effective governance and oversight to converge on a standard product suite that recognises how our employees and our customers want to interact with us. For Corporate and Business Services the key investment areas are set out in the table below.

Investment area	Description	T2 cost (£m)
Corporate & Business Services Comprising: Finance, Procurement & HR Stakeholder & Employee Comms	Finance Systems ERP Consolidation programme – maintain ERP and connected applications and leverage new capabilities Reporting and analytics development Enterprise content management refresh and implementation of on-line collaborative analysis and data virtualisation Procurement Systems Maintain and leverage purchase to pay systems	£48.0m

And Other Core Functions:	SAP Ariba refresh and digital contract management	
Legal	HR and Workforce Systems	
	Refresh/upgrade core HR systems - SuccessFactors	
Internal Audit	Digitised learning	
	Payroll systems refresh	
Safety, Health & Sustainability		
	Stakeholder & Employee Comms	
IT	External web site refresh	
	Intranet refresh	
	Other Core Functions	
	Legal contract automation	
	Risk and Compliance system upgrade/refresh	
	IT provisioning and software licence asset management	
	Health & Safety and incident management	

The investment decision packs that underpin this area are included in Annex A14.15 Business Services

IT infrastructure is one of the cornerstones that underpins the applications and services that enable us to deliver a safe and reliable network for our customers and stakeholders. Our T2 investment continues the work we have begun in T1, bringing our IT infrastructure in line with our revised asset health policies, so that our people have the right tools and equipment to work effectively. The key investment areas for our IT Infrastructure are set out in the table below.

Investment area	Description	T2 cost (£m)
Infrastructure Comprising: Enterprise Network End User Compute Hosting IT Operations & Tooling	Enterprise Network Wide Area Network refresh Local Area Network refresh Wireless and voice communications refresh End User Compute End user device refresh – 3 year cycle Services upgrade/refresh Security and device management Communication and collaboration refresh – video conferencing, Sharepoint refresh Hosting Replacement of out-dated servers and operating systems to improve performance and address the increasing cyber threat to our network Implement Hybrid cloud - investment to enable the move to cloud-based solutions Investment in appropriate data archiving capability Enhanced disaster recovery arrangements IT Operations & Tooling Implement tools and automation to streamline our processes to manage the IT estate efficiently Consolidation and automation of the network operations centre to ensure optimised network operations Establish cloud aware cost transparency for all IT costs across the business enabling effective prioritisation and decision-making	£100m

The investment decision packs that underpin this are: A14.03 Hosting, A14.18 Enterprise Networks, A14.19 End User Compute & A14.20 IT Operations & Tooling.

IT cyber security measures are required to ensure current and future capabilities and operations are in place to safeguard the organisation against an increasing level of cyber threat. These threats come from a wide spectrum of potential sources, including: state-sponsored espionage and sabotage, international terrorism, domestic militants, malevolent 'hacktivists' or even disaffected insiders. Our Cyber Security Operations centre receives on average, 1.1 million alerts across the network, endpoints, and email. In the period of a week, over 12 million emails are received with 10 million blocked as considered to be suspicious. This trend will only continue to grow as the organisation becomes more interconnected. Ensuring the appropriate cyber security defences are in place to protect our network and information systems is vital to ensuring a safe and reliable network.

The key areas for our IT cyber security investment are included in our Business IT Security plan and have been developed in conjunction with the NIS Competent Authority. Baseline investment covering the first three years of the T2 period is summarised in the table below. Later years will be subject to a proposed uncertainty mechanism (re-opener) once we have greater certainty about the nature of the threat, the solution and costs.

Investment area	Description	T2 cost (£m)
IT Cyber Security Comprising compliance with: Network and Information Systems (NIS) regulations National Institute of Standards and Technology (NIST) Cyber Security Framework CSF) and,	Specific investments include: ████████████████████ ████████████████████ ████████████████████	£16.8m

The investment decision packs that underpin this are included in Annex A10.05 Business IT Security plan

Collectively these investments will rationalise and modernise our infrastructure, providing a reliable, cyber secure environment that is flexible for the future, and provides a foundation for us to digitally transform our business to meet the needs of our customers and stakeholders.

Our Digitalisation Strategy

The future energy system will interact and be more dynamic than ever before. To respond to these challenges, we want to transform our business through digitalisation.

Over the next 3-5 years, we expect to see significant change brought about by the impact of Artificial Intelligence (AI) on businesses. Data-driven technologies will play a central role in the day-to-day operation of our business, while practical applications like Augmented and Virtual Reality and the Internet of Things will impact how we interact with the world around us. Our customers and stakeholders will come to expect their interactions and digital experiences with ET to be as seamless, rich and easy as their interactions with other commercial organisations. As part of our Digitalisation Strategy we will consider the recommendations of the Energy Data Taskforce report on 'A Strategy for a Modern Digitalised Energy System' and use technology and data to deliver value to our customers and stakeholders by:

- Reducing whole system costs through the ability to collaborate with a common data platform
- Reducing costs through improved real-time asset information allowing more informed risk-based decisions

- Using advanced analytics and intelligence in business support systems to provide information to allow lower cost decisions to be taken

Our data management capability is a key enabler for our T2 digital ambitions

Through T1 we have been working hard to really understand and document our business critical data. We've established a network of Data Owners and Data Stewards who are working to document what data we already have, how it's used, what state it's in and what good looks like. We are continuing to bring core data sets together in our Insights Platform so we can better manage the end to end data flows, minimise duplication and maximise efficiency

Everything we are doing now to enhance our data management capability is laying the foundations for delivery of our T2 IT strategy and aligns with the Energy Data Taskforce recommendations from 'A Strategy for a Modern Digitalised Energy System'.

Our alignment to EDTF recommendations is summarised below:

Digitalisation of the Energy System - is at the heart of our ambitions. Our investments in IT infrastructure, Business Services, work and asset management and customer facing IT systems outlined in this paper are key to enabling the digitalisation of our data assets where this drives value for customers and stakeholders.

Maximising the Value of Data – our work to build a comprehensive data library with common standards, structures and interfaces will be incorporated within our systems at the point where they are upgraded/replaced in T2. This will be a key foundation to move to a 'presumed open' principle, where data is discoverable, searchable and understandable.

Visibility of Data - our Data Library, together with our investment in Enterprise Content Management, Digital Experience and external portals will facilitate a greater level of sharing of our metadata with energy system users where it is safe and appropriate to do so.

Coordination of Asset Registration – during T2 we will be investing in our CRM platform and replacing our core work and asset management and asset registration system (Ellipse). This will afford us the opportunity to consolidate our systems and data and provide the capability to integrate with a future single Asset Registration Portal.

Visibility of Infrastructure and Assets - our Geospatial Information System (GIS), Asset Investment Planning (AIP) investments, together with our proposals for the use of Digital Engineering and Digital Twins present an opportunity to contribute towards the development of a Unified System Map of the energy system.

We have separately published our Digitalisation Strategy on our website and provided a hyperlink to Ofgem.

We benchmark or market test all our IT investments

Our proposed RIIO-T2 investments were independently reviewed against industry benchmarks by Gartner (a recognised IT benchmarking specialist), both in terms of business requirement and forecast cost. They found that the mix of investment areas, the individual project costs and the asset health policies that drive a large part of the investment portfolio were all in line with utility sector benchmarks. The Gartner benchmarking report is included in annex NGET_A14.01_IT Benchmarking (Gartner).

Proposed IT investments are challenged and reviewed by the Electricity Transmission Investment Committee to test the need case, delivery approach and efficiency of forecast costs prior to sanction. Sanctioned projects are then allocated to a suitable framework provider, through a competitive process to ensure that we get value for money at all stages of the project delivery process.

Our IT operating costs are included in chapter 14 of our submission - 'Our total costs and how we will provide value for money'.