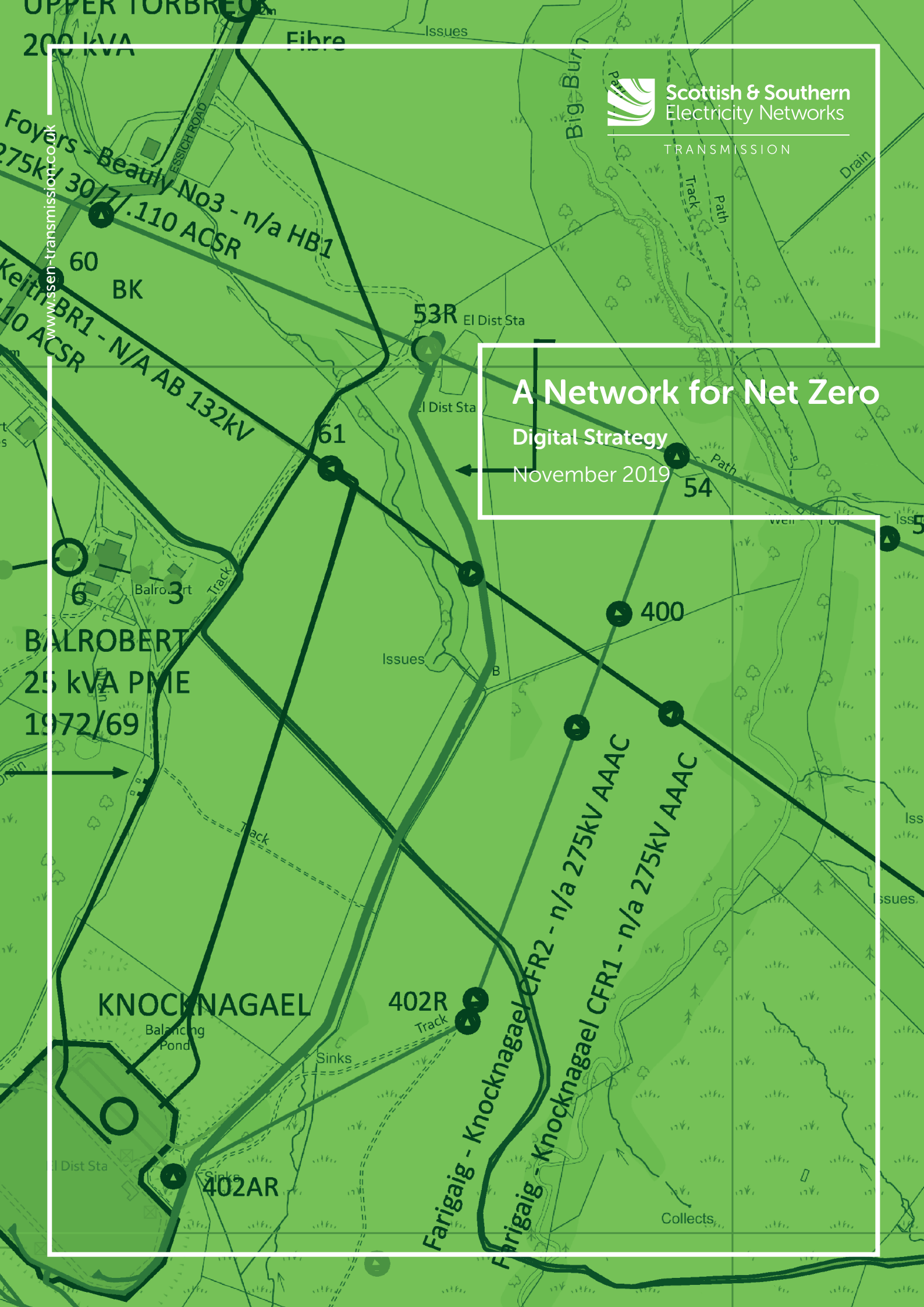
Scottish & Southern
Electricity Networks
TRANSMISSION
www.ssen-transmission.co.uk
A Network for Net Zero
Digital Strategy
November 2019
Foyers - Beauly No3 - n/a HB1
Keith BR1 - N/A AB 132kV
Farigaig - Knocknagael CFR2 - n/a 275kV AAAC
Farigaig - Knocknagael CFR1 - n/a 275kV AAAC
BALROBERT
25 kVA PMIE
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About us

We are Scottish Hydro Electric Transmission (SHE Transmission), part of the SSE Group, responsible for the electricity transmission network in the north of Scotland.

We operate under the name of Scottish and Southern Electricity Networks, together with our sister companies, Scottish Hydro Electric Power Distribution (SHEPD) and Southern Electric Power Distribution (SEPD), who operate the lower voltage distribution networks in the north of Scotland and central southern England.

As the Transmission Owner (TO) we plan, develop and maintain the high voltage electricity transmission network in the north of Scotland.

This network takes the electricity from generators and transports it over long distances for ultimate distribution to homes and businesses in cities, towns and villages. We do this via our extensive network of overhead lines, underground cables and electricity substations, extending over a quarter of the UK's land mass and crossing some of its most challenging terrain.

As a natural monopoly, our activities are regulated by Ofgem. This includes the outputs that we need to deliver for our consumers and the associated revenues that we are allowed to collect.

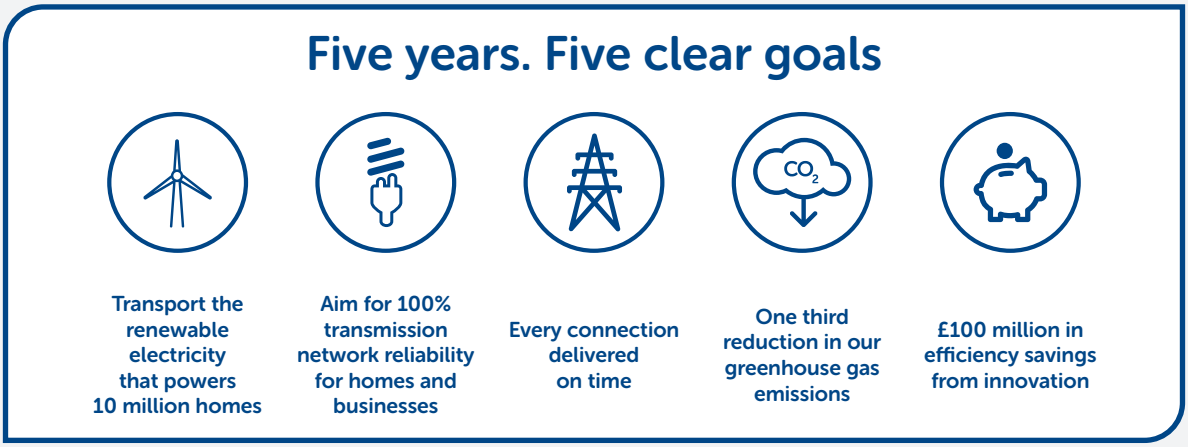
This is controlled through the RIIO price control framework, where RIIO stands for Revenue made up of Incentives, Innovation and Outputs. The current transmission price control period, RIIO-T1, runs from 2013-2021.

The next electricity transmission price control period, RIIO-T2, will be five years and will run from 2021-2026.

As well as this framework and the drivers within, we have a duty to develop and maintain an efficient, co-ordinated and economical system of electricity transmission.

Introduction

This Digital Strategy describes SHE Transmission's ongoing journey to become a more fully digitalised business, reflected in integrated data, systems, processes and ways of working, which support and enable delivery of SHE Transmission's strategic objectives. In RIIO-T2 these objectives are captured in the five clear goals:



Digital is integral to SHE Transmission's stakeholder-led strategy, supports delivery of our RIIO-T2 goals, and will create a contemporary user experience for customers, stakeholders and staff. Digital will drive continuously improving:

- efficiency and therefore value for consumers and stakeholders;
- the reliability, resilience and sustainability of our network.

Simply put, this means providing, within a secure and controlled environment, the Right Data to the Right People at the Right Time to enable the Right Decisions.

- Right Data – means quality, relevance, clarity, reliability and validation;
- Right People – means value for decisions, security, access rights, data protection and records;
- Right Time – appropriate currency, timeliness, time stamped and recorded.

The term Digital Strategy is used to cover all aspects of this ongoing digital journey, which is integral to business performance and continuous improvement. Multiple definitions exist of the following digital related terms, both from industry and academia. SHE Transmission will adopt the definitions[1] below:

Digitisation is the process of changing from analog to digital form, also known as digital enablement.

Digitalisation is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business.

Digital Transformation can refer to anything from IT modernisation, to digital optimisation, to the invention of new digital business models. (SHE Transmission is focussed on efficiency and consumer value).

Digital describes the dominant use of the latest digital technologies to improve organisational processes, improve interactions between people, organisations and things, or make new business models possible.

A Digital Twin is a digital representation of a real world entity or system.

[1] Gartner IT Glossary, available at https://www.gartner.com/en/information-technology/glossary

What is the scope of Digital?

Digital working is directly aligned with a stakeholder-led strategy, SHE Transmission's leading strategic theme for RIIO-T2. At the most basic level, this is delivered by having the right data available, at the right time, to share with the right stakeholders, enabling them to make informed decisions.

In more practical terms, digital means having a single source of network data, supplemented by data from relevant external parties, which stakeholders can access, in a contemporary and secure manner. In the background, this includes having the data quality processes, security, and information processing and presentation to ensure data and outputs are presented in standard and usable ways, can be readily understood and provide value to stakeholders.

To break this down into specific areas, Digital includes:

1 **Data**
A single source of truth, which is validated and updated appropriately for each data type. Data is owned by the relevant business function.

2 **Information Technology (IT)**
The applications (including design and development or procurement), tools, processing and presentation of data to enable effective collaboration with stakeholders, and efficient internal business processes.

3 **Cyber Security**
Controlled access to information and systems, for both external and internal users, so that systems, data and users are protected.

4 **Operational Technology (OT)**
The operational systems which monitor and control the network and ensure operational integrity is maintained, and the acquisition and processing of data, both of which provide network information to inform operations and asset management. (These systems are generally internal only and must be secure).

5 **Business Process Improvement**
Development of existing and new processes, to ensure reliable information is available in a timely manner to inform decisions.

6 **People**
Equipping and training our staff and contractors (present and future) to embrace digital working, and providing access to information for all stakeholders in a contemporary manner.

Digital Capability

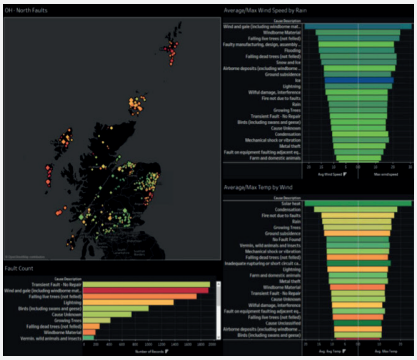
SHE Transmission has a highly capable workforce, with comprehensive knowledge of our network, based on operational and project experience, detailed technical knowledge and understanding of business drivers. There is a strong drive to innovate, and to make our collective network knowledge more accessible to all users, enabling better-informed and faster decision making.

All staff have a digital element to their roles, based on business wide deployment of IT systems, specialist tools for technical analysis or project management, and operational systems which support our national infrastructure assets. Continuous improvement of these tools and systems is driven by users, management and specialist corporate functions. There is a significant opportunity to further improve efficiency through greater integration of systems and data, and through making information accessible to the right users at the right time.

SSE Group IT

SSE Group has an objective to be a 'Data Driven Business' and has developed corporate capability to support this, both in providing direct services to the SSE Group businesses, and in providing expertise and coordinating collaboration.

SSE has a strong Group IT capability, which covers all technical aspects, and provides structured services and support to the various SSE businesses. The relationship between SHE Transmission and Group IT is being refreshed based on establishment of the digital team, development of the RIIO-T2 Business Plan, and to ensure that roles and responsibilities are well defined. Group IT is well engaged in development of the RIIO-T2 Business Plan and has guided the technical solutions, including the IT Investment Plan. The principal teams in Group IT all provide expert capability in their areas and are described briefly below:



- **Data and Analytics –** provides full data and analytics services, including data quality, management and storage, and design and evaluation of analytics solutions (using in house and external data sets) through discovery, proof of concept and implementation services. Currently evaluating Data Catalogue options from a group perspective, and will be involved with Energy Networks Association (ENA) Data Working Group.
- **Technology & Architecture –** covers enterprise architecture (integrated solutions) and solution architecture for individual solutions, including evaluation of need, development and delivery path through bespoke or 'off the shelf' solutions. Also includes the Emerging Technologies team which is responsible for technology watch, technology evaluation, solution discovery, proof of concept and implementation services.
- **Cyber Security –** provides full group IT cyber security services and expert input to Operational Technology cyber security, including a major role in developing the RIIO-T2 Cyber Resilience Plan. Runs the group Security Operations Centre, and designs attack exercises to test defences, resilience and recovery. Engaged with regulatory and government bodies including the National Cyber Security Centre (NCSC), in order to maintain levels of expertise and consistency. Evaluating solutions for OT asset discovery.

Digital Team

SHE Transmission reviewed the business operating model in early 2019, and identified the need for a dedicated digital team to own and drive the digital strategy and plan. This team has been established with a number of experienced senior staff, and will be fully populated in the coming months.

Engagement with the business, Group IT and stakeholders has been described above, and future plans will be set out in the Digital Roadmap, to be published in spring 2020. Roles and responsibilities for digital workstreams are being reviewed, with strong commitments from business and Group IT teams.

Alignment with Strategic Themes

Digital is a key enabler for both the Strategic Themes and the Five Clear Goals in SHE Transmission's RIIO-T2 Business Plan[5]. First and foremost, it is aligned with the philosophy and intent of a Stakeholder-Led Strategy, based on the broad principle of making the Right Data, available to the Right People, at the Right Time, to enable the Right Decisions.

The range of stakeholders includes all groups who use or rely upon our network; all parties who are affected by, or have an interest in, our assets and projects; our employees; and all consumers who ultimately fund our network.

Stakeholder-Led Strategy

Taking a Whole System approach to network operation and development to meet current and future customers' needs

Energy networks are built and operated to meet the needs of current and future customers, and so customers' and stakeholders' needs must be the drivers of all activities.

Safe and Secure Network Operation

Using data efficiently to understand, predict and get the best network performance.

Energy networks, and especially the high voltage transmission motorways, must be operated safely.

They must be reliable, available and resilient to changing circumstances, be these opportunities or threats.

Sector Leading Efficiency

Integrated approach to whole life development and operation, using risk-based engineering to deliver value.

Energy networks must be affordable to generators and customers, recognising the difficulties of the fuel poor and vulnerable, and be open about the trade-offs between cost and investment for local and national benefits to achieve the clean energy transition.

Leadership in Sustainability

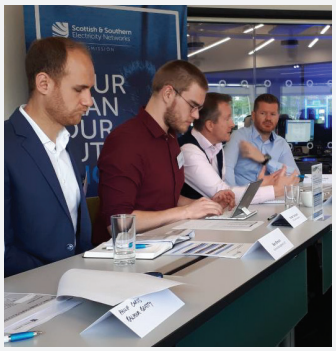
Trusted partner of customers and communities, realising long term benefit for society, economy and environment.

Energy networks must be trusted by the customers and communities they serve demonstrating long term benefit for society, the economy and the environment.

Stakeholder engagement

Development of this Digital Strategy has been guided by focussed stakeholder engagement, both internal and external, and by the wider stakeholder engagement[2] which has informed the SHE Transmission RIIO-T2 Business Plan. Ongoing engagement with other utilities, both directly and through international benchmarking groups (e.g. ITOMS[3], ITAMS[4]), will continue to inform and validate strategy and roadmap development.

Within SHE Transmission the business functions have all been directly consulted with a particular emphasis on how efficiency could be improved, and how the right data can be made available at the right time. In the wider SSE group ongoing collaboration, notably through the Data and Analytics Steering Group, and sharing of best practice is benchmarked with other utility teams, and with Group IT, which also provides access to IT sector best practice.



Cyber security best practice is informed by Group IT, and through engagement with other utilities, OFGEM and the supply chain. Industry and Government engagement is key to our approach, for example through direct engagement with members of the Energy Data Taskforce (EDTF) and the Centre for Digital Built Britain (CDBB), along with consultants and through the ENA. Wider industry engagement with other sectors is also important, in particular around best practice examples, organisational inertia and the required rate of change.

[2] SHE Transmission RIIO-T2 stakeholder workshops, available at:
https://www.ssen-transmission.co.uk/media/3398/riio-t2- connections-innovation-and-whole-systems-stakeholder-engagement-event-february-2019-output-report.pdf
https://www.ssen-transmission.co.uk/media/3385/she-transmission-operations-stakeholder-workshop-report-pdf.pdf
[3] International Transmission Operations and Maintenance Study, available at https://www.umsgroup.com/Europe/What-we-do/Learning-Consortia/ITOMS.html
[4] International Transmission Asset Management Study, available at https://www.umsgroup.com/Europe/What-we-do/Learning-Consortia/ITAMS/

Stakeholder-Led Strategy

Digital will support the requirement, clearly identified by stakeholders, to be more open with our knowledge and information. Making appropriate data openly available to stakeholders will improve understanding of our network, and enable customers, and other stakeholders, to identify their opportunities, and where to spend their effort and resources to meet their own objectives.

The comprehensive list of stakeholders identified in the Business Plan[5] can all be supported or collaborated with more effectively using digital capability, whether this is making more information available in a timelier manner, or facilitating deeper collaboration through appropriately shared models. Specific examples of stakeholders and digital solutions to support provision of information, and direct interaction include:

- **National Grid Electricity System Operator, and other Transmission Operators –** Implementation of Inter-Control Centre Protocol to manage exchange of data between control centres.
- **Contractors –** Enhanced use of Building Information Modelling to improve efficiency of design and construction project phases, with the potential to automate progress reporting and visualisation.
- **Staff –** Data Management, Data Enrichment and Analytics, to improve efficiency of processes from option identification and selection, site selection, design and asset management. Design, operations and training will be enhanced, with improved safety, through use of 3D modelling and visualisation, including virtual reality and augmented reality tools.
- **Statutory Consultees –** Data sharing through GIS to enable bodies such as councils, SEPA and SNH to more efficiently visualise, review and respond to SHE Transmission options and plans, and understand interaction with their assets.
- **Public –** Improved visibility of network through a contemporary user interface, which will provide an appropriate level of information for general insight or specific uses, e.g. planning applications. This will also improve public safety awareness, and provide applications to integrate safety through shared data.
- **Generators and Developers –** The clear goal under this strategic theme is for every connection to be delivered on time. The RIIO-T2 Commercial and Connections Policy[6] calls up the need to equip customers with digitised information, and to equip customers with digitised tools, to deliver optimal connection solutions. These requirements are focussed around enabling customers to make their own decisions, or at least identify options, in a much more flexible and rapid manner than is the norm under existing processes. Specific applications will provide information on network capacity at points of connection and the potential need for wider network reinforcements, and digitalised connection case management.

[5] A Network for Net Zero available at https://www.ssen-transmission.co.uk/media/3454/draft-business-plan_amended-28619.pdf
[6] SHE Transmission RIIO-T2 Commercial & Connections Policy, available at https://www.ssen-transmission.co.uk/media/3405/ssen-riio-t2-commercial-connections-policy-paper-28pp-22782-artwork.pdf

Safe and Secure Network Operation

Using data efficiently to understand, predict and get the best network performance **is the high level objective of this Strategic Theme. Network data is held at many different levels and in a number of different systems and formats. Digital projects have already delivered the first stages of bringing asset data into a single repository, developing a 'single source of truth' which can be relied upon by staff and stakeholders.**

This data is utilised in our Condition Based Risk Management (CBRM) tool, which prioritise maintenance and replacement interventions, thus ensuring that network reliability is maintained or improved.

These projects will also bring all assets onto a common Geographic Information System (GIS), which will yield efficiencies for our own teams, and in making information available, on a common reference platform, to stakeholders and other infrastructure owners. Work to date forms the basis of an asset digital twin which will be further developed prior to and during RIIO-T2.

Asset Data is a critical asset in its own right, and provides the ability to determine asset life, asset loading and to optimise asset utilisation. Smart monitoring of assets will enable the network to be controlled more actively, asset condition assessed in close to real time, and decisions made about optimal use of assets, which yields benefits in optimised investment and sustainability. A programme of work to implement smart monitoring of assets has commenced and will ramp up significantly in RIIO-T2.

Cyber resilience of the network, and cyber security in general, will contribute to the overall network reliability and performance. Projects in progress are making Operational Technology more secure, and further projects are already in train through our NIS Directive[7] improvement plan, which is planned to complete in RIIO-T1. SSE Group IT has a dedicated cyber security team, which is providing the technical expertise, and links to wider best practice, including the NCSC.

Digitalisation has the potential to introduce new threats, and change the 'attack surface' for cyber threats. Cyber threats are constantly and rapidly evolving, and the defence mechanisms employed need to keep pace with the threat spectrum. In addition the management of cyber attacks when they occur, and the recovery plans for restoring capability are equally important.

The SHE Transmission RIIO-T2 Cyber Resilience Plan includes a range of projects and actions to address all aspects of OT cyber security, and is under continual review to ensure it reflects current knowledge and best practice. We are closely engaged with OFGEM regarding this plan, and future enhancements, and with National Grid and others to share best practice.

[7] EU Network and Information Systems Directive, available here https://ec.europa.eu/digital-single-market/en/networkand-information-security-nis-directive

Sector Leading Efficiency

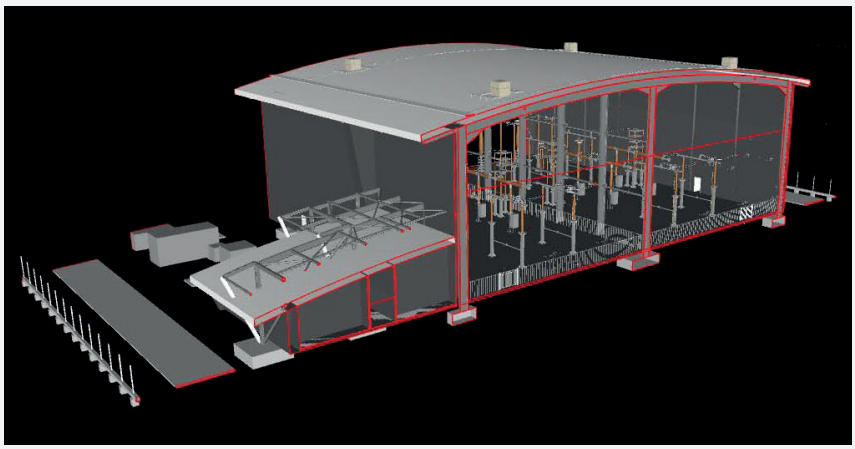
GB transmission network planning relies upon shared data from the Transmission Owners (TOs) and analysis by the System Operator (NGESO) to identify required strategic reinforcements and evaluate the most efficient and economic options. This combined model and analysis is a system digital twin. The information integration required for network planning is increasing with the level of Distributed Energy Resources (DERs) and the planned implementation of Distribution System Operators (DSOs).

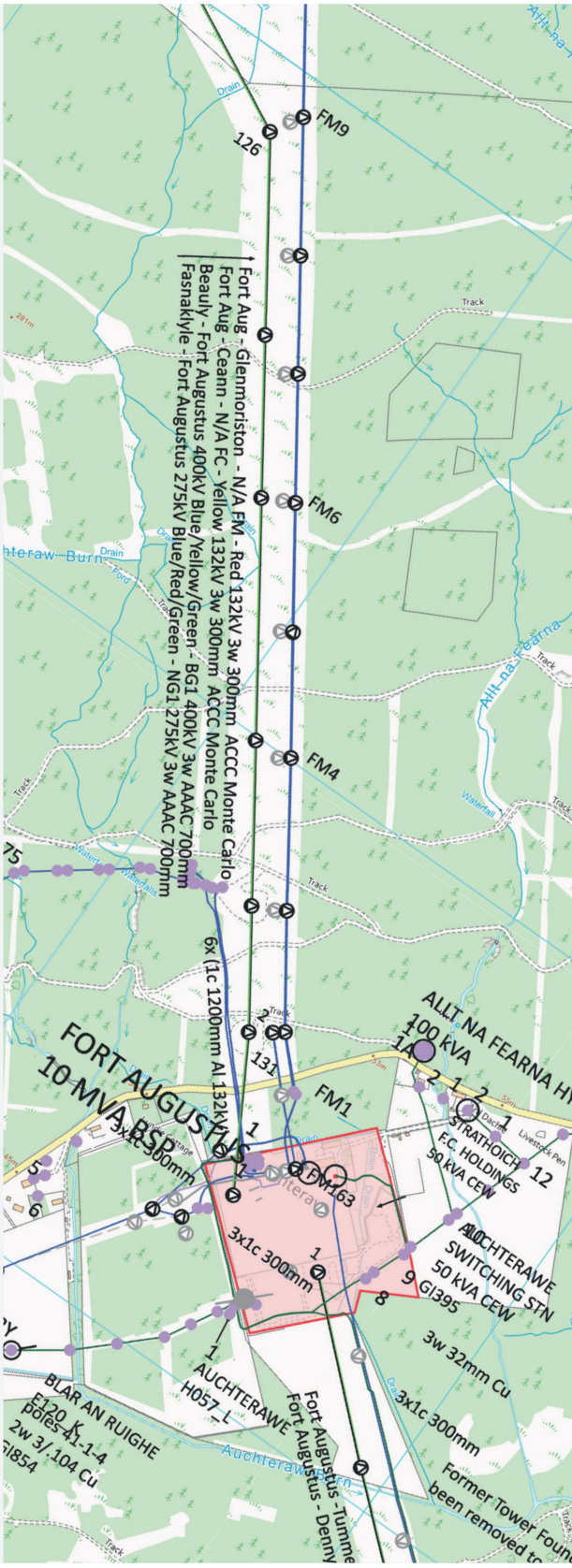
This increasing complexity requires higher data confidence to ensure validity of outputs. SHE Transmission's data and system models are already subject to quality and validation processes. These are being reviewed and enhanced to support the efficiency which can be realised through the Whole System[8] approach, which specifically identifies the need for data management for internal and stakeholder use and decision making.

SHE Transmission's Digital Vision of integrating all data and systems and providing access through a secure common user portal, with appropriate access for different users, will in itself be a significant tool for efficiency, both within the business as staff can access information more reliably and rapidly, and for external users who will be able to access relevant information without going through manual communications and justifications.

Data reliability also supports efficiency and sustainability through reduced travel and reduced rework. Asset data is structured according to an asset classification which was developed for the asset data register. This will be validated against the Common Information Model standards from the IEC, which is expected to form part of the work taken forward under the auspices of the ENA Data Working Group.

Common data models, standards and formats are critical to efficient use and sharing of data, particularly with external parties in different sectors, which could become commonplace. Current and future use of Building Information Management (BIM) in SHE Transmission is improving project development and delivery efficiency, and is planned to increase visibility of development plans and project progress for stakeholders and staff.





[8] SHE Transmission Whole System Strategy, available at: https://www.ssen-transmission.co.uk/media/3451/ssen-whole-system-strategy-20pp-22990-artwork-for-web-uploadwith-links-final.pdf

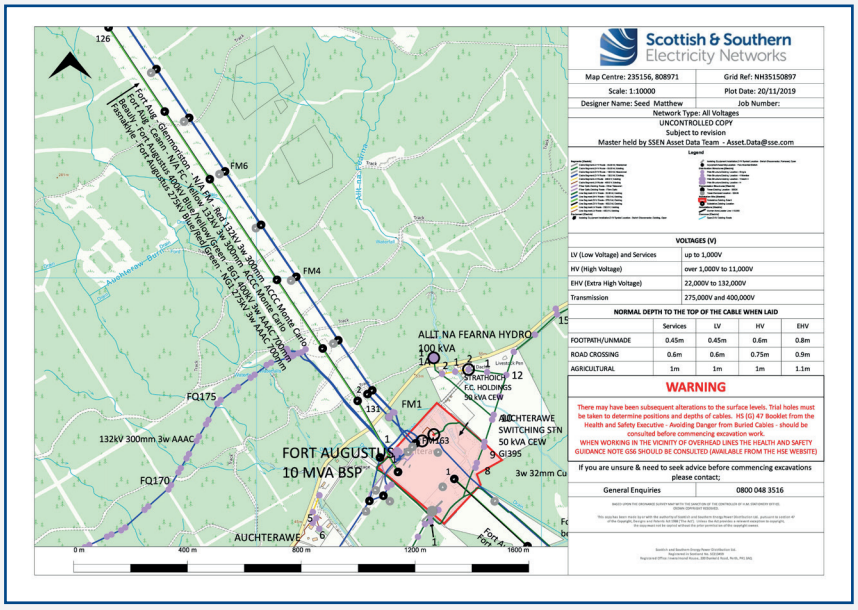
Leadership in Sustainability

Data and systems support achievement of the six sustainability goals defined under the overarching Leadership in Sustainability strategic theme. In order to improve our standing as trusted partners of customers and communities, we need to make information available to them in the form and timescales they expect, and provide well justified evidence of the benefits we bring in delivering and supporting sustainability.

Today everyone knows how easily data can be made available, through simple examples like pro-active travel information tailored to an individual's daily commute, and through seemingly more intelligent examples such as wildlife recognition and wildfire monitoring. It is therefore reasonable to believe that customers and stakeholders expect our data to be similarly available and processed to enable straightforward understanding or use.

This focus on information technology and data availability has direct benefits for our business, particularly in attracting a new generation of staff, and in providing training and simulations for all staff and others based on modern technologies and intelligent applications, including virtual reality and augmented reality. This directly supports our Sustainable Workforce Strategy.

It also enables us to interact proactively with stakeholders who may not understand the risks inherent in a high voltage transmission network, and provide training, warnings, and even interventions to improve public and stakeholder safety. This is the type of data sharing which helps build a national digital twin, and is embodied in the title of the National Infrastructure Commission report, Data for the Public Good[9]. Reliable data also improves efficiency of our communication with communities, including more traditional methods of communication, and enables us to explain issues and challenges in a more efficient manner.



[9] Data for the Public Good, National infrastructure Commission 2017, available at https://www.nic.org.uk/publications/data-public-good/

Alignment with Policy and Regulation

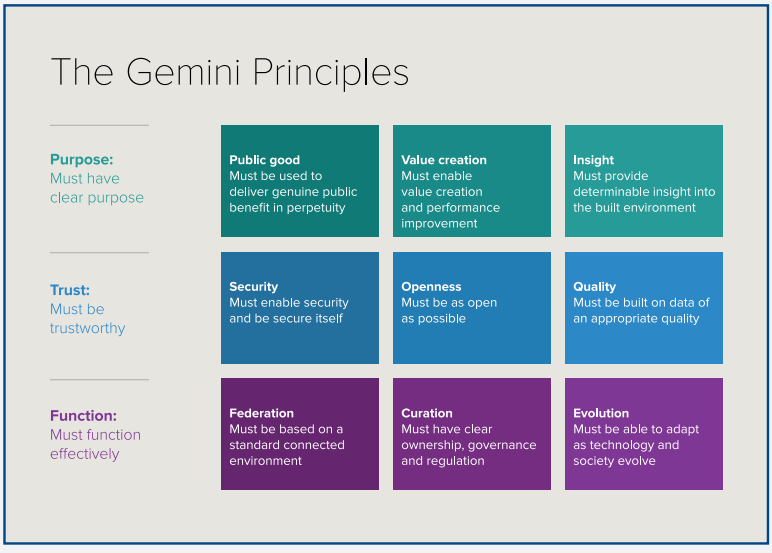
Government policy and plans for both the UK and Scotland are described in government strategy publications, and supported by government commissioned reports and working groups. The focus on Digital and Data is consistent, with collaboration being a clear theme.

UK Government Digital Strategy[10] is built on seven pillars, including digital infrastructure, digital skills, cyber security and data, and references industrial strategy, which has ten pillars, including skills, infrastructure, and affordable energy and clean growth. The Scottish Government Digital Strategy[11] is closely aligned with the pillars of the UK Government strategy. Data quality and reliability, and cross sector collaboration form the focus of the emerging UK Government Data Strategy[12].

The National Infrastructure Commission report, Data for the Public Good, advocates an integrated approach to infrastructure, driving towards digital twins, with a focus on artificial intelligence and effective use of big data and data analytics. It also calls upon 'regulators, network operators and utilities to prioritise data'.

The Centre for Digital Built Britain (CDBB) has taken on actions from the NIC report, developing a roadmap and the Gemini Principles[13] to support consistent development of digital twins. SHE Transmission's digital strategy and roadmap are closely aligned with these documents.

OFGEM and BEIS jointly commissioned the Energy Data Taskforce, which published its report[14], A Strategy for a Modern Digitalised Energy System, in July 2019. The five recommendations in this report have significantly informed SHE Transmission's Digital Strategy, and will also be further evaluated through the ENA Data Working Group, which SHE Transmission and Scottish and Southern Electricity Power Distribution (SSEPD) have joined.



Source: Centre for Digital Built Britain

[10] UK Government Digital Strategy 2017, available at https://www.gov.uk/government/publications/uk-digital-strategy
[11] A Digital Strategy for Scotland, Scottish Government 2017, available at https://www.gov.scot/publications/realisingscotlands-full-potential-digital-world-digital-strategy-scotland/
[12] UK Government Data Strategy 2019, available at https://www.gov.uk/guidance/national-data-strategy
[13] The Gemini Principles, Centre for Digital Built Britain 2019, available at https://www.cdbb.cam.ac.uk/system/files/documents/TheGeminiPrinciples.pdf
[14] A Strategy for a Modern Digitalised Energy System, Energy Data Taskforce, 2019, available at https://es.catapult.org.uk/news/energy-data-taskforce-report/

Energy Data Taskforce

The five headline recommendations from the Energy Data Taskforce are tabulated below, with a brief summary of SHE Transmission's ongoing work and future plans alongside.

EDTF Recommendation	SHE Transmission Action/Plan
Recommendation 1: Digitalisation of the Energy System – Government and Ofgem should direct the sector to adopt the principle of Digitalisation of the Energy System in the consumers' interest, using their range of existing legislative and regulatory measures as appropriate, in line with the supporting principles of 'New Data Needs' 'Continuous Improvement' and 'Digitalisation Strategies'.	• Maximo and GIS implemented with data assurance and validation ongoing. Process in place for addition of data for new assets. • Digital acquisition of inspection data through proprietary tools – integration with Maximo/GIS planned. • Ongoing programme to implement and enhance smart monitoring, including near real time analysis. • External data sources already integrated through project development GIS work – to be expanded based on digital roadmap.
Recommendation 2: Maximising the Value of Data – Government and Ofgem should direct the sector to adopt the principle that Energy System Data should be Presumed Open, using their range of existing legislative and regulatory measures as appropriate, supported by requirements that data is 'Discoverable, Searchable, Understandable', with common 'Structures, Interfaces and Standards' and is 'Secure and Resilient'.	• Principle of Open Data aligns with stakeholder led business plan, and SHE Transmission is engaged with ENA Data Working Group on common industry approach. • Data and Analytics capabilities to be utilised to validate and enrich data, and to maximise opportunities from internal and external data sets. • Cyber Security is addressed in ongoing work and the Cyber Resilience Plan, and through current practice and ongoing improvements in IT security. • Envisage using Registration for all specific data requests beyond public layer. Access control would be determined on the basis of user type.
Recommendation 3: Visibility of Data – A Data Catalogue should be established to provide visibility through standardised metadata of Energy System Datasets across Government, the regulator and industry. Government and Ofgem should mandate industry participation though regulatory and policy frameworks.	• SSE Group is evaluating Data Catalogue models, with some clear front runners emerging. Assessment is across the full electricity supply chain. • As above, the use of Common Information Model, or alternative data standards and catalogue approach will be a focus of ENA Data Working Group.
Recommendation 4: Coordination of Asset Registration – An Asset Registration Strategy should be established to coordinate registration of energy assets, simplifying the experience for consumers through a user-friendly interface in order to increase registration compliance, improve the reliability of data and improve the efficiency of data collection.	• Primary focus will be participation in the ENA Data Working Group, to ensure coordinated approach. • Existing standards and reporting approaches, e.g. regulatory reporting will inform approach. • Opportunity for consistent approach to increase data sharing for asset condition and reliability.
Recommendation 5: Visibility of Infrastructure and Assets – A unified Digital System Map of the Energy System should be established to increase visibility of the Energy System infrastructure and assets, enable optimisation of investment and inform the creation of new markets.	• SHE Transmission's Digital Vision directly addresses this recommendation, including digital twins, metadata maps, and geographical based access/searching, and ultimately sharing and/or integration with IoT data sources. • A system digital twin already exists between NGESO, NGET, SPT and SHET for system, power flows, etc., based on models used for annual strategic planning processes. • Engage actively with the ENA Data Working Group to develop a common Digital Systems Map

Digital Strategy Model

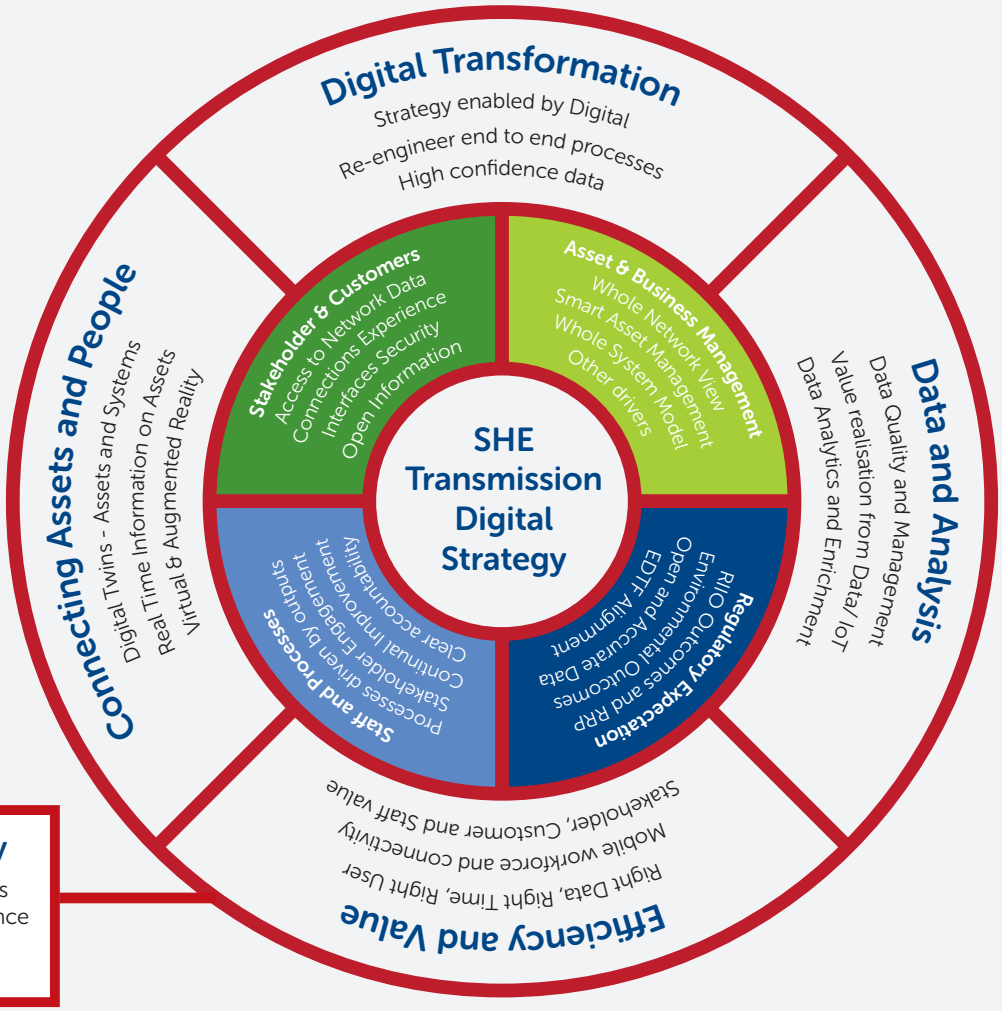
Building on the development of a single source of truth for all asset data, SHE Transmission has an ambitious vision for RIIO-T2 to make appropriate data accessible to all stakeholders in a timely manner, through a contemporary interface. In simple terms this interface will be the 'Network on your phone', which gives stakeholders access to data in the manner expected today.

While the functionality will be the same, 'phone' can mean anything from a smartphone, through tablets, desktops, etc., up to large touchscreens used in meeting spaces. The development of this interface is included in our RIIO-T2 Business Plan, and scoping and proof of concept is planned to be completed by the end of RIIO-T1, which will determine the breadth of integration, and which datasets will be shared within the RIIO-T2 timeframe.

How this interface overlays existing and planned applications, which solve specific business or technical issues will be laid out in the Digital Road Map, which is under development and will be published in spring 2020.

The process model below includes two segmented circles, the inner one captures the key users and business functions which the digital strategy must support, and the outer one defines the high level activities, to be elaborated in the digital roadmap, which form the main digital workstreams.

The red borders on all segments highlights the constant thread of cyber security, to ensure that SHE Transmission's systems and data are secure, and that information is shared in a secure manner with both internal and external users.



Cyber Security

- Changing Threats
- IT/OT Convergence
- Asset Discovery
- User Profiles

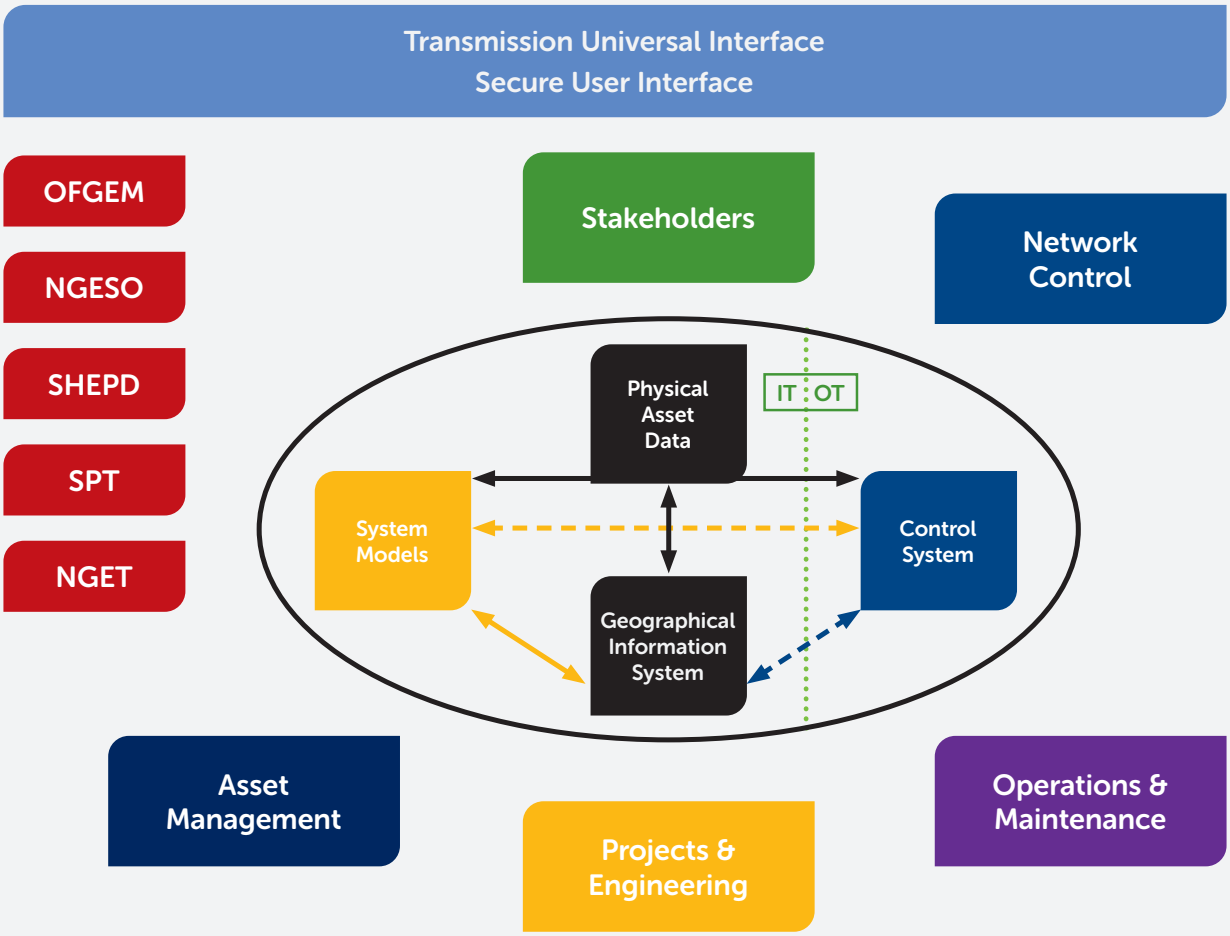
Digital Vision Model

SHE Transmission's digital vision is based on having a single, validated source of network data, as a central core, which is accessed by applications to enhance the value of the data through processing, analytics, merging with IoT data, and alignment to stakeholder requirements. New and additional data, e.g. new inspection information, is added to the data core through specific applications.

The data core is controlled by Asset Management, with system models (for technical validation and planning), and operations models (for network control) built on the asset data. The data core must be complete (or at least high confidence) first. Specialist systems and tools in each business area interface with the core, either adding data or using core data to give outputs. Above these internal and secure systems, there will be a single portal for all stakeholders, customers and users (including internal teams), which will enable secure and timely access to appropriate data for each group or specific user. This will be the 'network on your phone' interface, and will give all users a contemporary and accessible window for the data they require, replacing manual and complex systems which are both time consuming and often less than user friendly.

Direct system interfaces exist with key partners in the electricity sector, primarily the System Operator, other Transmission Operators, and the Distribution Network Operator for our geographic area. There are existing data exchange routes to these partners, and these will be developed as part of the digital plan.

General visibility of core data and outputs is via the 'Transmission Universal Interface' which allows all users defined levels of secure access commensurate with system rules and user requirements.



Conclusion

SHE Transmission has established a dedicated Digital Team to define strategy (this document), roadmap (spring 2020), and detailed implementation plans (some already developed and in progress), for all digital activities.

This team will also coordinate and manage these activities, and continually review and improve the digital strategy and plans, based on internal and external stakeholder engagement.

SHE Transmission is committed to the principle of open data, and believes that this will directly enable our stakeholder led RIIO-T2 Business plan, and enhance our relationships with all stakeholders and customers. It will also enable our teams, and provide significant opportunities for training and collaboration, improving efficiency and ultimately value to consumers.

SHE Transmission has an ambitious digital vision, which is designed to bring data management, systems, and stakeholder interfaces right up to date – a step change from some legacy systems. This vision, along with more detail on processes, systems and integration, will be expounded in the digital roadmap in spring 2020. This will show our path for implementation prior to and through the RIIO-T2 period, resulting in a digitally enabled SHE Transmission business. This will be the foundation of a fully digital plan for RIIO-T3.

Digital Collaborative Event

The Energy Networks Association will host a collaborative event for network companies, customers and stakeholders in March 2020. This will be an opportunity to hear more about the strategies of the network companies, to provide feedback on these strategies and how they can meet user requirements.

Details will be posted here: **http://www.energynetworks.org/events/**, and will include location and timing, and registration information.

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Scottish & Southern Electricity Networks

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