RIIO-T3 Load Strategy

SP Energy Networks
RIIO-T3 Business Plan

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1. Introduction

Our RIIO-T3 Load strategy has been established to ensure that our transmission system will enable our Net Zero future both within the RIIO-T3 period and beyond. In this Annex you will find each of the sections within the structure below, in addition to a number of our further key considerations while creating our RIIO-T3 Load Strategy.

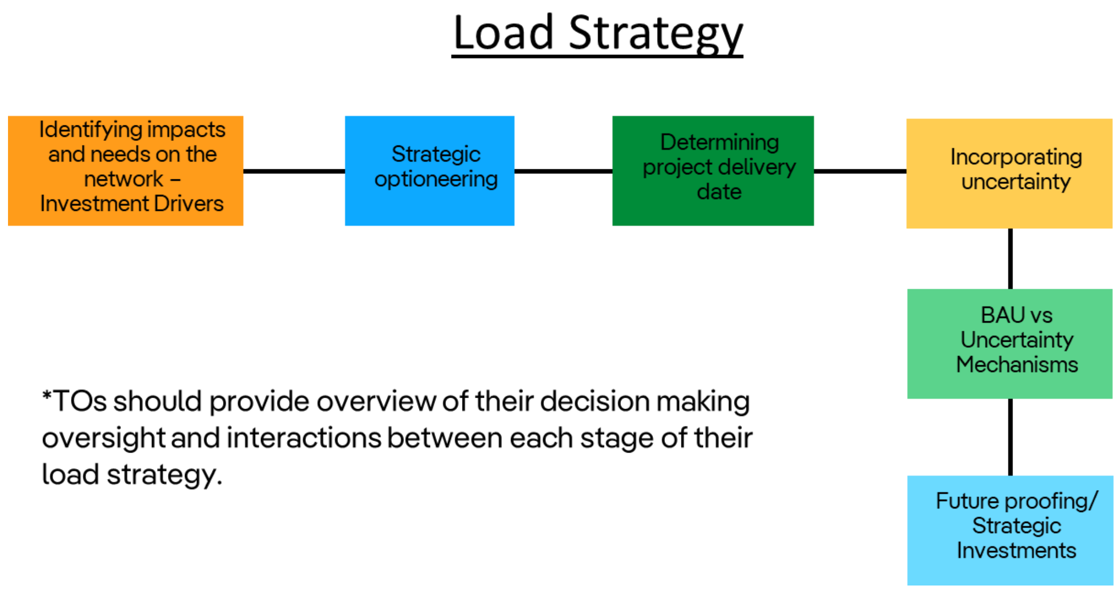


Figure 1 - Load Strategy Structure from Ofgem's RIIO-3 Business Plan Guidance

This strategy will show how we have established our investment drivers through our own connections analysis, coupled with projects identified through the Pathway to 2030 and Beyond 2030 reports, the Future Energy Scenarios and the UK and Scottish Governments' targets, including ambitions on achieving a clean power system by 2030. We have identified a number of key sites and routes that are required to be either built, uprated or extended to accommodate both local generation, and demand connections, and the bulk power transfer required across Scotland and into England.

Rigorous optioneering has been completed to ensure the best options are being taken forward, with our standard network planning processes, internal governance and assurance continuing to ensure our high standards of work throughout. Throughout our strategy we have ensured that we have the ability to continue to develop our system over time as further needs and drivers strengthen. This is particularly prevalent at this time, where there is a high level of change in terms of policy, markets and technology, therefore it is essential to incorporate these uncertainties.

Key to ensuring the flexibility to meet the needs of the industry, our plan relies on uncertainty mechanisms and reopeners in place to cover any eventuality and respond as required to changes. These are detailed within this strategy.

Our Load Strategy looks to balance futureproofing of our system, ensuring that Strategic Investment is a key factor in the design and development of all of our projects to the benefit of current and future GB consumers, whilst ensuring we deliver on our licence obligations to maintain an SQSS compliant, economic, efficient and coordinated transmission system of the Net Zero future.

We also include a section highlighting our projects that would be suitable for competition based on criteria set out by Ofgem and discussion on each of the projects included.

2. Statutory and Licence Obligations

SP Transmission plc (SPT) is licenced under the Electricity Act 1989 to transmit electricity, and is required to fulfil the following statutory duties within its licence area:

- To develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and
- To facilitate competition in the supply and generation of electricity.
- These statutory duties are reflected in SPT's transmission licence. SPT has the following obligations pursuant to its licence conditions:
    - To at all times plan and develop its transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and in so doing take account of The National Energy System Operator's obligations, as system operator, to co-ordinate and direct the flow of electricity on, to and over the GB transmission system (Licence Condition D3); and
    - To make its transmission system available for the purpose of conveying, or affecting the flow of, electricity and to ensure that the system is fit for purpose (Licence Condition D2).
    - To coordinate and cooperate with transmission licensees and electricity distributors in order to build a common understanding of where actions taken by one transmission licensee or electricity distributor could have cross-network impacts (Licence Condition D17).
    - To at all times have in force and comply with the System Operator - Transmission Owner Code (STC) (Licence Condition B12); and
    - To have in place and maintain a methodology for Network Asset Risk Metric (NARM Methodology) (Special Licence Condition 9.2).

The STC contains further obligations related to plant maintenance, including the requirement for adherence to Good Industry Practice in the provision of transmission services. In response to statutory and licence obligations upon it, SPT therefore requires to ensure that the transmission system is developed and maintained in an economic, coordinated and efficient manner in the interests of existing and future electricity consumers.

The establishment of the National Energy System Operator (NESO) in the October 2024 was a welcome step in the industry. SPT has and will continue to support the NESO in fulfilling their roles by proactive engagements, strategic planning and transparent knowledge sharing. Such close and effective coordination will be reflected in our load strategy planning as well in project delivery such as outage management.

Section 38 and Schedule 9 of the 1989 Act also impose the following duties on SPT when formulating any relevant proposals:-

- To have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and
- To do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

In terms of its statutory and licence duties, SPT must therefore balance technical, cost (economical) and environmental factors.

3. Overarching Decision Making Processes

3.1 Introduction

We place the safety of the public, our employees and contractors at the forefront of everything we do on the network both during and after installation. We aim to fulfil our obligations to our customers and our shareholders by providing an optimised portfolio of assets consistent with our statutory and licence obligations. Our business plan is based upon an asset strategy that seeks to strike the best balance for our customers; maximising availability of the network to provide the best standard of service possible and minimising the level of investment required to maintain that standard.

Our investment management and governance process intrinsically links our business plan with our externally accredited ISO55001 Asset Management processes. We continually evaluate our network to ensure it operates at optimum performance levels and provides our customers with the continued standard of service and supply they have come to expect of us. Financial and technical governance processes are applied throughout to ensure that the activities we conduct on our network are appropriate and reflect the needs of our customers. Figure 2 below provides a simplified representation of the linkage between our planning, investment and governance processes.

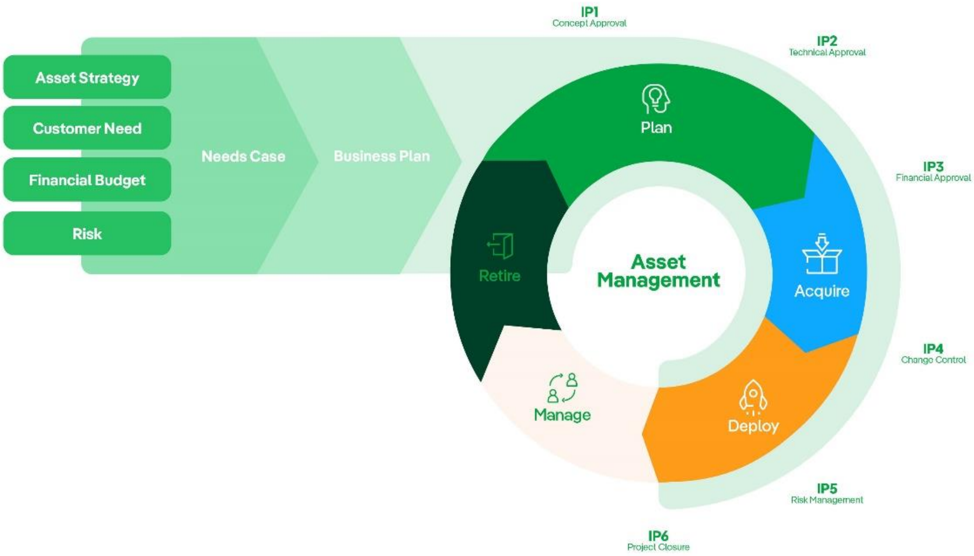


Figure 2 - Planning, Investment and Governance Processes

The purpose of this section is to describe our capital investment decision making process. The asset management undertakings associated with existing assets, namely Inspection and Maintenance (I&M) activities are fully explained in our Network Asset Management Strategy Annex.

Many of our operating sites have specific and unique considerations. This document does not provide an exhaustive list of all the activities we conduct, but rather provides a representation and assurance of the types of activities we undertake, and the range of aspects to which we give consideration during the evaluation of any proposed works.

SP Energy Networks as part of the Iberdrola group is governed by group policies. The group has a formal investment approval process which underpins the delegated approval of investments.

Price control period investment decisions are subject to a rigorous group governance process. This includes an investment dossier which is prepared following the price control final determination. A price control investment dossier is approved at board level and formalises the delegated authority of the SPEN Executive team for the relevant price control period.

Within SPEN an investment approval process operates on a project by project basis with authorisation, subject to delegated authority levels, by an Investment Review Group (IRG) which maintains overall oversight of investment governance at an executive level. This section describes this project by project process.

It should be noted that with the scale of the development of the system required over the RIIO-T3 period, as described in the 'Embedding Digitalisation and becoming a Data Driven Organisation' section of our business plan, going forward we will develop and deploy increased digital solutions, including increased data and monitoring, that will support our investment planning and governance processes.

3.2 Process Overview

As outlined in the introduction, our investment decisions are founded upon the ISO55001, a robust asset management lifecycle process that is widely used throughout industry. We employ a series of stage gates in our process to ensure we correctly evaluate, challenge and ultimately deliver the best balanced solution for all our stakeholders. We provide strong governance and control of our investment process in the shape of stage gates. That process is shown in Figure 3 below providing a graphical representation of the main elements of our stage gate process. Each stage is governed by a range of senior managers across the business, with IP1s and IP2s being prepared by our design function but challenged and approved by the Transmission System Review Group (TSRG), comprising technical experts from across SPT, including members Design, Delivery, Outage Planning and Operations. IP3-1 onwards are approved at director level by the IRG, with pre-approval from the Planning Authorisation Meeting (PAM), comprising members of the Design, Delivery, Regulation and Finance teams. Authorisation across all relevant transmission business functions ensures that each decision is taken correctly and at the right time.

Figure 3 - SPT Stage Gate Process

Development of our business plan starts with the identification of a network need, in other words a requirement to conduct activity on the network. These needs generally arise from:

- Customer request - a new connection to the network;
- Changes to the power flows on the network due to changes in generation or demand patterns - a modification to the network for compliance with the various standards;
- Maintaining the reliability of the network – ongoing monitoring of network assets to determine their condition, and;
- Legal, safety or environmental requirements – if assets present an unacceptable risk.

We consider many factors to determine the significance of each network need and this early stage of the process is a development idea until it passes the Concept Approval (IP1) stage gate. At this stage the idea becomes an actual project having passed the first stage of validation.

We then complete a Technical Approval (IP2), evaluating the available options to satisfy the network requirement which, where applicable, will be supported by a Cost Benefit Analysis. Upon agreement of the most efficient solution, approval for initial funding for the project is then sought using the Pre-Construction Development (Seed) Funding approval (IP3-1). Approval at IP3-1 stage is a significant project milestone essentially moving the project from Concept/ Design into the Delivery Phase, allowing preliminary works to commence and spend to be incurred on the project.

Development of the System Construction Authorisation (SCA) document defines the full extent and design intent to be undertaken during the Delivery Phase. This is a key step in our process following approval of IP3-1 that helps solidify the necessary expenditure requirement, in preparation for Full Funding approval (IP3-2), prepared by the project-specific delivery team.

It is not unusual for the approved project Scope of Works defined in the SCA document to require some modification through the duration of the project. The timescales involved in delivery of transmission projects can be significant. During project delivery a lot can happen both on the network itself and with other outside influences that may impact on the planned activity of an already approved project. For this reason, we have a change control approval mechanism (IP4) to facilitate and approve any deviations from the original planned scope, regulatory volumes, and financial deviations. In addition, every project runs with a degree of risk. We approve the risk allocation as part of the total project funding at IP3 stage. The drawdown of that available risk funding requires Risk Management (IP5) approval, which includes director level approval. Upon completion of the site works, our Project Closure Process (IP6) ensures that the project is complete both technically and financially.

At each stage two fundamental questions are posed:

Is this network need still valid? and;

Does the option being proposed today offer the best available balance of all the factors?

Proposals must pass these two tests first before any further considerations.

3.3 Project Evaluation Factors

We consider numerous data sources and consult with a variety of stakeholders before formulating a final project proposal that seeks to strike the best balance for all stakeholders across all the factors at play. Figure 4 below outlines the main factors we consider. There are instances where time sensitive works may present other prevalent factors not outlined here.

Figure 4 - Project Evaluation Factors

3.3.1 Safety

As stated previously, safety of the public, our employees and contractors is at the forefront of everything we do on the network both during and after installation. Our management system is externally audited and certified to OHSAS 18001/ ISO 45001 Occupational Health and Safety management standard. Throughout the evaluation of any proposed works, we give consideration to how those works will be conducted and seek to identify all the potential safety hazards and risks resulting.

3.3.2 Environmental

As a business we are a leader in sustainability, which is critical to our long-term success. Our management system is externally audited and certified to 'ISO14001: Environmental Management System' standard. We also rely on a sustainable supply chain and work extensively with our contract partners and suppliers to achieve that aim. During the initiation of any proposed works, we consult with landowners, statutory authorities, contractors and other interested parties to identify optimal working methods and access routes that minimise both the environmental effects of our works, visual impacts and the short-term disruption, before making any firm proposals. We utilise the biodiversity mitigation hierarchy at every project site – 'avoid, minimise, restore, offset, enhance'. Through this, we ensure we have a net positive impact on nature at our sites, targeting 10% enhancement of biodiversity for every project.

To reduce the embodied carbon associated with construction, we work with our supply chain to utilise low carbon construction materials such as HVO biodiesel and low carbon concrete, as well as ensuring our designs use materials as efficiently as possible. Efficient designs, combined with circular economy principles during construction, allow us to reduce the volume of waste created, reuse waste where possible, and recycle any other waste. By 2030 we aim to reuse or recycle 100% of our waste, sending none to landfill.

3.3.3 Regulatory

Our network forms part of the UK National Infrastructure facilitating life-critical supply of electrical energy to serve 3.5 million customers within our own geographic operating areas and millions more through our connections to the wider UK electrical infrastructure partners. We take that responsibility extremely seriously. We continuously challenge ourselves to exceed regulatory performance targets and to outperform the allowances afforded us in the regulatory settlements.

3.3.4 Operational

We already achieve a high standard of operational service for our customers and we aim to maintain and improve that service standard. To do so we evaluate our network risk and quality of service metrics to identify areas of our network that would, if unaddressed, fall below the high standards we set for ourselves. In evaluating proposed works, we consider items such as the potential operational impacts on our network from any proposed works, in terms of reducing energy not supplied and we seek to manage network risk. Additionally for any proposed works we consider the duration of those works, the feasibility of obtaining an outage, resourcing internally, and also from our contractors. The system planning process is a single activity for asset management and system development needs with a single business owner. Individual proposals will consider the condition of existing assets that are relevant to the project. Where intervention on existing assets is required in the timescales of the project or can be achieved during the project's outages, avoiding future constraint costs, due consideration is given to the integration of asset health related works. This approach is also described in the Network Asset Management Strategy annex.

3.3.5 Legal

We are committed to operating ethically and to provide the necessary services to our customers within the operating confines of UK and international laws. In the context of our proposed works, land access and consents is one of our key considerations, we work extensively to minimise the effect of our project works on landowners/occupiers and work with all relevant authorities to achieve an appropriate the best overall solution for all relevant parties, whilst maintaining compliance with all relevant legislation and contractual terms entered into.

3.3.6 Financial

Capital expenditure and enduring operating costs of any equipment installed are key considerations. Since these costs are ultimately borne by consumers and have a direct impact on the performance of our business, we seek to minimise the costs incurred to satisfy the defined need. A high level financial assessment is undertaken at concept stage to provide an assurance that any proposed project financially viable before incurring any additional expenditure. We re-evaluate project financing at each approval stage and always seek to minimise the cost whilst also fulfilling the requirements of the other factors noted.

Using the information obtained from each area above the long list of appropriate solutions is identified. These solutions will then be subject to further Cost Benefit Assessment.

3.3.7 Whole System

Our strategy depends on our ability to work together with other sectors and vectors. We make sure collaboration is at the heart of our Whole System approach and use our Whole System cultural change programme and engagement with Strategic Partners to challenge our thinking, support knowledge exchange and facilitate best practice.

Throughout RIIO-T3, we will measure progress through our published Whole System Electricity Coordination register and our own internal tracking. We will collaborate with our Strategic Partners and utilise our Strategic Optimisation function to challenge ourselves against new and existing activities in support of our Whole System Strategy. We have summarised in the table below some key activities:

Table 1 Whole Systems Activities

Continue to deliver through RIIO-T3	Expanded activity for RIIO-T3
Deliver better Whole System outcomes through working collaboratively across both our transmission and distribution licenses. We will evidence this through Electricity System Licence condition SLC-D17 through the annual publication of our Whole System coordination register.	We will work together with other network operators and NESO to exchange knowledge, experiences, and best practice related to the Whole Electricity System and identify policies and process that support Whole System approaches and outcomes.
Engage with stakeholders through ENA Open Networks, Scotland's Whole System Charter, and our Strategic Partnerships.	We will identify a further Strategic Partner for transmission to identify gaps in our collective knowledge and to bring new experts into the group. This will support identifying additional collective benefit and push the boundaries of Whole System approaches and expand collaboration to capture Whole System thinking and decarbonisation pathways for different sectors and vectors.
Work with Local Authorities and Local, Regional and National Government through our Strategic Optimisation function to support the development of their energy plans and reflect those plans in our network planning for transmission and distribution.	Establish a formal process to reflect local and regional ambitions into our own plans across transmission and distribution and capture Whole System thinking and decarbonisation plans beyond the energy sector.
Embed Whole Systems thinking into our culture and support our staff with applying Whole System thinking day to day through internal training, workshops, and changes to our working policies and processes.	Further build on our Whole System cultural implementation though our Whole System team who will be responsible for bringing SP Energy networks on a cultural transformation journey.

Throughout RIIO-T3, we will continue to embed a Whole System culture within our organisation – from improved communication and coordination with other sectors and vectors, to having a greater understanding of what is going on outside of our organisation. We will grow our Whole System capabilities to support our Whole System transformation and enable Whole System coordination across our transmission boundaries.

During RIIO-T3 we will continue to:

Collaborate with the other Transmission Owners (TOs) and the NESO

– Our relationship with the TOs and NESO is part of the core function of what we do. This relationship drives whole system thinking through a joint understanding of the electricity system and its interaction. The SO:TO incentive is one mechanism which enables us to identify and co-optimise Whole System solutions with the NESO in order to reduce constraint costs and innovate processes and outage planning approaches. Due to the NESO holding the contracts for all connected parties to our system, the NESO provides the treatment of flexibility on the system, however we engage with the NESO and the other TOs on how flexibility is incorporated in our network planning processes.

Coordinating with our Distribution Licenses

- We operate and plan our network maintaining the close relationship we have with our SP Energy Networks colleagues in our distribution businesses and our integrated transmission and distribution control room. We collaborate with our distribution licence in Scotland when identifying solutions to solve constraints to determine the optimal Whole System approach, including incorporation of the DNO assessment of flexibility.

Working with wider stakeholders

- We have established a Whole System and Strategic Optimisation function to support our engagement with our stakeholders and incorporate their plans and understanding into our own plans and build on our knowledge and capability beyond our network. We use these relationships as a method to share knowledge and understanding whilst supporting our stakeholders' own ambitions. More information can be found on our Whole Electricity System Coordination Register about our projects with other electricity licensees and on our Whole System and Strategic Optimisation website about our plans with stakeholders beyond the electricity sector.

3.3.8 Cost Benefit Analysis (CBA)

For our RIIO-T2 plan, a common Cost benefit analysis (CBA) model was created and utilised by SPT as well as fellow licensees. CBA is a set of practical procedures for guiding investment decisions. The analysis provides decision makers with an understanding of the potential effects, trade-offs and overall impact of options. Costs and benefits are analysed and discounted over a specified time period to provide an output in the form of a net present value (NPV). Utilising this appraisal process provides a greater level of consistency, clarity of the different options available.

Where appropriate, we are using the CBA model issued by Ofgem in RIIO-3, which has been refined and developed since RIIO-2, where the 'Spackman' approach annualising capital costs using the weighted average cost of capital (WACC) and utilising the social time preference rate (STPR) to discount all costs and benefits-excluding Health and Safety which is subject to its own separate discount rate.

Our CBA on the shortlist options will be evaluated along with the Critical Successes Factors including:

- Fits into overall business strategy
    - Safety and Reliability
    - Quality
    - Creation of Sustainable Value

- Innovation
- Customer Focus

- Deliverability / Achievability / Operation and Maintenance
- Whole life Value for Money
- (Load Specific) Network Capacity
- (Non-Load): Network Risk

Whilst the majority of our projects included within our RIIO-T3 plan are supported by CBAs aligned with Ofgem's CBA model, projects in the following categories do not:

- Live projects rolling over from RIIO-T2, since they have already initiated, with decisions made during the previous price control.
- Customer connection projects, as the proposed approach is based on agreement with the connecting party as they will bear a sizable proportion of the costs incurred.
- TO Reinforcements associated with new connections, where the options considered are evaluated purely based on the lowest cost solution, which meets the project objectives, as the benefits are all comparable.
- Projects justified through the Network Options Assessment, Holistic Network Design or transitional Centralised Strategic Network Plan (tCSNP2), as these are subject to an extensive and rigorous CBA process by the NESO who can consider market options, and different options which may be offered by TOs.

3.3.9 Stakeholder Engagement

In Scotland, the current requirements for public consultation in relation to applications for consent are not prescriptive. However, the UK Government are currently consulting on changes to the Scottish electricity consenting regime which will include statutory requirements for Pre-Application Consultation (PAC) with stakeholders and communities. We already have a well established approach to consultation with all parties who have an interest in projects, in accordance with accepted good practice, and far exceed the minimum requirements for PAC being proposed by both UK and Scottish Ministers. This includes preparation of a Consultation Report which sets out the feedback received throughout the process and how we have responded to this. We engage with stakeholders at the following key stages:

- Pre-project notification and engagement
- Information gathering
- Obtaining feedback on emerging corridors, line routes and substation sites

The Environmental Impact Assessment stage (EIA): The results of the early stages of stakeholder engagement are taken into consideration and used to confirm the 'proposed route' (and substation site if relevant) for progression to detailed engineering design, a key part of which is EIA. As part of the EIA, we undertake further consultation, including additional environmental and community information gathering, and the preparation of a publicly available Scoping Report which accompanies a 'Request for a Scoping Opinion' to the consenting authority as to the information to be provided in the Environmental Statement, including the proposed assessment methodologies.

Our approach ensures that meaningful engagement is carried out with all stakeholders who have an interest in our project. We use this feedback to test and review assumptions made during both initial site/route optioneering and through the detailed engineering design process, demonstrating how this feedback has influenced our proposals as part of the statutory consenting process for the project.

3.4 Resilience

The resilience aspects which are considered in the planning process include:

- Cyber security resilience: our Cyber Resilience Business Plan (a confidential annex) sets out our strategy and the enduring capabilities we will deliver to ensure ongoing compliance with the Network and Information Systems (NIS) Regulations, centred around the appropriate and proportionate management of risk during the lifecycle of assets and systems that support the transmission infrastructure.
- Physical security: new developments are assessed for physical security risks and measures are designed-in which reflect the relative vulnerability of the site and its criticality. This is described in our Network Asset Management Strategy Annex and the EJPs associated with physical security works in RIIO-T3.
- Climate Resilience, discussed in Section 3.4.1.

3.4.1 Climate Resilience Strategy

Our Climate Resilience Strategy annex provides a detailed explanation of our strategic approach to assessing and improving the resilience of the existing network and the principles applied to the design of new assets. The strategy details how we have assessed the climate risks that pose a threat to the transmission network and the adaptation solutions and pathways which will mitigate the impacts of the climate risks. This work informs the design of new infrastructure to ensure that climate variables are adequately considered in the siting of infrastructure, the specification of equipment and the specific measures in the design of substations, overhead lines and cables.

3.5 Our assurance Framework

As detailed above, our thorough process and the robust governance would safeguard sound investment decisions. In addition, our assurance activities would be deployed wherever appropriate and required.

3.5.1 Risk Assessment Methodology

We have Data Assurance Governance (DAG) and Enterprise risk reporting methodologies in place to assess the risks of our investment decisions and business plan. It has been in our integrated practices that such assessment covers the decision as well as the whole process, ensuring that we have full conversations of all potential risks. The risk assessment will serve as the direct input to guide the assurance measures: the higher the score, the more extensive the assurance.

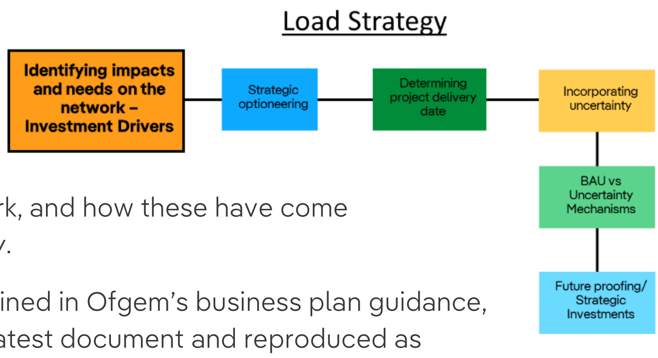
3.5.2 Our Assurance Activities

The assurance activities can include:

- Challenge from independent internal and/or external experts
- Challenge from our internal Assurance team
- Internal Audit team

It should be noted that we do not limit our external assurance work to only high and critical risks: where we believe that there was opportunity for an external expert to validate our work and therefore increase the confidence of our consumers and stakeholders in the accuracy and robustness of our decision, we would make sure that we take it.

4 Identifying Impacts and Needs on the Network – Investment Drivers



This section details the different investment drivers we consider while planning our network, and how these have come together to form the basis of our load strategy.

The different Load Investment drivers are outlined in Ofgem's business plan guidance, highlighting the following in Figure 2 of their latest document and reproduced as Figure 5:

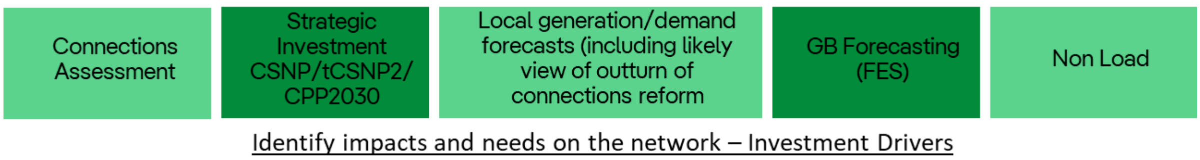


Figure 5 - Ofgem's Load Investment Drivers

4.1 Planning Scenarios

We start with GB forecasting (FES). The basis of our plan is the FES 2024 Holistic Transition. This is agreed with Ofgem through their SSMD publication for use by all three GB TOs.

This pathway has been specifically selected as it sets out how we will achieve Net Zero by 2050 using a balance of electrification and hydrogen to get us there. The general development of the FES considers cross sector factors – covering energy as a whole, therefore provides a whole system view of the requirements to achieve Net Zero. Included in these factors is flexibility, across all of the system, therefore due to this flexibility is included within the basis of our plan.

4.1.1 FES 2024 – Generation

As it currently stands, the SPT contracted position totals over 78GW of new connections activity, dominated by new generation but predominantly battery storage. The FES 2024 Pathway requires that less than 30GW of generation is connected within the SPT area by 2050, therefore the generation queue is significantly over-subscribed. This over-subscription is primarily battery energy storage – with almost 10x the capacity contracted within area against the FES 2024 Holistic Transition Pathway 2050 position.

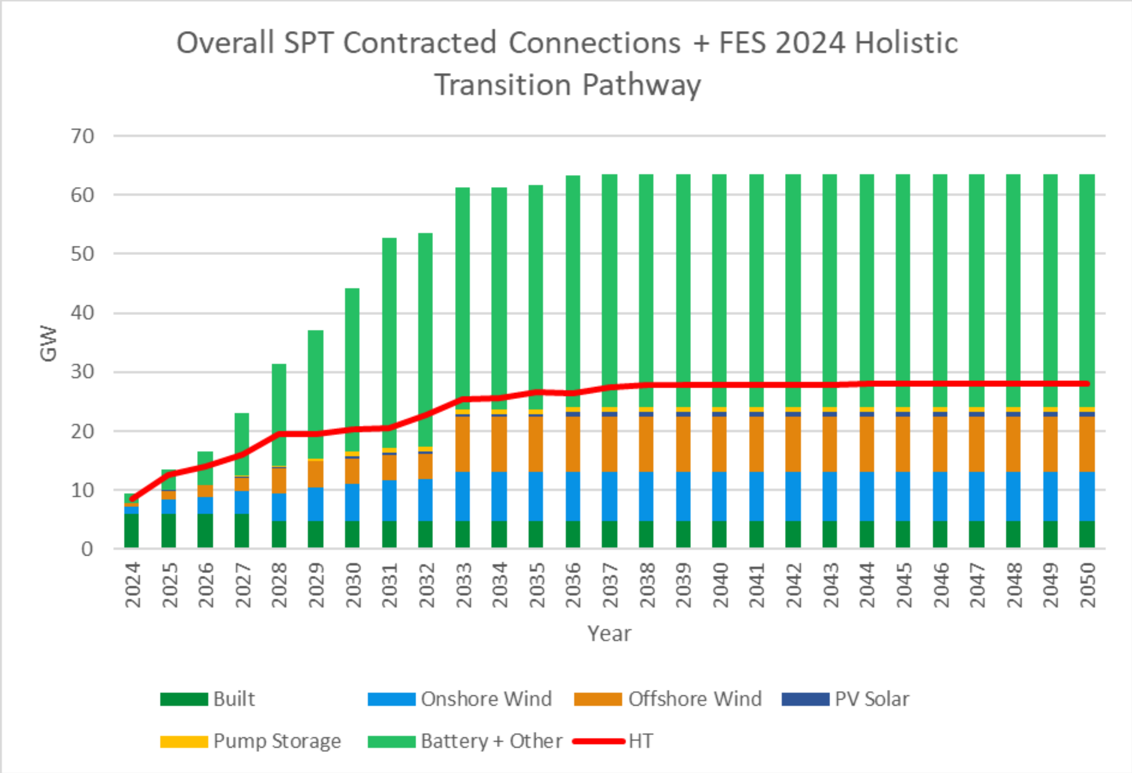


*Figure 6 - FES 2024 and SPT Contracted Queue**

*Generation and storage only, based on the NESO's TEC Register as of October 2024.

The generation profile provided by the FES provides us with a tool to inform our investment plans – feeding into our connections triage analysis to target key nodes/circuits on the system that will be required to enable the level of generation required for Net Zero.

4.1.2 FES 2024 – Demand

FES2024 Holistic Transition Pathway shows that to get to Net Zero by 2050, the overall demand within the SPT area will increase.

Underlying residential demand, shown specifically in the graph below, will decrease due to greater efficiency in home and in our devices.

Electrification of heat and transport, excluded from underlying residential demand will be the biggest impact on the GB peak (the time at which demand across the GB system is at its highest), with electrical vehicle uptake and use of heat pumps throughout the RIIO-T3 period increasing. Electric vehicles become the biggest impact on peak demand by mid 2030s. The FES assumes that batteries do not have an impact at peak demand, due to flexibility assumed to achieve Net Zero goals.

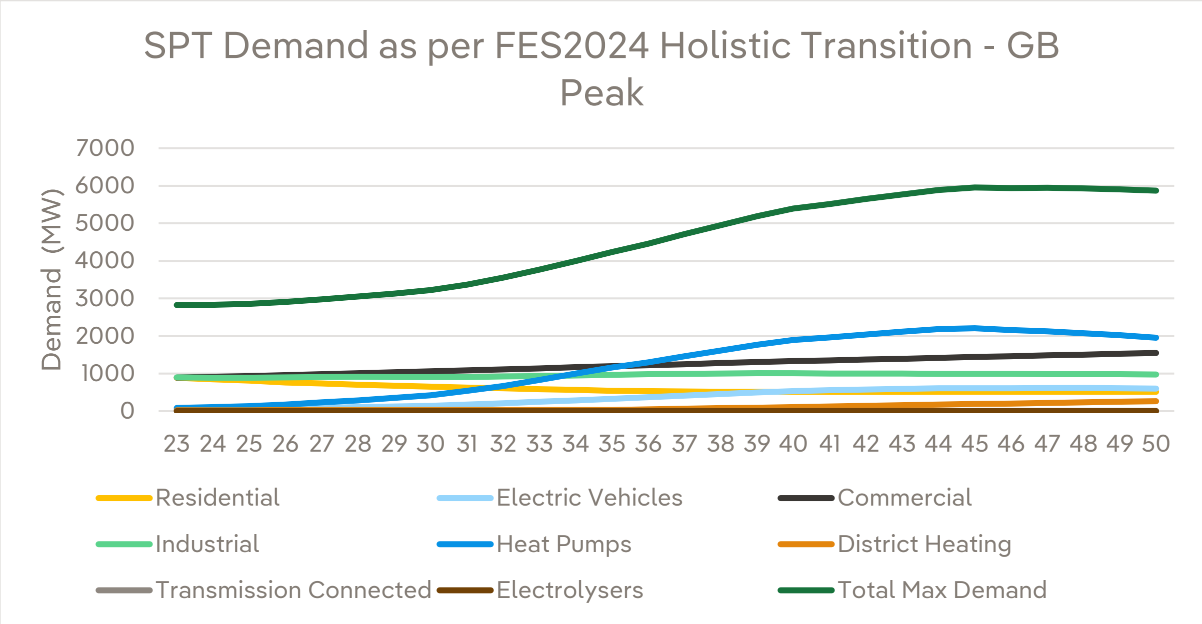


Figure 7 SPT Demand as per FES 2024 Holistic Transition at GB Peak

Within the SPT area, the installation of electrolysers required to produce green hydrogen, both directly connected to the transmission system or via the distribution system are minimal in this pathway, however their impact is seen at the GB Minimum – creating new demand at times of demand lows. Batteries also increase minimum demand by being in charge mode at this time.

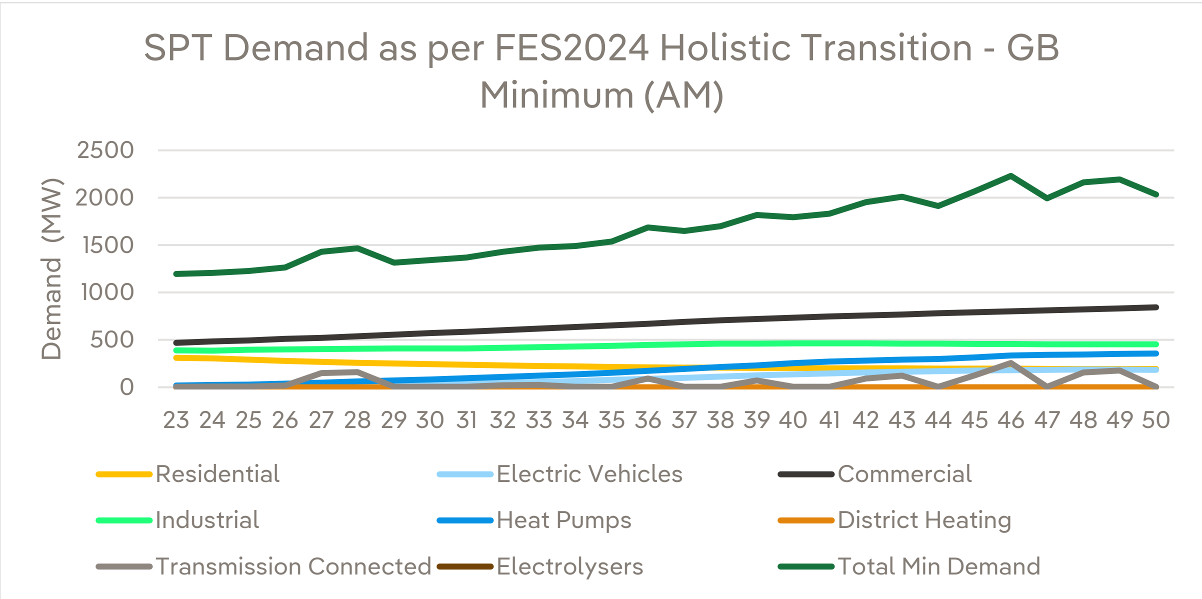


Figure 8 SPT Demand as per FES 2024 Holistic Transition at GB Minimum

4.1.3 Distribution Future Energy Scenarios (DFES)

Local generation/demand forecasts (including likely view of outturn of connections reform

The NESO's national FES provide us with a good view of the future Transmission connected demand and generation, however, to have a more granular local view of each of the GSPs connected to the system, we look to SPD's DFES. This view allows more targeted, coordinated working with SPD, ensuring that we take their future requirements into account whilst investing in our network, ensuring a whole system approach. Where we are constructing large new strategic substations, the DFES is used to determine if there is a driver for a new GSP to be included within the layout. This ensures the network is appropriately sized (in terms of substation layout and equipment ratings, for example) for the needs of the distribution customers in addition to the transmission requirements. It should be noted that the DFES are established with a focus on flexibility availability, both current and forecast, to help minimise any over-investment in both distribution and transmission networks.

One example of this alignment is the new Grid Supply Point (GSP) that is included within our new Redshaw 400/132kV substation – it was recognised at the time of initial design that there were distribution generation capacity constraints in the area, therefore a new GSP has been included within our substation designs since its conception.

We continue to proactively work with SPD to plan for future capacity across the transmission and distribution boundary, ensuring that new capacity is appropriately developed, sized and located over time to meet the needs of all customers. This joined up planning is particularly important at a time where the DFES indicates that demand is expected to increase in the coming decade due to decarbonisation of heat and transport.

4.1.4 FES 2024 - Overall Impact

Strategic Investment CSNP/tCSNP2/ CPP2030

Although overall demand will increase to achieve the Net Zero goals, given the abundance of wind resource in Scotland, the level of generation capacity in Scotland, based upon the FES, will always be significantly higher than the demands in the same area.

In order to meet the GB wide goal of Net Zero, this excess of generation requires to be transferred in bulk across the country to demand centres in the south. The FES 2024 provides a guide on the level of investment in wider system reinforcements required to facilitate these bulk power transfers by determining the requirements over the system network boundaries. A key system boundary lies in the south of the SPT area – connecting the SPT network with the north of England, B6. The following shows the maximum required transfers over this boundary, but the pattern is largely consistent across all northern boundaries – requiring additional investment across the full GB system to enable bulk power transfer from areas of high generation capacity to areas of high demand.

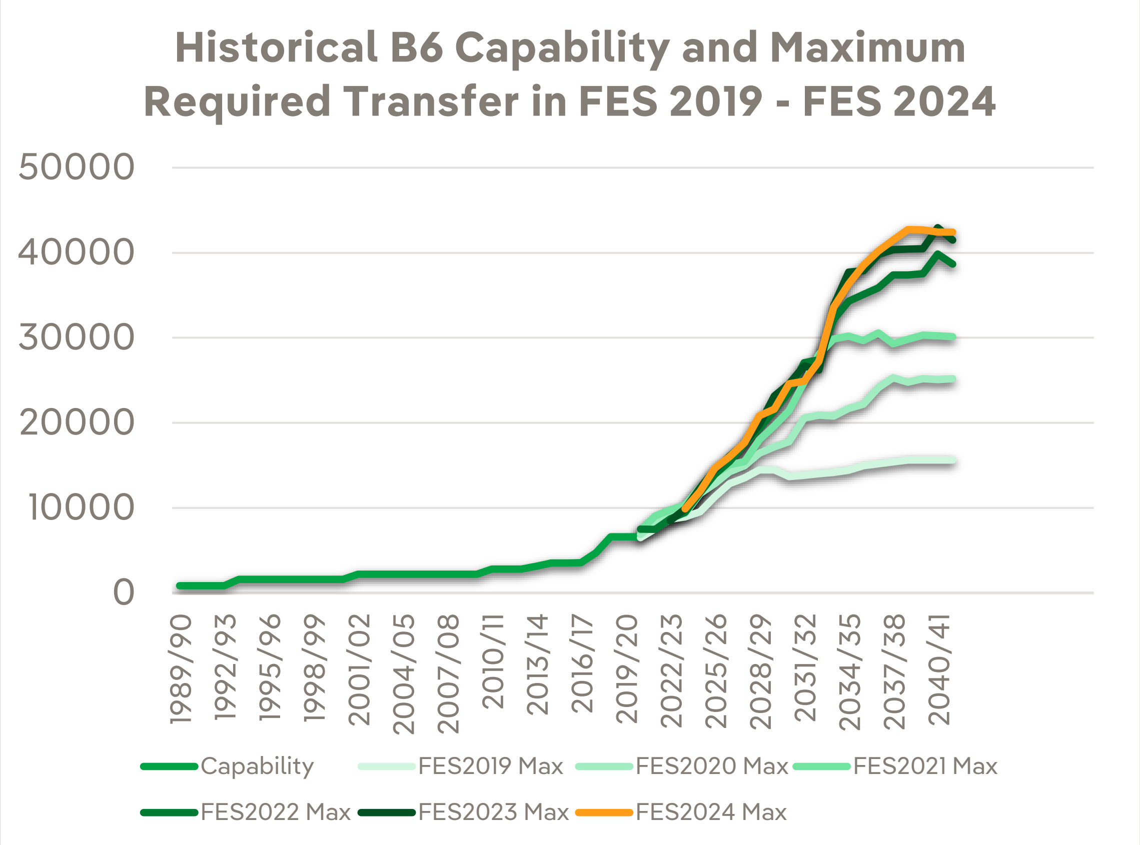


Figure 9 - B6 Required Transfers based on FES 2019 - 2024

The current capability of the B6 boundary is around 6.7GW. Based upon the new FES 2024 pathways, there is a required transfer of up to 40GW by 2040.

The level of power flow across the system based on the FES is the basis for the economic analysis carried out by NESO to inform our wider system reinforcements – further information on this can be found in the Pathway to 2030[1] and Beyond 2030[2] reports. From these reports, within the RIIO-T3 timeframe we will continue to develop/deliver a significant portfolio of works informed by the NESO, which will continue to be informed by the future CSNP, and consistent with the NESO's advice to the UK Government on achieving a clean power system by 2030. Note these projects will largely be funded through mechanisms outwith the RIIO-T3 price control, with the exceptions noted under the funding mechanism column.

Table 2 – SPT Strategic Projects

Funding Mechanism	NESO Recommendation	NOA/tCSNP2 Code	Description of Works	Cost Estimate (2023/24 prices)
T3 Baseline		BDUP	Uprating of the existing Beauly - Denny 275kV circuit to 400kV.	£3.09m (SPT section only)

[1] Pathway to 2030 Report

[2] Beyond 2030 report

ASTI	Required for 2030 Targets based on Holistic Network Design (HND)	E2DC	EGL1 – A new 2GW HVDC subsea link from a new Branxton 400kV Substation to Hawthorn Pit in the northeast of England.	£970.36m (SPT section only)
ASTI		DWNO	A new 400kV OHL from Bonnybridge to an existing OHL north of Glenmavis, together with associated substation works, conductor replacement and voltage uprating on existing OHL routes.	£217.04m
ASTI		TGDC	EGL4 - A new 2GW HVDC Eastern subsea link from Westfield to south of the Humber estuary, together with associated onshore works.	£1,389.71m (SPT section only)
ASTI		TKUP	New 400kV substations at Mossmorran, Westfield and Glenrothes to establish a 400kV double circuit corridor, on existing overhead line routes, between Kincardine North and the SSEN's Tealing.	£345.58m (SPT section only)
RIIO-T2 MSIP		VSRE	Replace existing OHL conductor on the strategic east-west Strathaven - Smeaton 400kV corridor with HTLS conductor.	£120.04m
RIIO-T2 MSIP - Needs Approved RIIO RIIO-T3 LRR Cost Assessment		LWUP	Establish a new 400kV substation north of Kincardine and connect to Denny North at 400kV.	£123.40m
RIIO-T2 MSIP - Needs Approved RIIO RIIO-T3 LRR Cost Assessment		DWUP	Establish a 400kV single circuit corridor south from Kincardine North, on existing OHL routes, to Clyde's Mill substation.	£77.30m
RIIO-T3 LRR Needs and Cost Assessment		EHRE	Replace existing OHL conductor on the southern (Elvanfoot - Harker) section of the strategic north-south Strathaven - Harker (ZV route) corridor with HTLS conductor.	£122.22m (SPT section only)
RIIO-T3 LRR Needs and Cost Assessment		VERE	Replace existing OHL conductor on the northern (Strathaven - Elvanfoot) section of the strategic north-south Strathaven - Harker (ZV route) corridor with HTLS conductor.	£90.34m
RIIO-T3 LRR Needs and		DLUP	Establish a new 400kV substation at Windyhill and a 400kV	£131.27m

Cost Assessment			single circuit corridor, on existing OHL routes, between Windyhill, Lambhill and Denny North.	
tCSNP2 development track	Recommended by Transitional Centralised Strategic Network Plan 2 (tCSNP2)	CMN3	New 400kV double circuit between Gala North and Carlisle area.	£357.48m (SPT section only)
tCSNP2 development track		WCN2	New 400kV double circuit between Ayrshire and Carlisle area (NGET area) via new substation(s) within Dumfries and Galloway .	£728.38m (SPT section only)
tCSNP2 development track		HGNC	New 400kV double circuit between Harburn and Gala North .	£280.24m
tCSNP2 development track		NHNC	New 400kV double circuit between New Deer (SSEN-T area) and Harburn.	£205.03m (SPT section only)
tCSNP2 development track		WCD4*	A new 2GW HVDC subsea link from southwest Scotland to northwest Wales, incl. connection of 2GW Offshore Wind Farm.	£2,601.88m (SPT section only)
RIIO-T3 LRR Needs and Cost Assessment		CVUP	Clydesmill to Strathaven 400kV Reinforcement via existing OHL route.	£40.29m
tCSNP2 development track		LCU2	Kincardine North - Currie 400kV reinforcement via existing OHL routes.	£106.88m
tCSNP2 development track		HBNS	Establish a new substation at Harburn.	£115.05m

*Includes coordinated delivery of AC5 and AC6 (offshore projects recommended under HND), which are subject to Ofgem's decision on regulatory framework.

It should be noted that the NESO is currently trialling a new Local Constraint Market (LCM) to access new sources of flexibility to help manage constraints on the B6 boundary[3]. These solutions will be supplementary to the projects required above, due to the scale of the current and future challenge across all of our network boundaries (as demonstrated for B6 in Figure 9 above), a combination of all potential options will form the path to reducing overall constraint costs.

In addition to the projects above, in order to accommodate the future renewable technologies the FES provides us with the study background to assess what additional investment may be required to ensure operability of the system.

This has informed a number of projects to be included within our plan:

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[3] https://www.neso.energy/industry-information/balancing-services/local-constraint-market#Service-Trials

- Synchronous compensators – required for stability and voltage control, particularly at times of high demand.
- Harmonic Filters – consistent with our approach in RIIO-T2, we have identified a number of key sites that will supress harmonic issues seen across predominantly the 132kV wind-dominated system.

Detail of these types of projects and other types of technologies can be found within our main business plan document and associated Engineering Justification Papers.

4.2 SPT's Transmission Economic Connection Assessment (TECA) Methodology

Connections Assessment

As shown in section 4.1.1 there is a significantly greater amount of contracted generation within the SPT area than is required within the FES 2024 Holistic Transition pathway. It is expected, then, that a significant number of the projects contracted will not connect therefore it is important that we consider our portfolio strategically to ensure the right level of investment is made at the right time.

The UK Government set out an ambitious plan under its Connections Action Plan to accelerate new connections. In response, the NESO began Connections Reform to assess how the new connections queue can better be managed, to look to ensure projects that are ready to connect can be accelerated, whilst removing 'stalled projects' which currently have reserved capacity that may never be used. Through Connections Reform, the TMO4+ process, to be aligned with the Government's ambitions for a clen power system by 2030, has been proposed to fulfil these requirements.

Ahead of the implementation of TMO4+, to ensure our RIIO-T3 plan focuses on the requirements for Net Zero, we have redeveloped our TECA methodology, first established for RIIO-T2 planning timescales, to assess our full new connections portfolio to assign a confidence level to each project and form our Best View. During RIIO-T2 we considered a number of factors when initially establishing the TECA, but ultimately the most weight was applied to consent status and connection dates. For RIIO-T3 we explored a number of different factors with a potential impact on new connections projects, and developed the methodology based on feedback from our INZAC group, the other TOs and Ofgem. The factors as described below considered within our assessment methodology align largely with the considerations for TMO4+, prior to knowing the full outcome of this. This allows us to appropriately target our investment and resources to ensure our infrastructure develops in the right place and at the right size.

The TECA assigns each new connection project a score out of 10 based upon:

- Technology:
  - Maturity – existing experience of a technology locally and globally.
  - Subscription level – compares SPT connection queue with Government targets and all FES 2024 data to determine future requirements for that technology.
- Project Specific:

- Developer track record – general experience of developer of developing and constructing similar projects, based on our historic customer data.
- Planning Milestone – consenting status of project.
- Route to Market – clear route to market, such as Contracts for Difference, Capacity Market contract or Pathfinder Contract, from NESO published data.

From the resulting score, high and medium probability projects become SPT's Best View. The total number of projects assessed, their capacity and resultant probability is detailed below.

Table 3 - TECA Outcome Overview – October 2024

Energisation Year	Number of Projects - High	Capacity (MW) - High	Number of Projects - Medium	Capacity (MW) - Medium	Number of Projects - Low	Capacity (MW) - Low	Total Projects	Total Capacity (MW)
< 2026	21	2187	11	1137	9	729	41	4052
2026	16	2919	10	568	25	2491	51	5978
2027	19	1805	11	5491	22	4633	52	11929
2028	5	340	15	1628	30	4842	50	6810
2029	8	1519	17	2376	24	6475	49	10369
2030	2	1080	11	1177	16	4106	29	6363
2031	0	0	10	1026	46	12182	56	13208
> 2031	2	530	26	10431	28	8398	56	19359
Total	**73**	**10379**	**111**	**23833**	**200**	**43856**	**384**	**78068**

Figure 10 shows the breakdown per technology and their capacities. Note these are for all projects, including those ongoing outwith the RIIO-T3 period, as it is important that we plan our system with the best view of the future as possible, not restricted by price control periods.

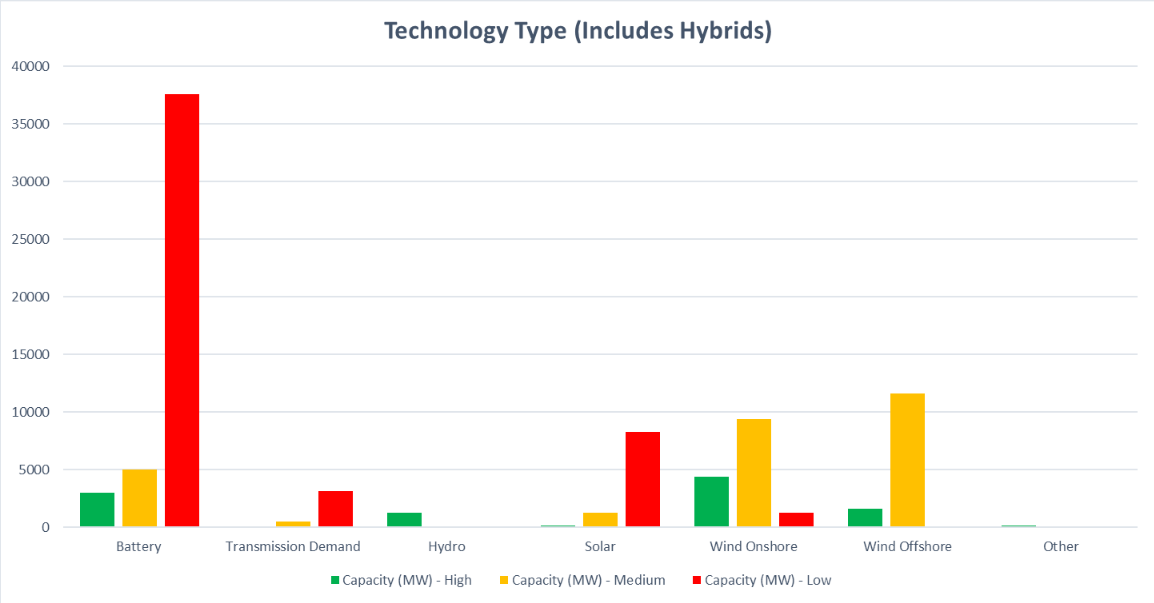


Figure 10 - TECA Capacity per Technology

TECA is an ongoing assessment for SPT – as Connections Reform, the Strategic Spatial Energy Plan, Clean Energy 2030 initiative and other policy evolves and produces output, our TECA methodology will evolve to ensure it remains fit for purpose to best serve the needs of GB consumer.

4.3 Non-Load Interaction

Non Load

Through our asset strategy processes, we have a very good understanding of our existing transmission assets, with a clear view on their future requirements in terms of maintenance, refurbishment or replacement to ensure our population of assets perform as required. Given this clear view, we have advanced information for requirements where major interventions are required, which, when overlaid with our other load drivers discussed elsewhere in this section, allows us to plan strategically. For example, where there is no future growth forecast in the area, like for like replacement would be acceptable. Where growth is forecast, different solutions are explored and compared by their relative benefit. For example, where an OHL circuit requires reconductoring for non-load reasons, but there is forecast growth of generation in the area, we would consider each incremental sized conductor versus the corresponding cost increase and choose accordingly dependent on the needs of the specific case. In this way we minimise any risk of stranded assets, or additional interventions within short timeframes, and allow ourselves to time our investments to best suit our load and non-load investments.

4.4 Site and Route Strategies

To form our RIIO-T3 plan, our Best View of connections projects, coupled with our Strategic Projects outlined above, operability requirements, Distribution Network Operator (DNO) or other utility interactions and non-load portfolio, we identified a number of key sites / routes that meet a number of these investment drivers. These have been developed and form the basis of our load plan. The funding mechanism and cost estimates for each is discussed within Section 8 of this document.

Site/Route Strategy Title	Connections Best View	Interaction with Strategic Projects	Operability needs	Non-Load driver	SPD / Other interaction
Glenmuckloch to ZV Route 400kV reinforcement	Yes	Yes	TBC	No	Yes
U+AT Route 132kV Reinforcement	Yes	Yes	TBC	Yes	Yes
Glenshimmeroch 132kV substation	Yes	No	Yes	No	No
Redshaw 400/132kV substation	Yes	Yes	TBC	No	Yes
Glenglass to Glenmuckloch 132kV Reinforcement	Yes	Yes	TBC	No	No
Gala North 400/132kV substation	Yes	Yes	Yes	No	Yes
Holmhill 132kV substation	Yes	No	No	No	No
EHRE - Elvanfoot to Harker 400kV Reinforcement	Yes	Yes	No	No	No
Colyton to Maybole 132kV Reinforcement	Yes	No	No	Yes	Yes
Dumfries North 400kV substation	Yes	Yes	TBC	No	TBC
Killoch 400kV substation	Yes	Yes	TBC	No	TBC
New Cumnock North 400kV substation	Yes	Yes	TBC	No	TBC
Teviot 400/132kV substation	Yes	Yes	TBC	No	TBC
Wyseby 400kV substation	Yes	Yes	TBC	No	TBC
VERE - Strathaven to Elvanfoot 400kV Reinforcement	Yes	Yes	No	No	No
DLUP – Windyhill – Lambhill – Denny North 400kV Reinforcement	No	Yes	TBC	Yes	No
Currie GSP	No	No	TBC	No	Yes
Carrick 275kV substation	Yes	No	No	No	No

Table 4 Site and Route Strategies

In each case, the future requirements of each site and route have been considered and allowed for accordingly – forming Strategic Investment. For further information on each of the above, please refer to the project specific engineering justification paper (EJP), which can be found: www.spenergynetworks.co.uk/pages/riio_t3_docs.aspx.

4.4.1 Examples

U+AT Route

This project will fully rebuild the existing Galashiels – Eccles 132kV circuits on U & AT overhead line routes. The U route circuit was initially built in 1932 and the AT route circuit following that in 1959, with very few interventions taking place in the preceding years. The condition of the assets along the routes, including insulators, wood poles and towers, have deteriorated causing an increased risk of asset failure on the route. Through asset condition reports, it has been determined that a full replacement of the line is required in order to provide a reliable connection between the two substations.

The project has also been identified as enabling works for a number of large-scale generation schemes in the surrounding area within the RIIO-T3 timeframe, an additional driver for project and the driver behind the additional capacity to be created. There has also been a noted need for an increase in capacity from SPD, including the need for a new GSP in the area. This project will help support this need through the increased capacity of the rebuilt circuits. Using the TECA scoring methodology, the majority of the enabled projects feature in the SPT Best View.

The new line will run parallel to the existing route, approximately 29km, from Galashiels to Eccles and is scheduled to be energised in 2028. The existing lines will then be taken out of commission upon the energisation of the new circuits, with works to demolish the routes to be completed in 2029. The project will uprate the existing line using twin UPAS conductors, increasing the rating by approximately 221MVA to a summer pre-fault rating of 310MVA from the existing 89MVA summer pre fault rating, allowing for more generation to be connected in the area.

The project will be designed to maximise capacity, mindful of future substation and overhead line projects driven by further future generation in the area that will require the rating of the twin UPAS conductor system but delivers earlier to minimise the risk associated with asset health deterioration.

For further detail on this project, please see the project specific Engineering Justification Paper, which can be found www.spenergynetworks.co.uk/pages/riio_t3_docs.aspx.

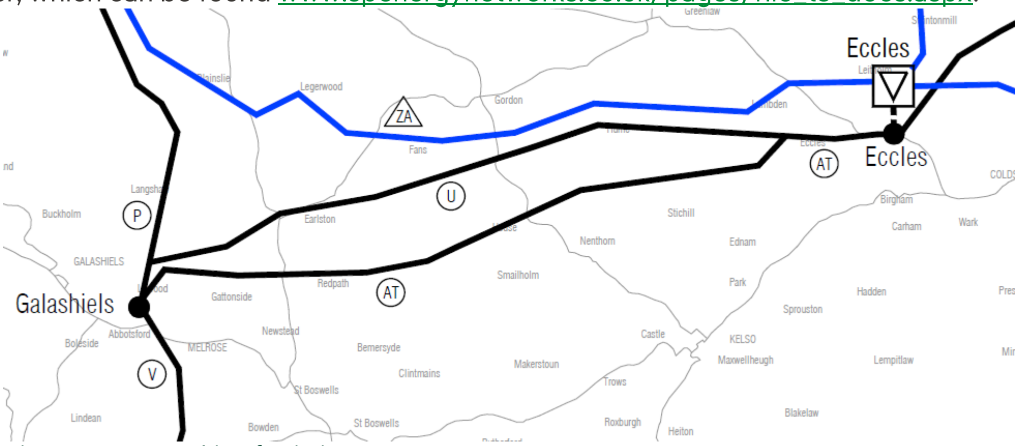


Figure 11 Geographic of existing U&AT Routes

Glenmuckloch to ZV 400kV Reinforcement

Glenmuckloch is a new 400kV substation proposed in South West Scotland (SWS) east of New Cumnock. It will play a key role in facilitating wider reinforcements in the region. The substation will ultimately serve as enabling work required for connection of 2GW of renewable generation in the area. It will provide a new point of interconnection between New Cumnock and the main west coast onshore Scotland-England connection, via Glenmuckloch itself and the construction of approximately 25km of new 400kV double circuit overhead line.

The staging of the construction of the proposed Glenmuckloch 400kV substation has been established to reflect the growing needs in the area and the project has grown over time to accommodate the future needs in the area. It will be initially built to accommodate a new 400kV double circuit overhead line to a point of connection on the existing ZV route, tying in with the proposed Redshaw 400kV substation. This will enable new renewable generation capacity in the area, initially from the 132kV substation at Glenmuckloch. The substation will then be built out over time (having established the required footprint from day 1) to connect first with New Cumnock North at 400kV, then to the south to Dumfries North and ultimately south over B6 into NGET's area as part of the tCSNP2 project WCN2. Interconnecting this circuit at Glenmuckloch, with its established connection to the ZV route provides additional flexibility and security for the SWS area.

This project is a good example of the inclusion strategic investment – from day one the footprint of the substation and the platform for the full planned size will be constructed to minimise additional costs and risk at later stages of the project. Additionally, the conductor size chosen for initial connection into Redshaw has been sized accordingly for interaction with the proposed new 400kV corridor established under WCN2.

For further detail on this project, please see the project specific Engineering Justification Paper, which can be found at www.spenergynetworks.co.uk/pages/riio_t3_docs.aspx.

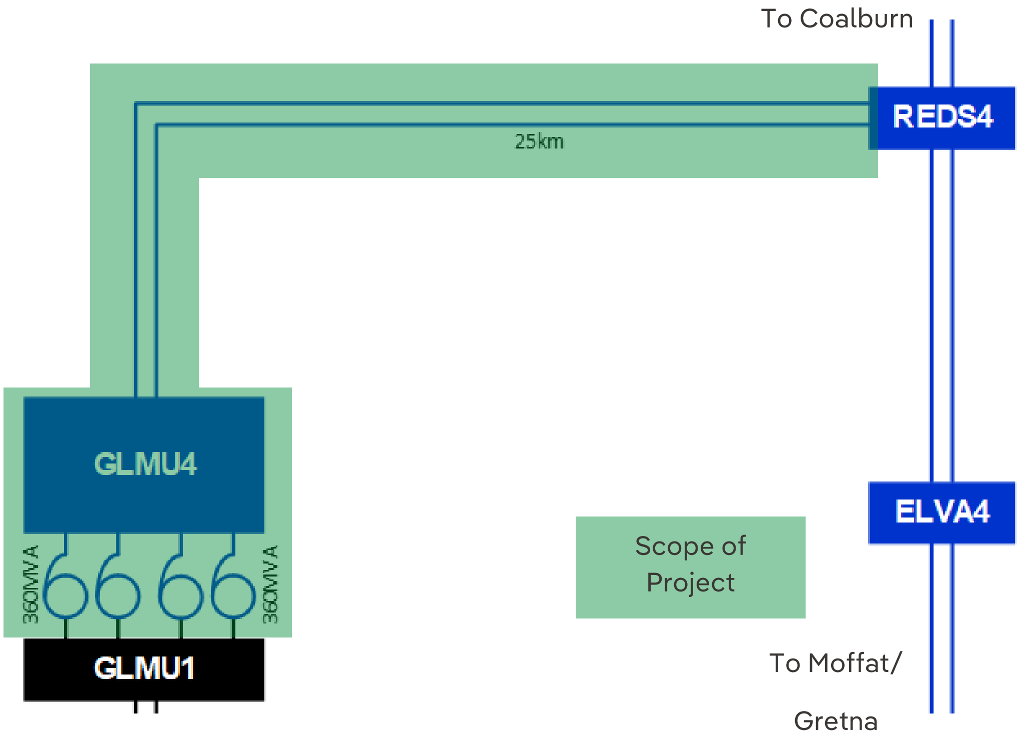
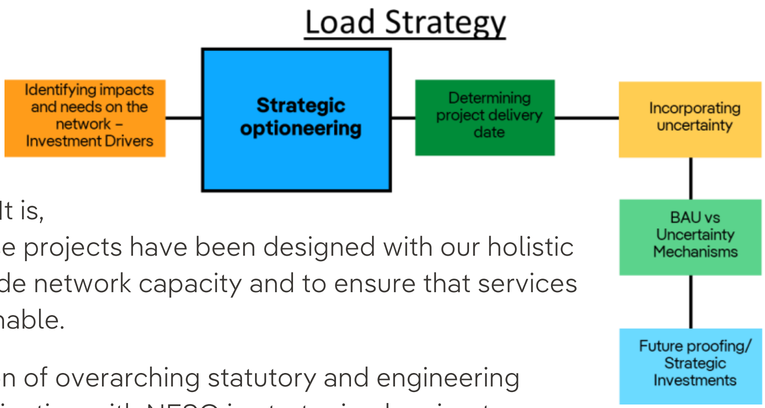


Figure 12 Single Line Diagram for Glenmuckloch to ZV Route

5 Strategic Optioneering



Our RIIO-T3 Load Strategy includes a number of site and route strategies, as detailed in the previous section, each with its own engineering justification paper. It is, however, important to note that these projects have been designed with our holistic approach, working together to provide network capacity and to ensure that services to customers are reliable and sustainable.

This section provides the introduction of overarching statutory and engineering obligations, and our proactive coordination with NESO in strategic planning to identify and optimise investment needs.

We also present the process of how we identify the optimal solution in a transparent and open-minded manner. This optioneering process works hand in hand with our Overarching Decision Making Processes to ensure the efficiency of our investment decisions. We provide some examples of how we determine the need for these projects, outline the interactions between them and how different solutions are evaluated.

We evaluate our Load Strategy at both the regional and the GB level to ensure value for money for our existing and future customers. This chapter makes reference to these projects and how they interact with other wider works driven by the Future Energy Scenario (FES) and included within SPT's RIIO-T3 business plan.

We work with our key stakeholders both internally and externally, introducing robust assessments to capture the potential delivery and/or operational risks at the early stages of our design. This will enable the timely delivery of projects such that the required network capacity is ready for our customers.

Whilst determining our network investments, we consider a wide range of build and non-build solutions, including whole system solutions where these are feasible, such as equipment installed on DNO networks. An example of this would be reviewing solutions to manage fault level at a GSP – we will work with SPD to determine the most economic, efficient and coordinated solution.

We also work closely with the NESO to ensure the future operability needs of the system can be met and have provided flexibility in our plan to safeguard against potential changes to requirements for our network driven by any currently unforeseen circumstances. We have been leading the innovation to leverage flexibility from our customers such as Network Rail to accelerate the connections.

5.1 Technical Requirements

The SQSS is the standard by which the GB transmission network is planned and operated. The SQSS ensures that all Users connected to the transmission system are provided with a minimum level of supply security and sets the limits within which the system must be operated. Our licence requires us to comply with the SQSS and to do so in an economic, efficient and coordinated manner. Essentially we, and the other TOs, have to provide the NESO with a network that will be economic and efficient to operate for a wide range of possible and evolving network, demand and generation conditions.

We test if our network complies with the SQSS by simulating the network with a computer model of the whole GB transmission system. This allows us to study the network for a range of scenarios and operating conditions at different points in time. Typically, the network is subjected to a wide range of faults or contingencies and the study results are then compared to the requirements of the SQSS to check if the standard is met. One example of this is to establish the capability of a boundary: the power flow in the circuits crossing the boundary is progressively increased and a number of outages (typically single or double-circuit faults) are applied. As soon as the network becomes marginally non-compliant with the SQSS (e.g. a circuit is loaded to full capacity or the voltage at a node is at its minimum limit), the maximum boundary capability has been reached. If greater capability is required, various options to reinforce the network can now be implemented in the study network and tested in the same way. Options that provide sufficient boundary capability uplift can now be compared and evaluated further in terms of cost, delivery timescales, losses, land requirements, etc. For boundary upgrade projects, the best options are also submitted to the NESO's wider system reinforcement assessment process for more detailed economic evaluation. This was previously the NOA, currently the tCSNP and to become the enduring CSNP in 2026.

A similar process is followed to test the network against a range of static and dynamic SQSS requirements, such as voltage, fault level or stability and to evaluate the performance of options to restore compliance where and when required. As the network evolves to accommodate an increasing penetration of renewable generation and new technologies, more sophisticated and complex network models are used, e.g. to consider fast transients, oscillatory events and other risks in more detail.

Our network models allow us to design and evaluate a wide range of solutions to any network limitations, non-compliance or risks identified. A wide range of potential solutions is investigated, including build and non-build options, with the aim of developing an economic and efficient transmission network. Some options can provide solutions to multiple issues, e.g. a new overhead line circuit will provide additional capacity but might also solve a voltage problem. We therefore study the impact of multiple options and projects working together and only study solutions in isolation when this is technically justifiable.

We have been contributing actively and working with the Energy Networks Association (ENA), who governs a suite of engineering recommendations that cover various aspects of engineering design and operational standards. These recommendations are crucial for maintaining the reliability and safety of the electricity network. An example of this is Engineering Recommendation G5 (ER G5):

- Harmonics: ER G5 specifically addresses the management of harmonics on the network. Harmonics are voltage or current waveforms that can cause distortion in the electrical system, potentially leading to equipment malfunction or failure.

5.2 Coordination with NESO

The NESO was established under the Energy Act 2023. The NESO became operational in October 2024.

The NESO's primary responsibilities include:

- Ensuring Energy Security: Overseeing the operation of the electricity system to ensure a reliable supply.
- Affordability: Managing the system to keep energy costs as low as possible for consumers.
- Sustainability: Leading the transition to a net-zero energy system by integrating renewable energy sources and reducing carbon emissions.

SPT welcome and have been supporting the NESO in their crucial role in identifying and validating strategic investment opportunities. This involves:

- Strategic Network Planning: Developing long-term plans for the electricity and gas networks to ensure they meet future demands.
- Market Development: Creating and evolving market arrangements to facilitate secure and investible energy markets.
- Coordination: Working with various stakeholders, including the TOs, to ensure investments are made in a coordinated and efficient manner.

Working along with key stakeholders such as SP Transmission, the Authority and other industry participants, NESO undertakes activities relating to the Central System Network Planning (CSNP or tCSNP). The NESO is responsible for overseeing the planning and coordination of the electricity transmission network, ensuring that it meets future demands and supports the transition to a net-zero energy system. With the in depth knowledge of our network and its operation, we continue to work with key stakeholders , including the NESO, and to ensure that our transmission system is developed in the sustainable manner for our existing and future customers.

The activities under the NESO are coordinated through various forums and bodies, including:

- **The Directorate of Resilience and Emergency Management**: Focuses on the resilience and security of the energy system.
- **Strategic Planning Forums:** These bring together stakeholders from across the energy sector to discuss and plan strategic investments and developments

The NESO plays a pivotal role in shaping the future of the UK's energy landscape. By carrying out economical studies, coordinating and publishing various consultations and reports, such as the FES, the NESO provides critical insights and guidance on strategic investment needs which guide our investment plans. These reports help to:

- **Forecast Future Energy Demand and Supply:** The FES outlines different pathways for how energy demand and supply might evolve over the coming decades. These form the basis of our transmission network investment planning. In addition, the NESO provides us with Construction Planning Assumptions (CPAs) for local areas used as generation and demand backgrounds to prevent potential over investment for new connections.
- **Identify Investment Needs:** By analysing these pathways, the NESO can identify where and when strategic investments are needed to ensure a reliable, affordable, and sustainable energy system.
- **Engage Stakeholders:** The consultations and reports involve input from a wide range of stakeholders, ensuring that the planning process is comprehensive and inclusive.

5.3 Process of our Strategic Optioneering

On the basis that each and every proposed investment complies with the statutory and engineering requirements set above, we then carry out the strategic optioneering in line with the Business Planning Guidance 4.30-4.37[4].

As discussed in Section 4, the Holistic Transition Pathway set out as part of the 2024 Future Energy Scenario (FES) will be used as the basis of our plans. This Pathway provides a view of the electricity transmission network needs to be ambitious and to move at pace to facilitate the levels of generation and demand by 2050. This will be more than doubled to reach 671TWh across GB compared with 285TWh in 2023. The transmission networks are on the critical path of connecting 50GW offshore wind by 2030 (within the RIIO-T3 period).

Also detailed within Section 4, TECA is an effective tool to record the dynamic status of the connection applications, provide us the probability based on key indicating milestones. The TECA's use of all of the three FES 2024 pathways also provides us with a range of potential futures on which to plan. We also factor such insights in our planning and regional

[4] RIIO-3 Business Plan Guidance

coordination where appropriate and required, based on SPD's DFES, which offers a level of additional sensitivity when planning the future requirements of the system.

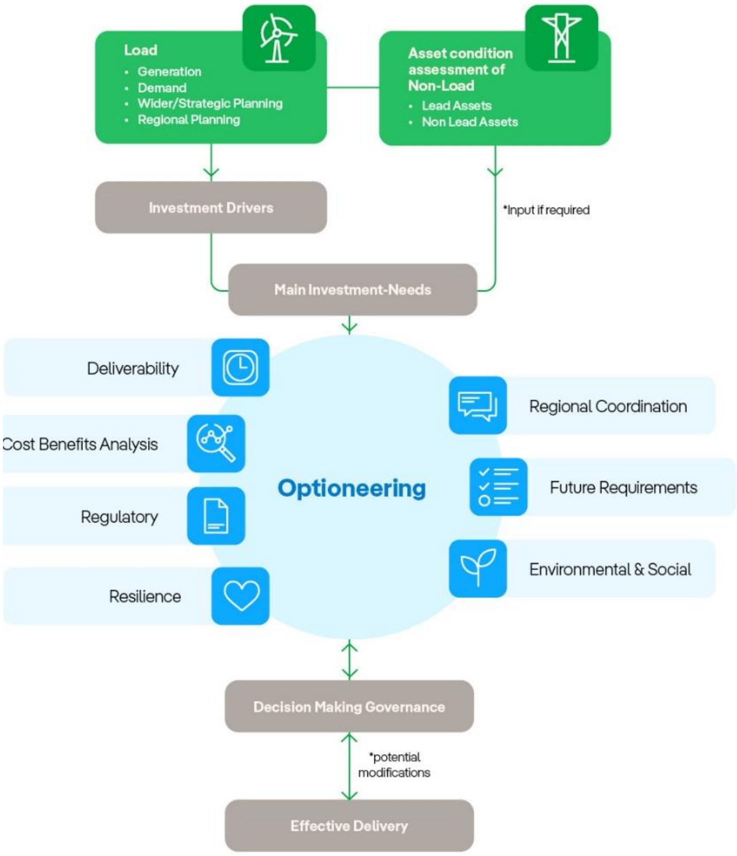


Figure 13 Strategic Optioneering Process

5.4 Establishment of a Valid Load Investment Driver

Connection requirements, whether from generation or demand, are crucial when determining load investment needs. In central and southern Scotland, around 78GW of new connections are contracted, both directly connected to the transmission network or via the DNO network. This includes approximately 13.6GW of onshore wind and approximately 14.3GW of offshore wind but dominated by up to 38.3GW of battery energy storage systems.

We proactively engage with our customers and NESO throughout the application process to capture developments and evaluate the readiness of their applications in line with our TECA methodology to plan our investments and resources accordingly. The TECA methodology will be updated and aided by the introduction of the Connections Reform.

For every additional project that is added to contracted queue, a reassessment of the local and wider network is required to facilitate the additional capacity. Our established TECA Methodology is our strategic approach to managing these new connections. To confirm valid investment needs for load, we collaborate closely with customers, listening to their requirements, leveraging our network expertise, and providing data to help inform their plans such as the Transmission Heat Map[5]. This approach helps determine the required connection size, and understand both core and optional customer requirements, narrow down potential geographic locations. Internally, this process helps SPT allocate resources optimally in line with the workload.

5.5 Optioneering

Our optioneering process is iterative and works hand in hand with our decision making process. The initial iteration includes assessing asset condition in potential sites and areas, along with strategic inputs from non-load related expenditure plans. We also consider findings of ongoing studies around the geographic area, plans of our connected Distribution Network Operator, and strategic development such as the Centralised Strategic Network Plan (CSNP). This initial process generates a long list of options associated with specific connection requirements.

High-level designs will then be generated for each option, based on connection requirements and considering all possible topologies and routes. This open-minded approach ensures we explore a wide range of solutions. Initial assessments will focus on the additional network capacity provided by the individual proposal, including but not limited to voltage levels, associated topologies to meet the customer requirements or if more innovative methods, such as HVDC, are required. These high-level designs help narrow down the long list of options by removing those that could not meet the core requirements.

Shortlisting these options involves detailed engineering assessments and CBA where appropriate. As outlined in the sections above, the SQSS and related Engineering Recommendations (ER) provide clear boundaries and standards for our designs. As part of the wider assessment, we need to consider practical factors such as land available, consenting requirements and outage coordination. As part of this process, we evaluate environmental and social impacts, as well as operational considerations. Environmental and social (community) effects are considered at each stage of optioneering and are used to inform decision making. At a strategic level, this involves consideration of highest amenity sites of environmental, landscape and social value e.g. European designated sites and settlements. At this stage in the process, our focus is to consider the feasibility of routeing or siting the chosen technology between the network points defined in the option. Further consideration of these sites, including sites of regional and local value, are used to inform detailed optioneering during later stages. A full environmental, landscape and social impact assessment of the final design is undertaken to inform the land and planning consents process. This optioneering process is transparent and interactive, both within SP Transmission and with our key stakeholders (such as the NESO, other TOs, DNO and our customers).

The design elements that we can evaluate and optimise include:

Site Strategies

[5] *Transmission Generation Heat Map - SP Energy Networks*

While new substations tend to be initially driven by new connections, projects evolve over time as connection activity grows in different areas. Wider system reinforcements are developed which are cognisant of where connections drivers already exist, so alignment of drivers of investment has always been standard network planning practice within SPT. Additionally, working so closely with our SP Distribution colleagues, we are able to recognise where their needs align with ours, allowing us to identify where there may be future needs on the distribution system that can be served by the transmission system.

Route Strategies

SPT has several projects planned for development in RIIO-T3 that will increase the B6 boundary capacity, recommended by the NESO via the Pathway to 2030 and the Beyond 2030 reports. Route strategies have been developed over time aligning with these requirements, in combination with the known locations of required new collector substations for the connection of new developments. There are crossovers with route strategies and the site strategy approach as the routes and locations are developed to align to where is seen as most beneficial for the multiple drivers. Close coordination with the other TOs is key for these types of projects as they cross boundaries, to align with each other's existing projects and other considerations.

5.6 Innovation as Standard

As a key part of our optioneering, we consider how innovative approaches can be taken to best develop our system. We have employed different innovative approaches to benefit from new technologies in evolving our approach to planning transmission network. Examples of where innovative solutions have become business as usual in planning and operating our network with respect to load planning are below.

To better use the existing network capacity and permit customer connections in advance of necessary enabling works or on an enduring non-firm basis and to provide a higher level of flexibility, Load Management Schemes (LMS) have been introduced over the RIIO-T1 and RIIO-T2 periods and are now standard during RIIO-T3. LMS is a system comprised of geographically distributed measurement devices and site-specific customer interfaces to detect, in real-time, unacceptable overloading of transmission assets and disconnect the generation contributing to the overload in accordance with contractual agreements. LMS maximises utilisation of existing and future networks by providing non-firm and Restricted Available Access (RAA) for both transmission-connected and embedded parties and enables the earliest possible connection date. LMS will also avoid reducing asset lives by protecting assets from unacceptable overloads.

In our network, LMS has already enabled around 1.9GW of generation to 50 substations and grid supply points over the SPT and SPD networks. Going forward, we are contracted to enable connection of more than 10GW of generation to the system via LMS schemes in our full portfolio.

Another innovative solution to maximise the use of our existing transmission footprint whilst accommodating demand and generation growth is utilising High Temperature Low Sag (HTLS) conductor on overhead lines. HTLS conductors are designed to operate at higher temperatures than conventional conductors (e.g., AAAC conductor) and offer greater transfer capacity across the network. HTLS technology has since RIIO-T1 been successfully utilised to uprate thermal capacity of overhead line circuits in the SPT network, and we continue to consider this conductor type when planning future reinforcement projects, where economically and technically viable. For example, two of our route strategies to be subject to the RIIO-T3 Load Related Reopener will see HTLS installed on ZV Route. ZV Route is the existing west coast onshore circuit crossing B6, between Strathaven and Harker in the NGET area, maximising the capacity of that circuit and increasing the capability of this constrained boundary.

We also recognise where innovation projects' outputs provide additions to the toolkit of network design options. For example, our NIC project VISOR introduced Wide Area Monitoring Systems (WAMS) to provide greater visibility and understanding at key points across our transmission network. Given the changing patterns and sources of power flows across our network, there are changes in behaviour, including sub-synchronous oscillations. The VISOR system has already proven its worth in providing data to the NESO that has allowed them to identify participants in oscillatory events. By extending WAMS first installed via the VISOR project to new areas of interest can help us to better understand and begin to resolve these new emerging issues. This extension of the scheme increases monitoring across the system and will provide us with more data with which to better understand the network.

5.7 System Operability Challenges

The Net Zero transformation is evident through the deployment of advanced technologies on both the generation and demand sides. For instance, large offshore wind farms connect to the onshore transmission network via High Voltage Direct Current (HVDC) systems[6]. Similarly, large-scale energy storage or extensive solar energy farms, integrate into the network through embedded power electronics, effectively decoupling generation from the network. This decoupling results in reduced system inertia and fault levels. From an operational perspective, maintaining frequency and voltage stability across various scenarios presents a significant challenge.

Almost all of our load related works provide reinforcement for a system with increased renewable generation. Our projects will provide network support that will help to realise the NESO's ambition to operate a zero-carbon electricity system by 2025[7] and provide some of the electricity system building blocks that will help to ensure that Net Zero can be met.

Our optioneering will evaluate the operational challenges of investment proposals on both an individual basis and at system level. We mitigate the operational risks by network simulation, optimised topologies, advanced monitoring and protection and control systems.

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[6] *https://www.iea.org/reports/energy-technology-perspectives-2020/energy-transformations-for-net-zero-emissions*
[7] *https://www.nationalgrideso.com/news/zero-carbon-operation-great-britains-electricity-system-2025*

5.8 Example – Wyseby 400kV Substation

Our proposed reinforcement by a new 400kV substation at Wyseby, including its layout and connection to the Main interconnected Transmission System (MITS) is a clear example of how we leverage our knowledge of our network, our customers and their needs, and our commitment to the high standard of services. Our objective is to develop an optimised investment case by balancing the individual generation requirements, engineering, techno-economic evaluation and strategic planning. The proposed staged approach in delivery also reflects our appreciation of the evolving nature of renewable generation development and helps mitigate the investment uncertainties.

5.8.1 Context and Initial Design

An application has been received for the connection of 750MW of solar arrays and batteries from an energy company at Wyseby Hill in Southwest of Scotland. This is located approximately 5km west of Gretna substation. This would mean that the location of this renewable generator is also very close to our ZV Route - a 400kV double circuit between Strathaven (in SPT area) and Harker (in NGET area).

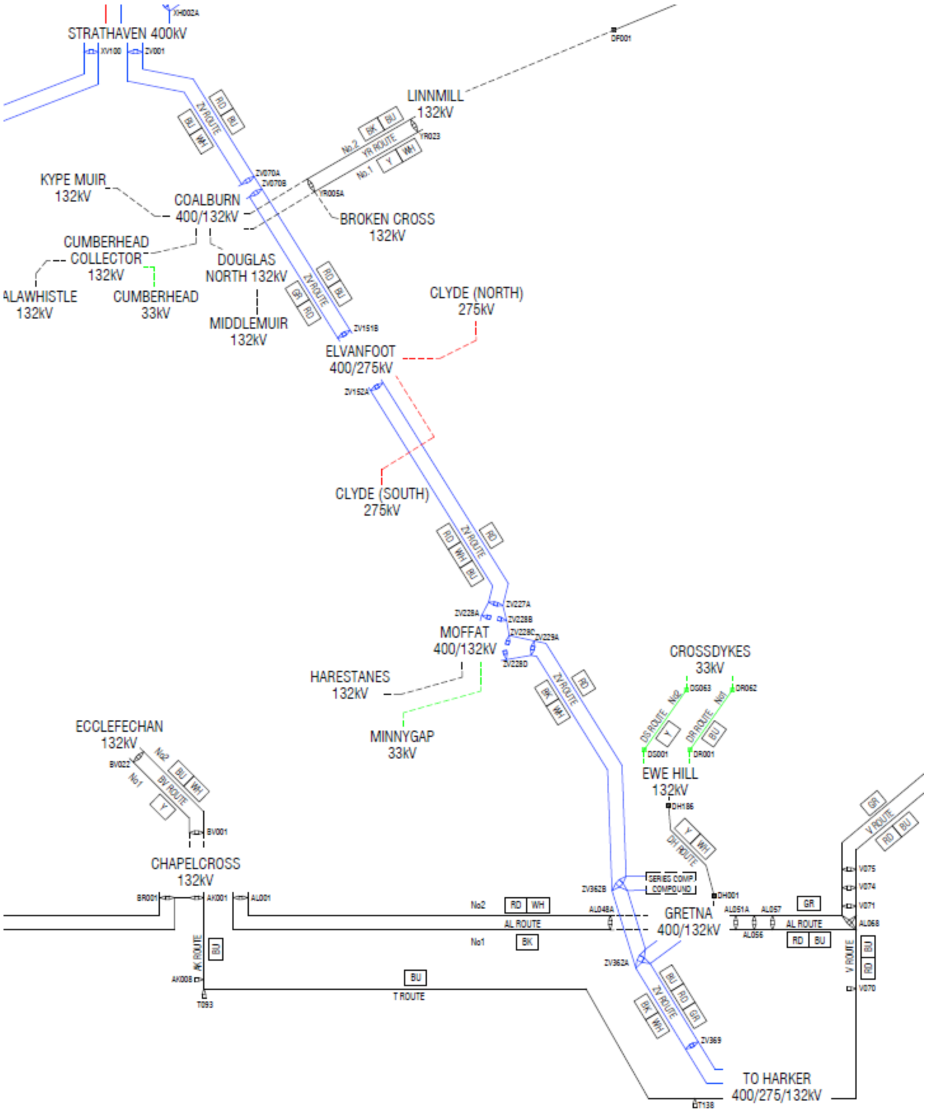


Figure 14 - Single Line Diagram for ZV Route and surrounding area

[redacted]

Figure 15 - Gretna and Wyseby Geographic

Given the requirement to provide 750MW of capacity, the development will be required to connect to our transmission network at 400kV. Connecting this development to our existing 400kV Gretna substation is an obvious option due to its proximity. However, Gretna substation is connected to only one circuit of ZV route, adding a generator at this size will increase the imbalance of power flow along ZV route, pushing power circulate to other parts of the network, leading to overloading and increased losses. Our site inspections have also identified the practical issues with expanding the existing substation area.

We then identified an effective connection by using Tee off arrangements as shown in Figure 16 – the initial option of Wyseby (WYSE4): Tee off from ZV circuits, with 4 bays to enable one generator connection only. This design was later evolved into a preferred solution after optioneering, allowing the renewable power from Wyseby 400kV substation to be evenly distributed across both circuits on ZV route before being transmitted south of the border.

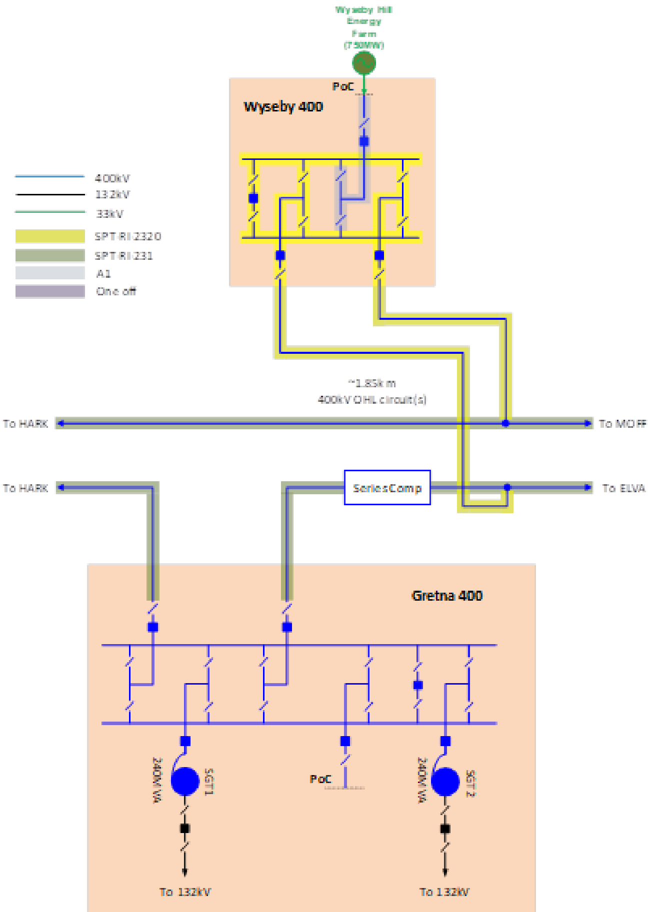


Figure 16 – the initial option of Wyseby (WYSE4): Tee off from ZV circuits, with 4 bays to enable one generator connection only. This design was later evolved into a preferred solution after optioneering

5.8.2 TECA assessment and local connections coordination

Southwest Scotland has always been one of the most active areas when it comes to renewable generation development due to nature resources and the land available. In the relatively narrow areas between the south of Glasgow and North of Carlisle, there are 5.4GW[8] of generation/BESS already contracted to the transmission network. Therefore, it is sensible to evaluate our initial design further.

TECA confirmed that there is 1.5GW of varying types of generation and BESS further contracted in the Wyseby area from 7 different generators, with 200MW of this appearing in SPT's Best View, with a further 428MW from 2 generators under formal application at the time of writing. Individual substations for each generator would be a duplication of investment and not consistent with our licence obligations to be economic, efficient and coordinated, and therefore a coordinated approach is required. We need to design and

[8] *TORI-231, the list of contracted generation and BESS*

develop the proposed Wyseby 400kV collector substation, ensuring that it has space to accommodate those connections.

Table 5 - Wyseby 400kV substation contracted position

Substation Name	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Wyseby 400kV	[redacted]					
Total Contracted Generation		1539*				

*exclusive of additional 428MW additional generators with live offers.

Based on the number of generators already contracted, at least 11 feeder bays and two sections of busbars will be required . Additionally to accommodate this level of generation on the existing ZV route, it is required to move from a Tee off as shown in Figure 16 to a double circuit turn in to ensure the power shares evenly between the circuits on either side of the route. This arrangement is shown in

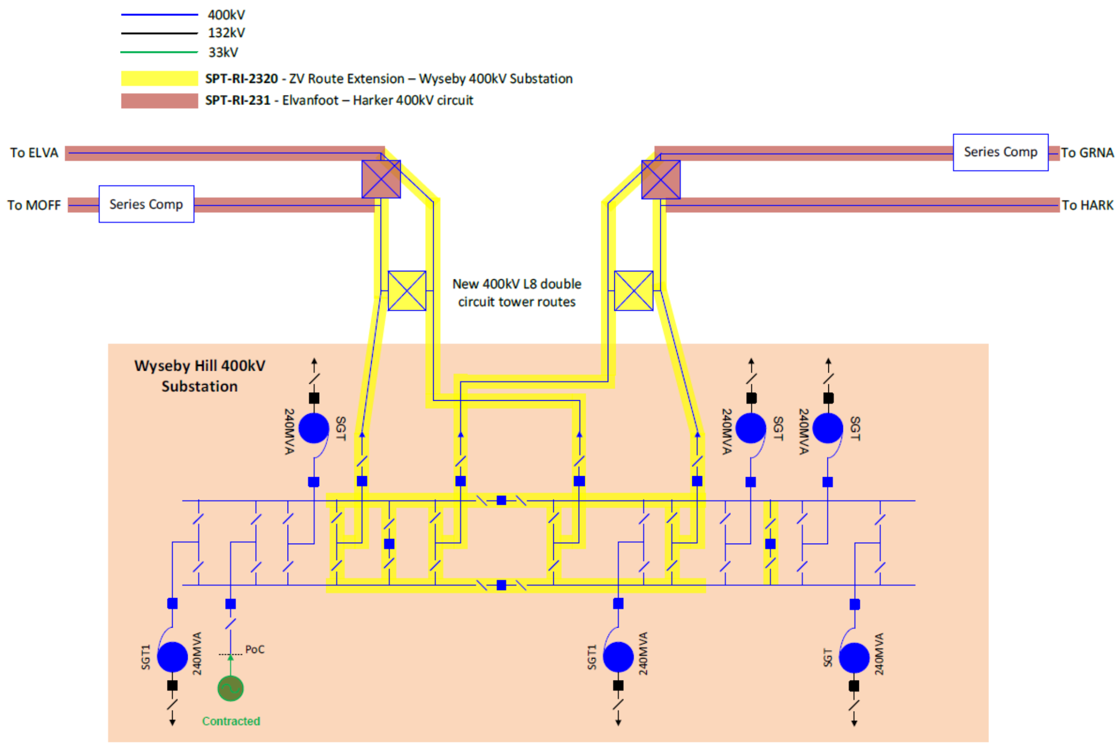


Figure 17 and provides the pathway for the connection of significant additional capacity and represents the most effective solution.

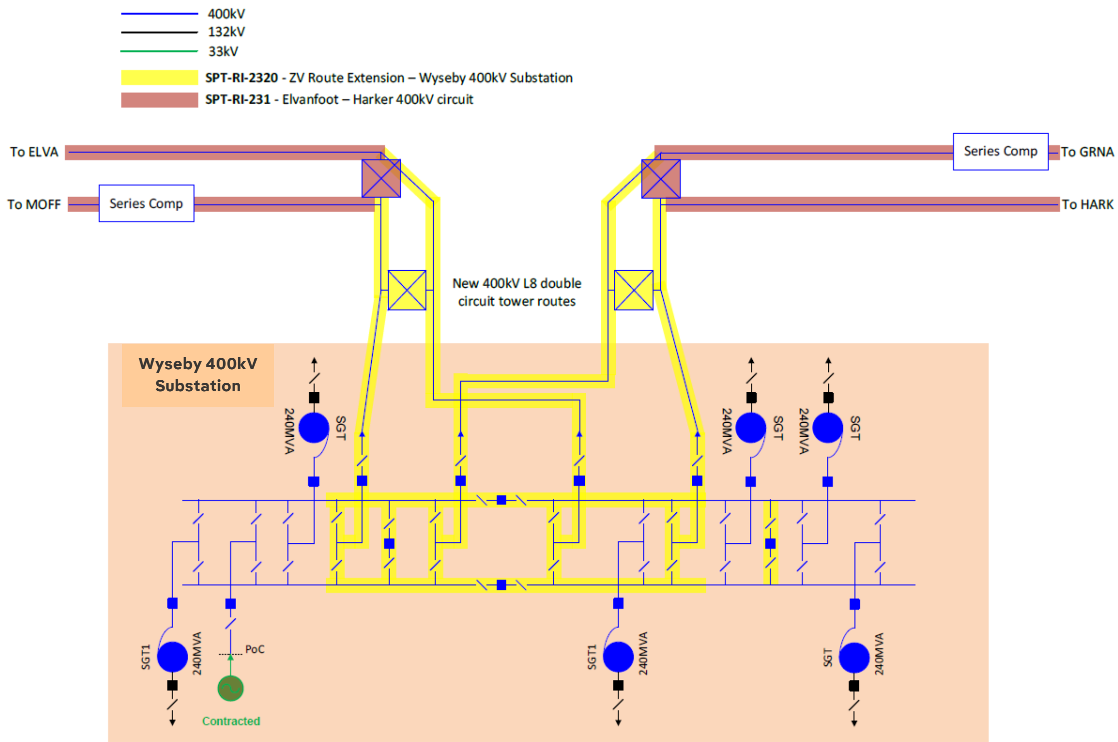


Figure 17: Wyseby 400kV substation preferred option 1a, Stage 1: 11 bays arrangement and ZV route Turn-in/out with consideration of contracted background

With this coordinated approach, we will reduce the overall number of substations for bespoke connections, avoid duplicated investment in expanding substations and present the most economical solution with minimum environmental impacts.

5.8.3 Strategic works coordination

Following a recommendation in the 7th Network Options Assessment (NOA7) for a 'notional' west coast reinforcement, the WCN2 project was developed and has subsequently received a proceed signal from the NOA7 Refresh undertaken to support the HND and further recommended by the tCSNP2, or Beyond 2030 report, published by the NESO in March 2024.

WCN2 will establish a new corridor between Kilmarnock South (within SPT's area) and North West England. This joint scheme between SPT and NGET will increase the capacity of B6 boundary between Scotland and England, by constructing a new 400kV double circuit.

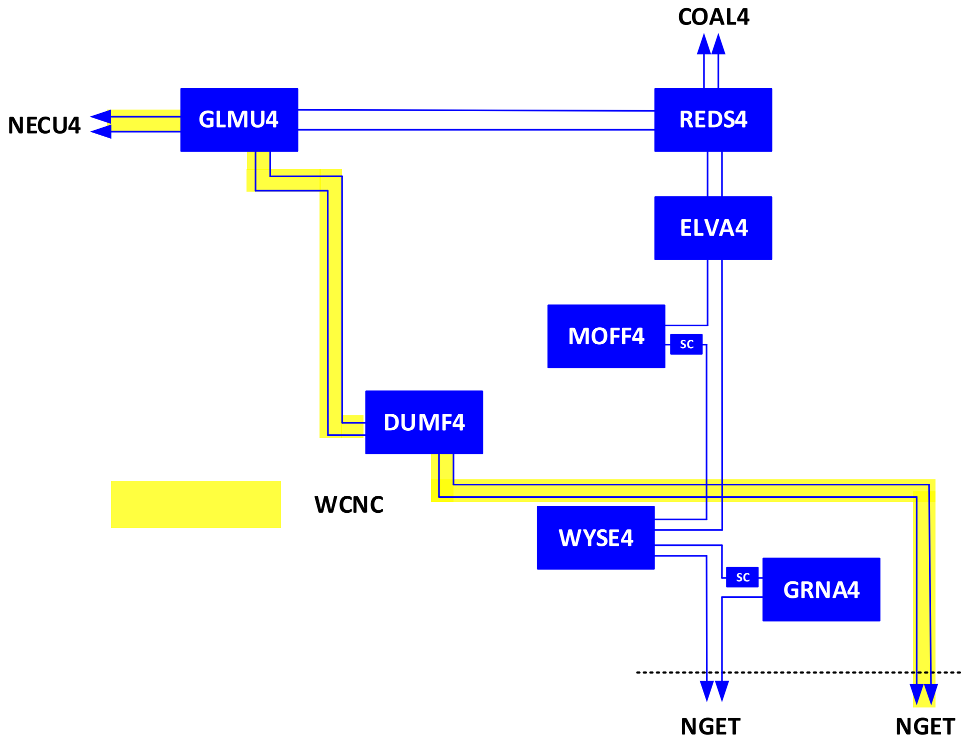


Figure 18 – the future development of Wyseby (WYSE4) and interactions with WCN2

[redacted] While the Wyseby 400kV direct connection into the existing ZV route circuits in the initial design is an efficient connection for the initial generation collector substation, the headroom for further development is limited. With the increase of connected generation, the ZV circuits will exceed the limit of Infrequent Infeed Loss set out in the SQSS. In those cases, we will have to put in place operational mitigations such as constraining the renewable generation along this circuit even for the intact network; and to avoid cascading overloading in other parts of networks under secured planning events.

From that perspective, connecting the whole Wyseby 400kV substation to WCN2 project offers a great opportunity for generators around Wyseby 400kV substation to get access to the MITS in an enduring manner.

To realise such a coordinated design, a phased programme is proposed to address the timing discrepancy, as the Wyseby 400kV substation is planned to be commissioned on/before October 2031 for connection of local generation while the WCN2 is scheduled for 2036.

1. **Stage 1** [contracted for completion in 2031]: Initial stage
   Establish the new substation platform at Wyseby with
   - 400kV double busbar substation;
   - 4 x400kV feeder bays and a bus-coupler to connect generation and provide the power flow access to ZV circuits by tee off arrangement at Gretna, under SPT-RI-2320.
   - The footprint of the substation will be sufficient to accommodate at least 11 feeder bays, 2 sections of double busbar; 6xSGTs, along with corresponding monitoring, protection panel/buildings.
2. **Stage 2: Further Development stage**
   Contracted and new generators in the region can be connected to Wyseby 400kV substation if/when they are ready. Each of such connections will be assessed and arranged in line with the engineering standards and network operational considerations.
3. **Stage 3: Integration Stage** [around 2036/2037]
   Given the proposed WCN2 project as signalled via the NOA, HND and tCSNP2, this new 400kV double circuit corridor can be connected in and out of Wyseby. It is sensible for the provision to have a dedicated busbar and 4 feeders to enable this design. The future footprint requirement will be increased to at least 20 feeder bays, taking into account the ongoing connection interests in the Wyseby area.

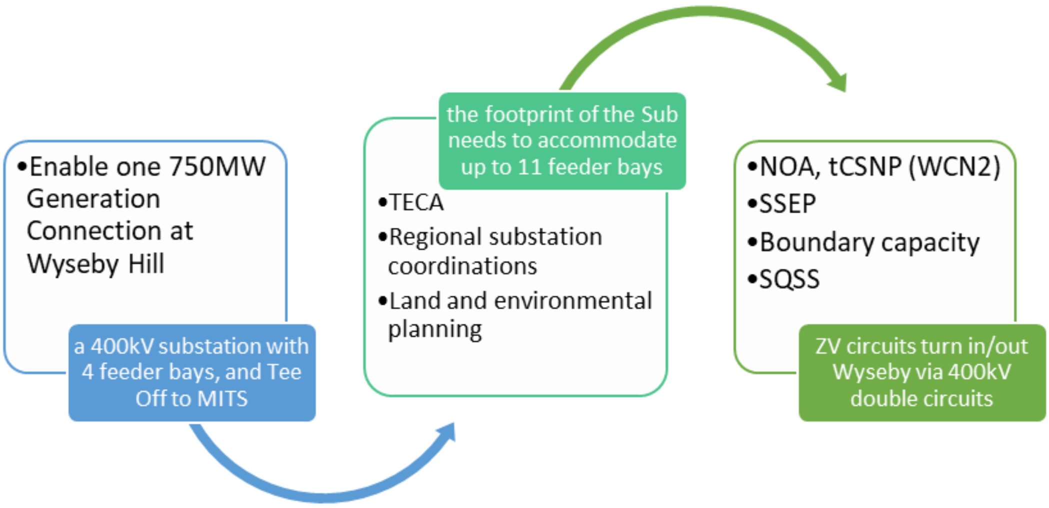


Figure 19 - Summary of the phased approach

For further detail on this project, please see the project specific Engineering Justification Paper which can be found at www.spenergynetworks.co.uk/pages/riio_t3_docs.aspx.

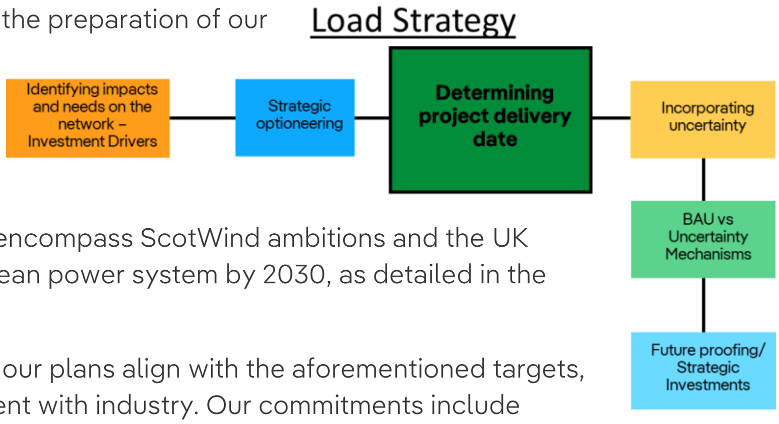
5.9 Conclusion

We are proposing projects to enable customers access to the transmission network. We fulfil our statutory duties in a pragmatic manner to provide a coordinated, economical and reliable service. Our load strategy presented has been assessed at both the individual and system level. The strategy represents an optimised proposal is value for money for the existing and future system users.

The range of conditions and backgrounds over which our network has to operate is widening. New approaches are required to deal with these changes to the electricity system. Our plan proposes an ambitious range of projects to ensure that these challenges can be met and that the network can continue to be operated in a safe, efficient, economic and stable manner while ensuring that the required changes in energy generation and consumption on the path to Net Zero can be made.

6 Determining Project Delivery Dates

6.1 Focusing on how to secure the targeted date



Throughout our delivery of RIIO-T2 and the preparation of our RIIO-T3 business plan, we have actively engaged with industry representatives to plan our responsibilities in meeting both UK and Scottish governments' decarbonisation targets. These targets encompass ScotWind ambitions and the UK Government's ambitions to achieve a clean power system by 2030, as detailed in the sections above.

To enable continued awareness of how our plans align with the aforementioned targets, we carry out various forms of engagement with industry. Our commitments include contributions to national strategic planning tools such as NOA, CSNP2, and ASTI. Additionally, we host a variety of touchpoints with connected, contracted and perspective customers on our network. One of these key events is our bi-annual SPT Connections Summit which welcomes customers to learn more about our network. The main interests for customers are hearing about strategic projects that enable their connections and upcoming policy changes to the industry.

For each project, we build up our programmes and establish initial delivery dates, using a number of key factors. These are discussed in turn below. Throughout the project life-cycle programmes are kept as live documents, and updated as both internal and external factors impact timelines. Whilst each discrete project has its own specific programme, driven by individual needs, it is also important to note that our full portfolio of works is considered holistically, to ensure that they are developed in the most economic, efficient and coordinated way, consistent with our licence.

Wider Government Targets – We recognise the significant role we play in order to meet the UK and Scottish Governments' targets, key to both connecting the new generation and demand connections to meet Net Zero by 2050 and 2045 respectively, but also wider system reinforcements to ensure that renewable power is able to reach where the demand is located, and to ensure the system remains operable and within limits through installation of devices such as reactors and harmonic filters. We establish our initial project schedules with our best view of the delivery dates. Throughout the project lifecycle and on a project-by-project basis, taking into account wider portfolio considerations - we continuously review schedule risks and opportunities and where appropriate and possible, adapt the individual project schedules to best suit each project objective.

Design Standards - Through the design process, we look holistically at all system drivers to ensure that each project is developed in coordination with all others. For example, where there are a high number of connections in one area, we would establish a collector substation (under a Transmission Owner Reinforcement Instruction, or TORI) and circuits back to the existing system, to minimise the construction of new assets, reducing the overall cost, construction time and programme risk., where multiple circuits might carry additional consenting risks. Our project schedules will align with this coordination – all of the schedules will be dependent on the TORIs being completed, and therefore will become the energisation date of each new connection and resulting programmes will work back from this point. By working in this manner, it is efficient in both cost and programme.

Connections Dates Driven by Generation and Demand - Each developer that makes an application s, via the NESO, will request a connection date. Where possible we will work to meet these dates, however it is important to note all of the other points that are considered (as discussed elsewhere in this section) that will inform if this date can be achieved. Regardless of outcome, we will engage with the developer throughout the process, and where there are opportunities to accelerate these dates, we will. This is through continual review of overall designs as the connections queue evolves over time.

Planning and Electricity Consents Approval - Each initial schedule where consents are required will assume that the application will be approved within the statutory timescales set by decision makers. For Local Planning Authorities this is four months (assuming all transmission infrastructure is national development). For section 37 consents, the Scottish Government's Energy Consents Unit (ECU) currently have no statutory timescales to determine applications. However, the suggested target timescale to determine new section 37s, whether a Public Local Inquiry (PLI) is required or not, is 12 months. We are engaging with the relevant Scottish Government departments, including Energy Consents Unit and Department of Planning and Environmental Appeals (DPEA) on this issue and wider resourcing matters. Where the 12 month determination timescale is not met, delays to projects will be incurred which, from our most recent experience, can take over four years to determine an application which has been subject to a PLI. It should be noted that through design we will try to minimise consenting requirements, by using our existing transmission footprint for sites and routes in so far as possible. However, with the scale of the challenge required across the network to achieve Net Zero by 2050 (2045 in Scotland), in general the existing footprint has been and will be maximised within the RIIO-T3 period and therefore it is necessary to increase beyond this.

Land Rights - Similar to planning and electricity consents, our initial programmes will be established with a view that voluntary land rights and purchases can be agreed, where we do not already have existing rights (and again, similar to consents, these existing rights will be maximised where possible ahead of new). Where this is not the case, we will look to secure land rights either through the use of Necessary Wayleaves (NWL) or through and a Compulsory Purchase Order (CPO) is required, this will add additional time to the process, of generally around a year.

Communities and Engagement - Engagement with our local communities is intrinsically linked with the land, planning and electricity consents processes. We have a well-established approach to engaging in an open and transparent way with stakeholders at all levels, from statutory consultees to communities, landowners and anyone who might have an interest in the individual project or scheme. We engage directly on the matters which stakeholders can influence, obtaining feedback that will assist in refining our proposals, providing and gathering information through a range of mediums, including information leaflets and newsletters, consultation documents, public drop-in events and webinars.

Supply Chain and Skills - To ensure we have access to the skills we need (where we are not able to access them in-house) we have a number of key frameworks, and built strong relationships with the supply chain, through which we are able to access additional labour and specialists as required. As a result we know to a reasonable degree the lead times on accessing these resources, and therefore would generally not have an impact on our project programmes. However, given the scale of growth within the industry, we will continue to engage closely with our suppliers and manage our frameworks to try to ensure this does not become a cause of delays in the future.

Equipment and Asset Purchases - As each project progresses through its lifecycle, our procurement teams track supplier lead times for manufacture of procured assets, changes are fed back into the project schedules, ensuring accurate durations are captured and updated throughout the project lifecycle (and tender dates adjusted where possible to ensure energisation dates can be maintained).

Given the nature of new connections, on occasion developers may terminate their connection agreement or delay their connection date where equipment has already been procured. Where possible these assets will be diverted to accelerate or de-risk alternative projects that are more likely to go ahead at that time.

In recent years, issues within the supply chain (e.g. greatly increased global demand for plant and labour) have increased lead times significantly which has generally led to an increase in our expected project durations. Through our new Strategic Framework Agreements and the Advanced Procurement Mechanism, we plan to mitigate the risk of increased lead times, minimising increased project delivery durations by giving earlier visibility to the supply chain of our asset and labour requirements. This will allow them to plan resource, materials and manufacturing slots into production schedules and resource planning. In order to provide up-to-date views of project delivery timescale, schedule risk and opportunities, continual review of current project schedules reflect changing procurement practices and supply chain delivery timescales, and will continue to do so in the future. More information on our contracting strategy and supply chain relationship management can be found in sections 6.5 below.

Outage Planning - An initial programme view will only consider that system outages must be completed within the summer outage season and with other projects in the immediate network area, before a more detailed assessment will be carried out in early project development to ensure that within the larger portfolio of works these can be accommodated. Within this assessment, all projects and required system outages are optimised, in conjunction with the other TOs and the NESO, to maximise each outage to deliver efficiently. In specific cases, risk assessments will be carried out that will allow for outages to be taken in the winter, however this would only be where the risks to the overall system have been adequately assessed and approved against winter Emergency Return to Service (ERTS) guidance to justify the works – assessed on a case by case basis. More detail on outage planning can be found in Section 6.4 below.

Risk and Contingency - Each individual programme will start with average durations based on historical experience. As projects mature through their lifecycle, task durations become specific to the project – for example, as surveys are carried out and ground conditions are understood, the full requirement of the civil engineering scope will become clearer, allowing task durations to be refined as the design maturity of the project increases.

Throughout each project's lifecycle, there are a number of stage gates that projects have to pass through with differing levels of approval from across the business (as discussed in Section 3 above). At each stage, the programme and key dates will be scrutinised to ensure they still align with the original targets for the project, and if not, why not. That way the risk of unintentional slippage in dates is reduced.

6.2 Customer Engagement

With experience and lessons learned from RIIO-T1 and RIIO-T2, we have found that engaging actively with our community and customers, even before official connection applications are submitted, benefits all parties and minimises risks. Therefore, we have established a clear and tested process for managing connection applications through to the design, delivery and energisation of these connection projects. From day one, we coordinate closely with our customers and key stakeholders such as NESO to support them in determining an achievable timescale. We engage with customers at the pre-application stage to explain the process for a connection into our network. This includes, but is not limited to, what a programme could look like for their project and provide detail on the enabling works within the area.

Once a connection application for either a demand or generation connection is received from the NESO, we establish regular and frequent check-in points to monitor progress, record developments, and capture any changes. We internally utilise a professional customer relationship management (CRM) tool, Salesforce, which is used by all relevant SPT teams. This ensures transparent and timely communication within SPT and co-ordinated, consistent communication with the customer. As outlined in our connection offer processes in the section above and our internal approval processes, these two elements work hand-in-hand to provide proper governance on the engineering design, ensuring that corresponding deliverables can be properly discussed, challenged and signed off at the appropriate level.

With inclusive membership and representatives from key internal departments such as Transmission Operations, Engineering Standards and Design, Commercial, Legal, Land and Planning, and more, TSRG (as in 3.2) serves as the ideal forum for sharing lessons learned, engaging in proactive preparation, and ensuring effective coordination, before sign off the recommended design (including the dates).

Following on from internal approval, a project programme is created in MS Project, taking into consideration the approved work scope and timescales derived from delivery of similar projects in the past and applying project-specific schedule risk. This is accessible and updatable by key personnel, specifically project managers. Each project has clear key deliverables and milestones with defined timescales, allowing us to monitor progress on a weekly basis. Once the customer accepts the contract, the project moves into the SPT Projects portfolio and is used to highlight risks clearly, such as delays in project delivery, procurement timelines, and legal processes.

6.3 Outage planning

SPT work to STC Procedure 11-1 "Outage Planning" as well as having in place a Network Access Policy (NAP) in co-ordination with the other onshore TOs and internal processes specific to SPT. This ensures that a coordinated and established transmission outage plan is provided to the NESO up to 6 years in advance. These processes drive continual refinement and alignment of transmission outages to ensure network access is taken in a safe, economical and coordinated manner.

As part of these policy commitments, and to ensure SPT have a fully transparent outage planning processes, SPT will produce a series of annual key performance indicators (KPIs) to monitor outage planning performance and outage delivery. The KPIs are set in appendix A of the GB NAP which can be found here on our website.

These KPIs have been developed in collaboration with all GB TOs and the NESO following feedback from customers and stakeholders across GB. In order to continually drive improvements in performance, these KPIs are regularly reviewed and feedback on performance provided to stakeholders to promote transparency. SPT have produced these KPIs using data from the current outage database as provided by the NESO where available. The electronic Network Access Management System (eNAMS) was introduced by the NESO during RIIO-T2 and is now used on a daily basis to provide further monitoring and transparency of performance and collaboration between TOs, NESO, customers and stakeholders.

6.4 Portfolio delivery

We have created a detailed model to assess the deliverability of our business plan including outputs, supply chain, enabling technology and organisational readiness and development and delivery timelines. We have fully developed programme templates for all out major project types, using our extensive data gathered during the delivery of similar projects over the last decade. These programmes showed key stage sequences and durations and allowed us to evaluate the viability of the initial plan shaped by available system access.

The plan has outlined the various stages our projects and programmes of work are at and whilst many lead times are fixed, for example statutory periods associated with planning activities, where opportunities present themselves, we will look to accelerate works where possible taking into consideration the following:

- Core project dependencies and identifying the earliest connection of generation/demand.
- Most efficient and sustainable construction and delivery method.
- Risk and mitigations associated with accelerated project plans.

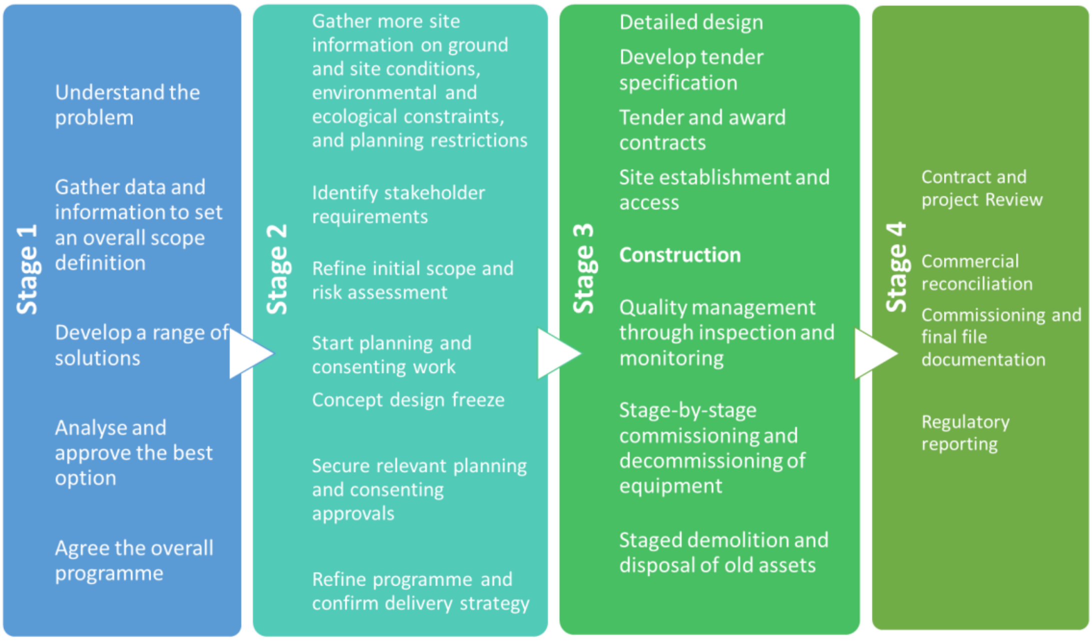


Figure 20 Start to Finish Project Lifecycle

6.4.1 Contracting Strategy

For the past ten years, we have used a delivery model we refer to as our 'Disaggregated Model with Direct Contracting'. This retains for SP Energy Networks all responsibility for designing solutions and managing programmes of work while using small to medium sized subcontractors (known as Tier 2 contractors) to provide specialised areas of work such as civils, overhead lines, cable installation and the supply of equipment. The 'Direct Contracting' element is carried out through one-off tenders under frameworks with Tier 2 contractors. It involves significant commercial and contracting activity but is effective because we have kept costs down by creating competition amongst a large cohort of contractors, maintained knowledge of rates and prices at a relatively granular level and retained high levels of control over the design of our network.

The Disaggregated Model has worked well with the mix of work involved in transmission network development to date and market conditions we have experienced thus far. However, the scale and pace of our RIIO-T3 programme, requires us to adapt our approach.

Our supply chain framework needs to retain elements of what has worked well so far, but it also needs to ensure the quantity of contracts and individual procurement events remain proportionate, that our partners can deliver a mix of regular and complex projects at pace and that our suppliers have the confidence to commit resources to fulfil our orders for equipment. To address these issues and following detailed engagement with key stakeholders and the market to understand the emerging landscape, we have developed a hybrid delivery model based on a combination of Direct Contracting and Engineering Procurement and Construction (EPC) Contracting depending on a project's characteristics.

EPC contracts feature a single agreement covering all stages in a project. We engage EPC Contractors to carry out the design, construction and commissioning on a turnkey basis (meaning the network infrastructure is ready for immediate use when our EPC contractor hands it over to us). EPC contractors – owing to their size, expertise and portfolio of work – tend to have access to their own equipment suppliers, subcontractors and engineering experts and are ideally placed to deliver large scale strategic projects.

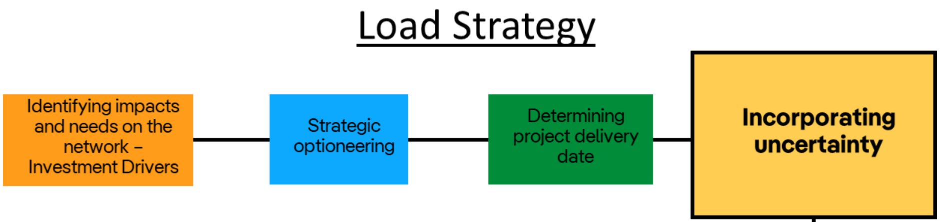
6.4.2 Managing Relationships

Our contracting strategy has been developed with the objective of improving resilience and long-term certainty with our supply chain partners. To enable us to achieve this goal we are introducing a new Contractor Management Team. This will enhance our ability to support and manage our partners, providing a vital link to drive more efficient planning and utilisation. Enabling our delivery teams to work collaboratively with our contracting partners to allocate projects and plan effectively to ensure efficient utilisation of contractor resources.

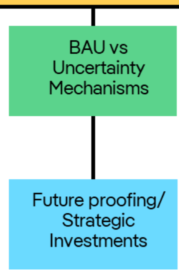
Further detail on our contracting and delivery strategy is contained within our Workforce & Supply Chain Resilience Annex.

7 Incorporating Uncertainty

This section discusses how uncertainty has been captured within our RIIO-T3 plans.



7.1 Unprecedented User Needs



Recent developments in the GB network are in the wake of the UK Government's 2050 commitment to facilitate nationwide grid decarbonisation and the connection of green energy resources to facilitate Net Zero. The UK government has driven ambition that by 2030 where offshore wind capacity is increased to 50GW, and low carbon hydrogen production is ramped up to 10GW. The government is also looking to increase solar power fivefold to as much as 70GW by 2035. In Scotland, there are specific targets set by the Scottish Government to realise Net Zero by 2045 with the need for a total of 20 GW onshore wind, 11GW of offshore wind and up to 6GW of solar capacity by 2030.

The SP Transmission network is uniquely placed – we are located within an area of high renewable capacity as well as being the interface between the North of Scotland (SSEN-T's network area) and the North of England (NGET's network area).

In developing the load related projects in our RIIO-T3 business plan, we have only included baseline cost allowances where the need is sufficiently certain, timing of expenditure is understood and we have high confidence in our costs. However, some areas of our operations naturally incur material costs which are difficult to forecast years ahead as they are subject to uncertainty outside our control.

Consequently, no provision is made for load related expenditure in our business plan for costs which we perceive as uncertain and subject to significant change over the course of RIIO-T3 as this approach could pose financial risks to both SPT, connected customers and consumers. Instead, we are supportive of Ofgem's proposals to accommodate such uncertainties in our business planning with the use of uncertainty mechanisms, which provide flexibility for the adjustment of revenues over the course of RIIO-T3.

We have grouped the mechanisms into three categories corresponding to the overarching sources of uncertainty The three categories are as follows:

Energy system uncertainties for Net Zero - this area broadly includes uncertainties related to our efforts in meeting the Net Zero target that may arise across the energy system. From our experience in RIIO so far, we face uncertain factors such as costs due to global supply chain pressures, the timing and volume of expenditure related to each source of uncertainty vary and are not accurately predictable at the time of developing this business plan.

One example where uncertainty could have an impact on our plans are the ongoing policy changes that will impact our new connections portfolio. With UK Government's ambitions to achieve a clean power system by 2030, Connections Reform and the Strategic Spatial Energy Plans all ongoing, our portfolio of projects is set to change – precisely what developments we are going to connect and where will be impacted by all three of these initiatives, therefore our plans have been developed to be able to flex to any eventuality of this outcome. We have taken several steps to help to manage the variable outcome through the T3 period and beyond.

We have updated and applied our TECA methodology, which acts in advance of the output of the Connections Reform to comply with the Government's Connection Action Plan to accelerate new connections, looking at the likelihood of projects going ahead to allocate our resources accordingly. This will continue to be reviewed and updated as required as policy changes and outputs of ongoing initiatives are firmed up.

Our main load strategy is to target specific sites and routes that are required strategically and are not sensitive to the outcomes of the ongoing reforms. These will provide us with the base network required on which the rest network can then be developed.

Strategic Investment has been incorporated into our plans to help to futureproof against current unknowns.

Ensuring we have a strong base of uncertainty mechanisms with which we are able to fund any eventuality is a pivotal objective in the creation of the RIIO-T3 business plan.

Legislative, policy and standards uncertainty - this area of uncertainty pertains to external bodies making legislative or policy changes which may impose new technical or operational obligations on our business. In particular, complying with legal obligations introduced by new legislation or Government policies is likely to give rise to unavoidable (and unpredictable) additional costs.

Closely linked to the changes required for a Net Zero Energy System, a clear example is the ongoing Connections Reform, coupled with the forthcoming Strategic Spatial Energy Plan, due to be published by the NESO in 2026, which could have a significant impact on our current portfolio of projects. These uncertainties will be mitigated as per the section above.

External financial uncertainty - the last category identifies established uncertainty brought about by external changes of which SPT have no control, such as cost increases not in line with inflation and supply chain pressures due to global acceleration of investment. To help to manage these uncertainties, we are engaging significantly with our supply chain, as a global organisation, as part of the Iberdrola group. We are also changing the way we contract with our suppliers, using a blend of our existing disaggregated model, as well as a more strategic approach to larger contracts, to ensure we are best able to deliver on our plans within RIIO-T3 and beyond.

We have therefore taken the approach of only including certain costs within our baseline, proposing to make use of uncertainty mechanisms to make appropriate adjustments once more information becomes available. This is explained further in the following section.

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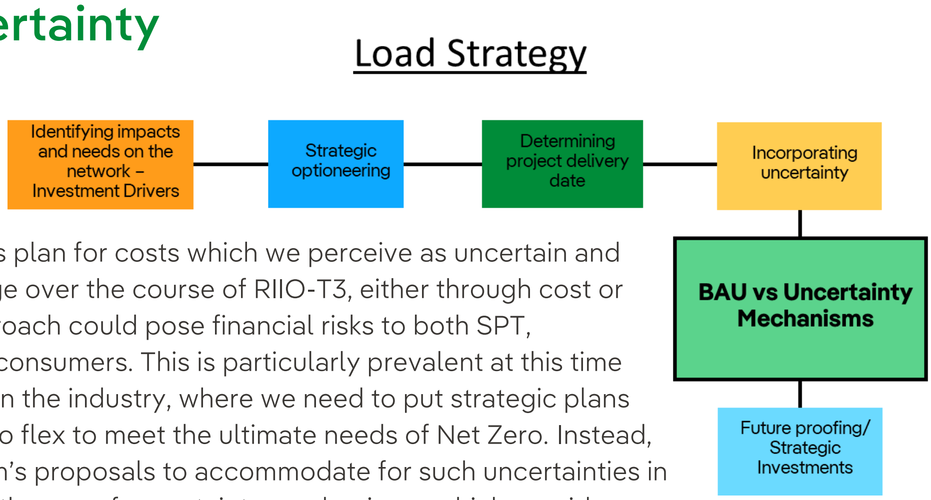
8 BAU vs Uncertainty Mechanisms



No provision has been made for load related projects within our business plan for costs which we perceive as uncertain and subject to significant change over the course of RIIO-T3, either through cost or scope changes as this approach could pose financial risks to both SPT, connected customers and consumers. This is particularly prevalent at this time of uncertainty and change in the industry, where we need to put strategic plans in place that are also able to flex to meet the ultimate needs of Net Zero. Instead, we are supportive of Ofgem's proposals to accommodate for such uncertainties in our business planning with the use of uncertainty mechanisms, which provide flexibility for the adjustment of revenues over the course of RIIO-T3.

There are four key RIIO-T3 mechanisms that will fund our load projects delivering both in the period, but also further reaching beyond April 2031 to ensure consistent development of the system. These are detailed in this section. It should be noted that a number of the mechanisms will continue to fund our existing projects which have already been approved. Our four ASTI projects will continue to be funded via this mechanism, projects already approved by RIIO-T2 MSIP continue into the RIIO-T3 period with no further funding approvals required, and tCSNP2 projects will continue under the tCSNP2 development and delivery track. The projects with funding under these categories are included in Table 2, section 4.1.4 above.

8.1 Baseline Projects

In our RIIO-T3 load baseline, we have included only four projects where we are confident that the costs, scope and investment drivers are mature and sufficiently certain. By taking this approach to setting our load baseline, we are protecting consumers from the potential effects of ex-ante funding for works where there is potential for change, instead opting to use Uncertainty Mechanisms where these are more suitable.

Our baseline projects are shown in the table below.

Table 6 - RIIO-T3 Load Baseline Projects

Project Title	Description	Cost Estimate
Braco West to Denny Uprating (BDUP)	Southern end of SSEN-T's ASTI BDUP project to uprate existing Beauly – Denny 275kV circuit to 400kV operation.	£3.09m
Currie GSP Transformer Replacement	Replacement of 132/11kV grid transformers with new 132/33kV grid transformers to standardise the existing site, creating additional capacity for the distribution network.	£9.84m
Transmission Upgrade – Distribution Restoration Zone	Transmission works to enable Distribution Restoration Zones (DRZs), to restart the system from the 33kV network.	£16.20m
T3 Restoration	Next phase of the RIIO-T2 Black Start works to upgrade existing transmission sites for Emergency System Restoration conditions.	£5.30m

The 'Transmission Upgrade – Distribution Restoration Zone' output is proposed as a Price Control Deliverable (PCD). Ofgem has invited PCD submissions to allow for enhanced reporting and regulatory review for eligible allowances greater than £15m, ensuring that consumers only pay for the outputs they receive. Our approach to PCDs in RIIO-3 is to propose all eligible baseline investments over the £15m materiality threshold as a PCD.

8.2 Volume Driver

Given the scale of the new connections activity, as detailed in Section 4 above, to ensure that we are able to deliver at pace, it is vital that the funding mechanism requires minimal regulatory burden for projects that are typical builds. During RIIO-T2 two volume drivers for new generation and demand connections projects have operated well. In these, standard cost elements, agreed at the beginning of the period, are applied to each individual project to provide an allowance. This allows any typical project to be developed and delivered in line with our standard project timescales, with no project-specific in-period regulatory approvals required. A threshold is set such that if the cost estimate is either above or below the allowance set by the unit costs, the projects are treated as atypical and require regulatory submissions to approve costs. During RIIO-T2 this was via the Medium Sized Investment Projects (MSIP) mechanism.

For RIIO-T3 we support the continued use of a volume driver for all new connections projects, but re-designed with our latest portfolio of works. Since the setting of the RIIO-T2 unit costs, there has been a significant shift in our portfolio. When we submitted our RIIO-T2 business plan, new connections were mainly onshore wind farms with 132kV radial connections to existing transmission sites. During RIIO-T2, we have seen a significant increase in battery projects contracting whose capacity requires 275kV and 400kV point of connections but are located much closer to our existing footprints. The wind portfolio also continues to grow, but their capacity has also generally increased and with the increasing volume of projects, more new collector substations are being proposed to produce the most economic, efficient and coordinated approach to designing our network. Given this significant overall change, the scope of requirements of the volume drivers in RIIO-T2 have changed, and also indicate the need for flexibility within period to ensure we continue to meet the needs of our customers.

We will continue to work with Ofgem and the other TOs to ensure that volume drivers are in place to fund our projects at pace as required. The following graph shows the current portfolio of new connections projects by capacity and technology type, both high and medium probability projects, the SPT Best View, and low probability projects. Although we have assigned probabilities to assist in our planning processes, the RIIO-T3 volume driver must be flexible enough to provide funding for all but the most outlying projects that are ready to connect to our system.

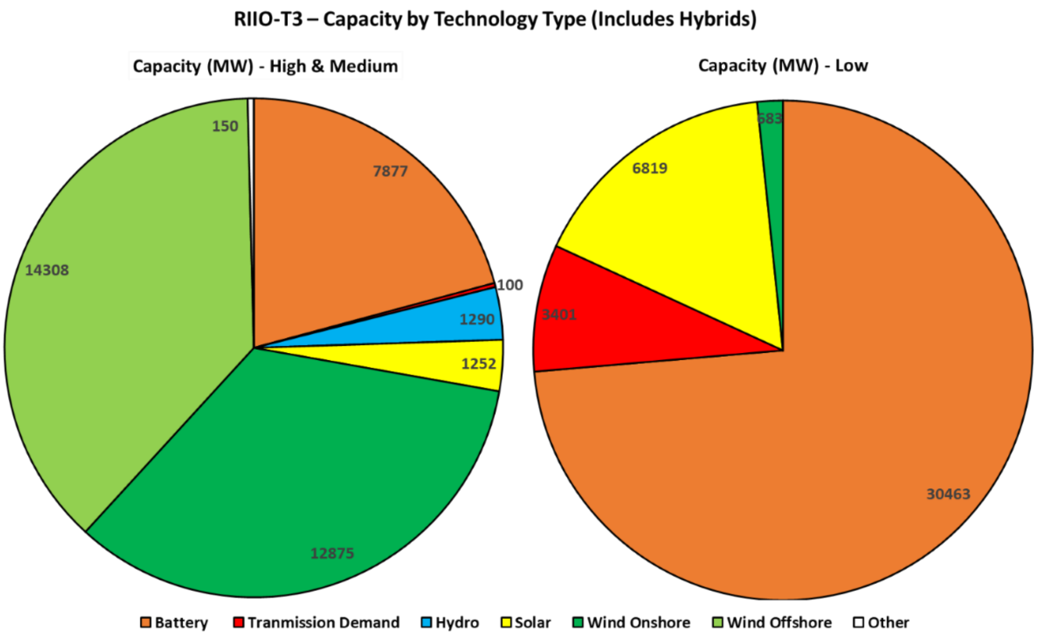


Figure 21 - New connections portfolio capacities split by probability

**Hybrids are where one development has two or more different types of technology, for example wind and solar connected behind one meter.*

8.3 Use It or Lose It (UIOLI)

The UIOLI pot has been proposed for introduction during RIIO-T3 to provide funding for load projects whose costs are less than £25m, that are not included within baseline or funded with the RIIO-T3 volume drivers. This will reduce the regulatory burden on projects which are of lower materiality but have a clear needs case, such as enabling atypical new connections falling outwith the upper or lower threshold of the volume driver (but under £25m) or those required to maintain operability of the system, such as harmonic filters or reactors. This pot has been designed with delivery at pace in mind, and will be a valuable tool for SPT, working alongside the RIIO-T3 volume driver to ensure that we are able to deliver on our requirements to meet the needs of our new connections customers and GB consumers overall. Similar to the volume driver, it is not expected that there will be any implications of individual project delivery in use of the proposed UIOLI.

As it stands, we have identified a number of projects that will be funded through the UIOLI pot, both for operability and low cost connections enabling, which are shown below in Table 7. We also anticipate this pot will be used to fund a number of shunt reactors within the T3 period, similar to the projects that were delivered within the T2 period – with an estimated total cost of around £25m. It is difficult to fully quantify the required size of the proposed pot at this time, due to the uncertainty around what connections projects will be required, and how the volume driver will be redesigned/recalibrated for use within RIIO-T3.

8.4 Load Related Reopener (LRR)

The Load Related Reopener (LRR) has been developed for RIIO-T3 to replace both the MSIP and Large Onshore Transmission Investment (LOTI) mechanisms from RIIO-T2 to help to streamline the process for assessing load projects throughout the period. The LRR will fund load projects over £25m which have no other funding mechanism. Work with Ofgem is still ongoing on finalising the LRR process and requirements, however there is an expectation from the SSMD that the assessment will have two tracks: need and cost assessment and cost-only assessment.

In our RIIO-T3 plans, we have submitted a number of Site and Route Strategies, introduced in Section 4.4, that have very clear need, but due to interaction with different projects or new connections, as well as the stage of development of each project, costs remain uncertain at the time of the RIIO-T3 business plan submission. For these projects, we are seeking approval from Ofgem for the needs case of the projects only. Once costs are sufficiently certain, approval of the costs will be managed through a cost-only assessment as part of the Load Related Re-opener, or if under £25m, through the proposed UIOLI pot described in the section above. At the time of writing, the detail of LRR submission functionality is to be agreed by Ofgem, however lessons learned from previous price control uncertainty mechanisms will be applied to ensure minimal implications on delivery of individual projects.

It should be noted that the costs below are only those that are recoverable through the proposed uncertainty mechanisms and those to be directly recovered by the connecting party are excluded. Whilst designing individual projects and the overall network, total costs, regardless of funding mechanism, are considered to ensure that the most economic, efficient and coordinated solutions are taken forward.

Table 7 - Needs case submission via T3 Plan

Project Title	Associated TORI references (where applicable)	Proposed Funding Mechanism	Total Cost (2023/24)
Glenmuckloch to ZV Route 400kV reinforcement	SPT-RI-236	LRR (cost assessment only)	£139.62m
U+AT Route 132kV Reinforcement	SPT-RI-151b	LRR (cost assessment only)	£66.37m
Glenshimmeroch 132kV substation	SPT-RI-274 SPT-RI-2243 SPT-RI-296	UIOLI*	£26.75m
Redshaw 400/132kV substation	SPT-RI-2060 SPT-RI-2061 SPT-RI-2139 SPT-RI-3060 SPT-RI-4137 SPT-RI-4138	LRR (cost assessment only) UIOLI	£138.95m £19.50m
Glenglass to Glenmuckloch 132kV Reinforcement	SPT-RI-173	LRR (cost assessment only)	£45.41m
Gala North 400/132kV substation	SPT-RI-2079 SPT-RI-2080	LRR (cost assessment only)	£158.45m
Holmhill 132kV Substation	SPT-RI-1507 SPT-RI-221 SPT-RI-2094 SPT-RI-292	UIOLI*	£35.47m
EHRE - Elvanfoot to Harker 400kV Reinforcement	SPT-RI-231	LRR (cost assessment only)	£122.22m
Colyton to Maybole 132kV Reinforcement	SPT-RI-3062	LRR (cost assessment only)	£91.75m
Dumfries North 400kV substation	SPT-RI-2862	LRR (cost assessment only) /CSNP-F	£42.54m
Killloch 400kV substation	Part of SPT-RI-2876	LRR (cost assessment only)/CSNP-F	£121.90m**
New Cumnock North 400kV substation	Part of SPT-RI-2876	LRR (cost assessment only) /CSNP-F	£172.14m**
Carrick 275kV Substation	SPT-RI-293	UIOLI	£13.78m
Teviot 400/132kV substation	SPT-RI-2418 SPT-RI-2378	LRR (cost assessment only) /CSNP-F	£90.10m***
Wyseby 400kV substation	SPT-RI-2320	LRR (needs only)	£66.99m

VERE - Strathaven to Elvanfoot 400kV Reinforcement	SPT-RI-1797	LRR (cost assessment only)	£90.34m
DLUP - Windyhill - Lambhill - Denny North Reinforcement	SPT-RI-2085	LRR (cost assessment only)	£131.27m
Coalburn 132kV Harmonic Filter	N/A	UIOLI	£11.84m
Arecleoch Extension 132kV Harmonic Filter	SPT-RI-4057 SPT-RI-4030	UIOLI	£9.17m
Synchronous Compensation	N/A	LRR (needs and cost assessment)	£311.60m

*UIOLI has been indicated where individual elements of the project are less than £25m and therefore are applicable for this funding.

**costs included within BPDT as part of Strategic Project WCN2.

***costs included within BPDT as part of Strategic Project CMN3

For further detail on each of the projects above, please see the project specific Engineering Justification Paper which can be found at our website: www.spenergynetworks.co.uk/pages/riio_t3_docs.aspx.

As is the nature of uncertainty mechanisms, there will be further projects that require to be funded by the LRR. These will be submitted within the period when appropriate.

We continue to work with Ofgem and the other TOs on the suitable development of the LRR based on learning from RIIO-T2 and our current portfolio of projects, however we support the current proposals as a good way to provide the flexibility required with the current level of uncertainty in the industry.

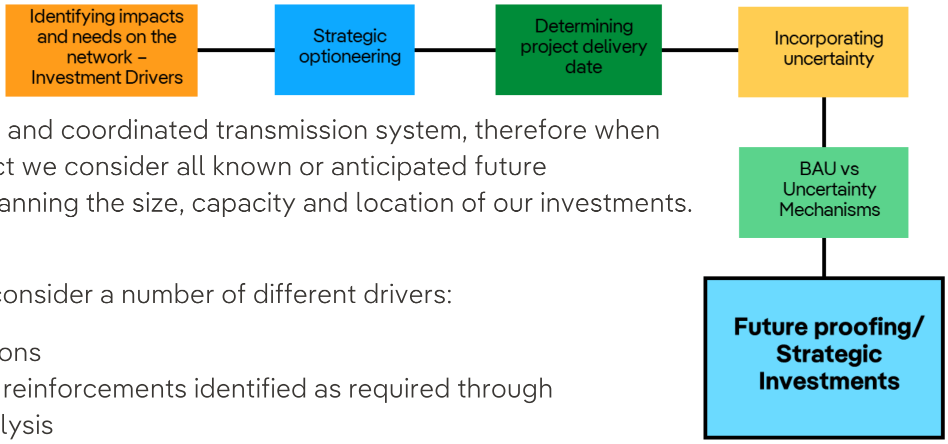
8.5 Centralised Strategic Network Plan (CSNP)

There are currently no projects in CSNP-F, as the first CSNP is expected to be published until 2026 at the earliest, however we will continue to work with Ofgem on how these funding mechanisms will develop for tCSNP and any future CSNP projects.

Ofgem have published their view on the tCSNP2 projects suitability for competition. Across GB, 8 projects have been identified as suitable for competition, 4 of which cover works within our area. Further information on competition can be found in Section 10, but it will play a key role in the development of CSNP-F.

9 Future Proofing/Strategic Investment

Load Strategy



As discussed, we are bound by our licence to develop an economic, efficient and coordinated transmission system, therefore when developing any project we consider all known or anticipated future requirements when planning the size, capacity and location of our investments.

As per Section 5, we consider a number of different drivers:

- New connections
- Wider system reinforcements identified as required through economic analysis
- Operability requirements
- DNO or other external interactions
- Non-load drivers

With a view on all of these future requirements we will consider the different options to complete the project, including proposed timing and requirement of each of the elements and ensure projects are completed to do so.

An example of where strategic investment has been identified is at New Cumnock North 400kV substation.

This project was initially driven by the tCSNP2 requirement for a new 400kV onshore connection from Kilmarnock South into the NGET area, project code WCN2, to deliver additional B6 boundary capability. The proposed overhead line section between Kilmarnock South and New Cumnock substations will use existing transmission circuits, to be uprated to 400kV. As a result a new 400kV substation will be required in the New Cumnock area to ensure continued connectivity of the 275kV network.

There is a significant level of new connections activity in the New Cumnock area, with limitations already on the existing circuits and existing substation footprints have been maximised. Recognising the new 400kV substation proposed in the area driven by WCN2, this provides opportunities to provide additional capacity to accommodate connections directly from the existing 275kV network. As plans develop, the proposed 400kV footprint will be sized to align with potential future connections in the area, and the conductors, transformers and other equipment will also be rated accordingly. As standard, Strategic Investment is made at each substation in the form of spare substation bays (which would provide connection points to further new connections, or further integration with additional network investment), incorporated into all designs to allow for further development.

It is recognised that the large power transfers which have determined the requirement for the new 400kV circuits proposed in WCN2 will also require operability projects to ensure voltage profiles remain within SQSS limits. These could take the form of new synchronous or dynamic compensation, shunt reactors, MSCDNs, or a number of other solutions. For New Cumnock

North, further analysis and development is required to determine the best operability solution at this site, however space is left within the planned footprint to accommodate these requirements.

The provisions for future needs outlined in this one example are applied as standard to all system developments. In this regard, our principal objective is to ensure that new developments can accommodate the future requirements that can reasonably be foreseen.

10 Competition in Transmission

10.1 Introduction

The concept of Competition for onshore transmission network projects has been considered for many years, with primary legislation being introduced in Oct 2023 to facilitate its introduction. Ofgem and the NESO have been working on the development of Early and Late Competition. Ofgem recently published their eight shortlisted projects for Early Competition, four of which are SPT's projects shown in Table 10. One of the eight shortlisted projects will go to the first competitive tender, to be identified via consultation at the end of 2024.

10.2 Ofgem Request on Early and Late Competition

Ofgem's business plan guidance requires an assessment of projects' eligibility for late and early competition including where it is possible to bundle projects so that they meet the materiality thresholds - £100m for late competition and notionally £50m for early competition (recognising that currently there is no threshold for early competition). Note that for bundling, we have used our site strategies to determine where these could be bundled locally to become projects greater than the thresholds. Our assessment based on these criteria can be found in Table 7 which outlines all projects from our full portfolio of works. In addition, through our site strategies developed for the RIIO-T3 submission, we have identified a number of projects that could be bundled that would have resulting value of greater than £100m or £50m. A total of 28 projects meet the criteria based on these thresholds for late and/ or early competition, which are included in the table below, however we set out some additional factors needing to be considered when determining the suitability of these projects for competition which is discussed later in the section.

Table 8 - Identified Projects

Scheme Name	Early	Late
Synchronous Compensators	Y	Y
CMN3 Scotland to England Reinforcement TORI-1795	Y	N
HGNC Harburn S/S-Gala North 400kV TORI 3884	Y	N
NHNC Harburn-New Deer Greens 2	Y	N
WCN2-West Coast Onshore B6 reinforcement	Y	N
E2DC - Eastern Subsea HVDC Link from Torness to Hawthorn Pit Output	N	N
TGDC-Eastern Subsea HVDC Link from Westfield to South Humber	N	N

Harburn Substation (TORI 3002/TORI 3168)	Y	N
West Coast Offshore HVDC (WCD4)	Y	Y
LCU2 - Eastern B5 400kV Reinforcement (TORI2084)	N	N
DWNO Denny to Wishaw 400kV Reinforcement TORI-003	N	N
LWUP Kincardine North 400kV Reinforcement TORI2095	N	N
DWUP Kincardine North to Clyde's Mill 400kV Reinforcement TORI-2083	N	N
DLUP(TORI 2085) Windyhill Lambhill. Denny North 400kV Reinforcement	N	N
VSRE XH & XJ Routes 400kV Major Refurbishment.	N	N
VERE(TORI 1797) Strathaven to Elvanfoot 400kV Reinforcement.	N	N
EHRE Elvanfoot to Harker Uprating (TORI 231)	N	N
TKUP (TORI-2073) Kincardine North - Tealing 400kV Reinforcement	N	N
SPT-RI-2319 – Carradale to Kilmarnock South Subsea Cable	Y	N
Eccles Shunt Compensation (B6) (ECVC)	N	N
Branxton 400kV substation	N	N
Narie	Y	N
TORI-151b Galashiels to Eccles 132kV	N	N
Cousland 400kV substation TORI-1796	Y	N
Dunlaw Extension to Galashiels Reinforcements (TORI 2080)	N	N
TORI-236 Glenmuchloch to ZV Route	N	N
Coylton to Maybole 132kV Circuit TORI-3062	N	N
Redshaw 400/132kV substation (bundled projects from site strategy)	N	N

10.3 Suitable projects for Early or Late Competition

There are a number of instances where there would be significant impacts on the development and delivery of other projects that currently have either interface or interdependency with the projects being considered for the first competitive tender in December 2024. We have set out some of the key considerations below that we believe make each project considered for further study ineligible or impractical for selection for competitive tender. The primary consideration is to ensure there are no inadvertent delays arising from interdependencies and contracted connections if a project is selected for competition and to ensure the projects continue to be delivered at pace.

Synchronous Compensators

During RIIO-T2, SPT proposed synchronous compensators as means to support voltage and stability of the network as existing synchronous plant closed. The RIIO-T2 projects were submitted for evaluation in the NESO's Stability Pathfinder project but were not successful in the tender. During RIIO-T3 we recognise that there remains an operability issue across the network that can be met with the installation of synchronous compensation, therefore we propose again that SPT install these types of devices, to be funded under a RIIO-T3 uncertainty mechanism, to ensure the system's requirements are met. The proposal would meet the criteria regulations for both Early and Late Competition. It has a delivery date of 2031 and has a total estimated cost of £311.6m.

CMN3

This project is currently shortlisted for Early Competition by Ofgem. It has an expected delivery date of 2034 and has a total estimated cost of £357m. CMN3 received a proceed signal from the NESO and Ofgem as part of the tCSNP2 and it will see the installation of a new 400kV double circuit connection: Gala North – Teviot – Carlisle Area. Whilst this project may meet the criteria for Early Competition it is critical to the connection of onshore generation with approximately 2,500MW contracted generation currently in the area, across multiple individual generation developments. This project will consist of at least one new collector substation (at Teviot) to support this generation activity and connects into a new substation south of the B6 boundary. The Teviot and Gala North projects also have contracted generation connections which will be embedded in the 400kV and 132kV substations making the substations inseparable. The competitive process will impede SPT's ability to offer connections at these locations, and clarity is required on the status of contracted connections, therefore increasing the risk of unnecessary project delays. Whilst this project may meet the criteria regulations for Early Competition it is of importance there is significant onshore generation connection activity relating to this project, alongside the need for careful coordination with WCN2 to co-locate new OHL routes across the B6 boundary to ensure environmental restrictions are carefully considered and acknowledged, including Hadrian's Wall World Heritage Site. Given their importance to achieve Net Zero and security of supply for consumers across GB, the cross border connections projects should not be exposed to the risks that sit with the introduction of competition.

<u>HGNC</u>

This project is currently shortlisted for Early Competition by Ofgem. It has an expected delivery date of 2037 and has a total estimated cost of £280m. HGNC received a proceed signal from the NESO and Ofgem as part of the tCSNP2, it will strengthen and provide further resilience between the existing 'east-west' Strathaven-Torness corridor and the primary east coast B6 corridors. Whilst this project may meet the criteria regulations for Early Competition it is critical for energy security which is of particular importance given the integral role that the need to secure the system for a fault outage on the Strathaven – Harker (ZV) route, where the new circuit improves utilisation of the existing Eccles – Stella West (ZA) route and the proposed new Gala North – Carlisle Area route (CMN3), improving the utilisation of the new CMN3 infrastructure. This new 400kV OHL project will attract significant interest from stakeholders and communities. There are multiple routing challenges associated with this new line which may require mitigation such as technology choices. This includes the route between/around the Pentland hills and established settlements to the north and east, such as Penicuik. There are also several areas of highest amenity, including Historic Gardens and Designated Landscapes, Special Areas of Conservation etc. HGNC is coordinated and complimentary of NHNC and CMN3 which will see interdependencies having to be managed carefully and efficiently.

<u>NHNC</u>

This project is currently shortlisted for Early Competition by Ofgem. It has an expected delivery date of 2039 and has a total estimated cost of £205m. NHNC received a proceed signal from the NESO and Ofgem as part of the tCSNP2, it consists of a new 400kV double circuit between New Deer 2 (Greens) and Harburn. Whilst this project may meet the criteria regulations for Early Competition it is of importance in the context of decarbonisation and net zero delivery as it has significant interdependencies with the connection of vast renewable onshore and offshore generation from the northeast of Scotland and will provide an additional high-capacity exit route from the northeast towards the Main Integrated Transmission System (MITS) in the central belt. The project also integrates with the coordinated and complementary B6 reinforcements CMN3 and WCN2. Harburn substation, part of NHNC for tCSNP2 analysis purposes, is being progressed towards earlier completion to facilitate contracted customer connections.

WCN2

This project is currently shortlisted for Early Competition by Ofgem. It has an expected delivery date of 2038 and has a total estimated cost of £728m, however it does not meet the criterion in the Criteria Regulations, as the scheme is not separable due to significant design constraints. WCN2 consists of a new 400kV double corridor: utilising existing uprated 275kV circuits between Kilmarnock South and New Cumnock, and new 400kV infrastructure between New Cumnock, Glenmuckloch and the Carlisle Area. As part of new connections reinforcement projects, a number of new collector substations are contracted to be established along the proposed new circuit for connection of new renewable generation in the Dumfries and Galloway area. All of the substations established on this new circuit include contracted new connections which are embedded in both the 400kV, 275kV and 132kV substations which makes the substations inseparable. The competitive process will impede SPT's ability to offer connections at these locations, and clarity is required on the status of contracted connections, therefore increasing the risk of unnecessary project delays. The project will also see the existing 275kV WA and XY routes uprated to 400kV and establish new substations at Killoch and New Cumnock, helping to minimise new 400kV OHL build. Whilst this project may meet the criteria regulations for Early Competition it is of importance there is significant onshore generation connection activity relating to this project, alongside the need for careful coordination with CMN3 to co-locate new OHL routes across the B6 boundary to ensure environmental restrictions are carefully considered and acknowledged, including Hadrian's Wall World Heritage Site. Given their importance to achieve Net Zero and security of supply for consumers across GB, the cross border connections projects should not be exposed to the risks that sit with the introduction of competition.

SPT-RI-2319 – Carradale to Kilmarnock South Subsea Cable

This project meets the eligibility criteria for Early Competition, it has an expected contracted connection date of 2035 to enable contracted connections and has a total estimated cost of £98.1m. We assess that the cable and transformer works are separable. Whilst this project may meet the criteria regulations for Early Competition as this is a joint TO project with SSEN-T it will require careful coordination.

Narie

This project meets the eligibility criteria for Early Competition, it has an expected contracted connection date of 2036 and has a total estimated cost of £74m. This project consists of approximately 35km of new 400kV double circuit between the developer's site and SPT's proposed 400kV substation. Whilst this project may meet the criteria regulations for Early Competition it has programme dependencies with WCN2. As this project includes a new 400kV OHL it will attract significant interest from stakeholders and communities which will require considered engagement. Given this project is designed to directly connect a new connections customer, any competition process cannot be allowed to impact the customer connection date. Additionally, it is likely that further developers in the area could be connected into this circuit to provide economic, efficient and coordinated designs. Therefore this must be considered in the competition process to ensure this continues to be the case.

WCD4

This project was given a proceed signal through the tCSNP2. It meets the criteria for competition, with an expected delivery date of 2037. The total estimated costs for this project are still to be confirmed however it will meet the materiality threshold for both Early and Late Competition. WCD4 targets the transmission boundary B6 by establishing a further 4GW subsea HVDC link in the west that crosses this boundary. WCD4 represents an enhancement of the HND recommendation, delivering an overall 4GW north to south capacity (as opposed to 2GW) by establishing 2 x 2GW rigid bipole HVDC circuits, while continuing to utilise four subsea cables. WCD4 increases B6 transfer capability, maximises seabed utilisation and offers the potential for phased offshore generation development as well as development in excess of 2GW. Given the experience on Eastern Link 1 (EGL1) and the ongoing development of Eastern Link 4 (EGL4), key to the delivery of the project will be supply capacity within the HVDC converter and cable market. Engagement is ongoing with NGET and the offshore wind developer to establish the route to market from a technical and commercial perspective; this will include strategies for securing supply capacity. Despite this project meeting the criteria regulations for competition it is critical and has complex interdependencies with an offshore wind connection, whilst also being a JV project with NGET.

10.4 Justification for Projects Identified as Not Suitable for Competition

Within Table 9 we outline the projects that we have deemed to not be suitable for Early Competition the rationale for this decision can be found in the table under the comments column. We have also set out the rationale for the projects we have identified as not suitable for Late Competition in Table 10 below.

Table 9 – Early Competition (EC)

Scheme Name	EC	Comments
E2DC - Eastern Subsea HVDC Link from Torness to Hawthorn Pit	N	ASTI Project - exempt from competition.
TGDC-Eastern Subsea HVDC Link from Westfield to South Humber	N	ASTI Project - exempt from competition.

Harburn Substation (TORI 3002/TORI 3168)	Y	New substation works integral to existing transmission circuits. New substation separable but OHL works not, reducing separable works to less than £100m, but greater than £50m. Careful management required to coordinate with contracted developers to maintain connection dates.
LCU2 - Eastern B5 400kV Reinforcement (TORI2084)	N	Not separable - extension of existing substations and reconductoring of existing transmission circuits.
DWNO Denny to Wishaw 400kV Reinforcement	N	ASTI Project - exempt from competition.
LWUP Kincardine North 400kV ReinforcementTORI2095	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
DWUP Kincardine North to Clyde's Mill 400kV reinforcement TORI-2083	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
DLUP(TORI 2085) Windyhill Lambhill Denny North 400kV Reinforcement	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
VSRE XH & XJ Routes 400kV Major Refurbishment	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise. The scope is to reconductor existing transmission circuits and therefore not separable.
VERE (TORI 1797) Strathaven to Elvanfoot 400kV Reinforcement	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise. The scope is to reconductor existing transmission circuits and therefore not separable.
EHRE Elvanfoot to Harker Uprating (TORI 231)	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise. The scope is to reconductor existing transmission circuits and therefore not separable
TKUP (TORI-2073) Kincardine North to Tealing 400kV Reinforcement	N	ASTI Project - exempt from competition.
Eccles Shunt Compensation (B6) (ECVC)	N	Project tendered and in construction phase, therefore not suitable for competition.

Branxton 400kV substation	N	Project tendered and in construction phase, therefore not suitable for competition.
Cousland 400kV GIS substation TORI 1796	N	Not suitable for early competition, asset condition driving completion date - delay for tender exercise increases asset risk.
Dunlaw Extension to Galashiels Reinforcements (TORI 2080)	Y	New substation works integral to existing transmission circuits. New substation separable but OHL works not., Substation works separated greater than £50m. Careful management required to coordinate with contracted developers to maintain connection dates.
Dunlaw Extension to Galashiels Reinforcements (TORI 2080)	N	Not suitable for early competition - completion date during RIIO-T3 period, enabling works for new connections projects therefore project cannot be delayed for tendering exercise.
TORI-236 Glenmuckloch to ZV Route Reinforcement	N	Not suitable for competition - completion date during RIIO-T3 period, enabling works for new connections projects therefore project cannot be delayed for tendering exercise.
Coylton to Maybole 132kV circuit TORI 3062	N	Not suitable for early competition - asset condition driving completion date, circuits integral to existing transmission system. Possible splitting of rebuild of existing routes for competitive tender, however circuits integral to existing system for both existing demand and generation, therefore careful management required.
Redshaw 400/132kV substation (bundled)	N	Not suitable for early competition - Project significantly developed, progressing in RIIO-T2 for RIIO-T3 completion.

Table 10 – Late Competition (LC)

Scheme Name	LC	Comments

CMN3 Scotland to England Reinforcement TORI-1795	N	Identified by Ofgem as being suitable for early competition. Careful consideration of connecting parties required to ensure no impact - approximately 2500MW of onshore wind due to connect into proposed new circuit via collector substation(s).
HGNC Harburn S/S-Gala N 400kV TORI 3884	N	Identified by Ofgem as being suitable for early competition.
NHNC Harburn-New Deer Greens 2	N	Identified by Ofgem as being suitable for early competition.
WCN2-West Coast Onshore B6 reinforcement	N	Identified by Ofgem as being suitable for early competition.
E2DC - Eastern Subsea HVDC Link from Torness to Hawthorn Pit - Output	N	ASTI Project - exempt from competition.
TGDC-Eastern Subsea HVDC Link from Westfield to South Humber	N	ASTI Project - exempt from competition.
Harburn Substation (TORI 3002/TORI 3168)	N	New substation works integral to existing transmission circuits. New substation separable but OHL works not, reducing separable works to less than £100m.
LCU2 - Eastern B5 400kV Reinforcement (TORI2084)	N	Not separable - extension of existing substations and reconductoring of existing transmission circuits.
DWNO Denny to Wishaw 400kV Rein TORI-003	N	ASTI Project - exempt from competition.
LWUP Kincardine North 400kV Reinforcement TORI2095	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
DWUP Kincardine North to Clyde's Mill 400kV reinforcement TORI-2083	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
DLUP(TORI 2085) Windyhill Lambhill Denny North 400kV Reinforcement	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise.
VSRE XH & XJ Routes 400kV Major Refurbishment	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise, The scope is to reconductor existing transmission circuits and therefore not separable transmission circuits not

VERE (TORI 1797) Strathaven to Elvanfoot 400kV Reinforcement	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise, and scope to reconductor existing transmission circuits not separable.
EHRE Elvanfoot to Harker Uprating (TORI 231)	N	Not suitable for competition, identified through HND as 'Required for 2030' therefore project cannot be delayed by tender exercise. The scope is to reconductor existing transmission circuits and therefore not separable.
TKUP (TORI-2073) Kincardine North to Tealing 400kV Reinforcement	N	ASTI Project - exempt from competition.
SPT-RI-2319 – Carradale to Kilmarnock South Subsea Cable	N	Suitable for early or late competition - contracted completion date 2035, cable and transformer works separable. Joint TO project with SSEN-T.
Eccles Shunt Compensation (B6) (ECVC, NOA4)	N	Project tendered and in construction phase, therefore not suitable for competition.
Branxton 400kV substation	N	Project tendered and in construction phase, therefore not suitable for competition.
Narie	N	Suitable for early or late competition - contracted connection date 2036, approximately 35km of new 400kV double circuit between developer site and SPT proposed 400kV substation. Timing dependent on WCN2.
TORI-151b Galashiels to Eccles 132kV	N	Not suitable for late competition, asset condition driving completion date - delay for tender exercise increases asset risk.
Cousland 400kV GIS substation TORI 1796	N	Project total less than £100m, so not suitable for Late Competition.
Dunlaw Extension to Galashiels Reinforcements (TORI 2080)	N	Not suitable for late competition - completion date during RIIO-T3 period, enabling works for new connections projects therefore project cannot be delayed for tendering exercise.

TORI-236 Glenmuckloch to ZV Route Reinforcement	N	Not suitable for late competition - completion date during RIIO-T3 period, enabling works for new connections projects therefore project cannot be delayed for tendering exercise.
Coylton to Maybole 132kV circuit TORI 3062	N	Not suitable for late competition - asset condition driving completion date, circuits integral to existing transmission system. Possible splitting of rebuild of existing routes for competitive tender, however circuits integral to existing system for both demand and generation, therefore careful management required.
Redshaw 400/132kV substation (bundled)	N	Project significantly developed, progressing in RIIO-T2 for RIIO-T3 completion to meet new connections delivery dates, delays to facilitate tender process would delay connection dates.

10.5 Managing the Risks of Competition

SPT is committed to adhering to our obligations in supporting the competitive process and will work to ensure we are compliant with all obligations within our licence. We have determined that there will be significant work required to support the competitive tender during the Pre-tender and PQQ stages, as well as potential further assistive works that may be required by a successful bidder in delivering the assets to meet interface requirements. We anticipate this to require significant additional work and FTE allocations to manage this relationship. SPT will need to ensure that we are fully resourced to be able to efficiently support the competitive process. Ultimately, this will apply an additional resource constraint on SPT which must have a route to funding to recover efficiently incurred expenditure.

Throughout RIIO-T2, TOs have been able to recover costs for employees through the Closely Associated Indirects (CAI) in the RIIO-T2 baseline. Where there are allowances needed for additional CAIs associated with uncertainty mechanisms, the opex escalator uncertainty mechanism provided a route for this to be recovered. This has been an efficient way for SPT to plan its resource needs and to receive a degree of certainty around the recoverability of resource costs. Work required will be with Ofgem to ensure cost a recovery mechanism for SPT's involvement in competed projects.

10.6 Impact of Competition

SPT supports the introduction of a competitive process in networks that consider all associated costs and delivers true consumer value and benefit. We are committed to supporting the process and have been proactive in ensuring the competitive process delivers for GB consumers. As we transition to become more energy independent and approach our net zero targets, many of our strategic projects are key enablers for government ambitions and are for the overall benefit of GB consumers. Ofgem published its initial thinking on shortlisted projects for the first competitive tender, yet to be decided in December 2024. Eight projects were identified as being shortlisted, four of which are SPT's projects. It is essential that wider policy objectives from Government are considered alongside the introduction of competition, particularly around the ambitions to achieve a clean power system by 2030, and legally binding net zero targets. The impact of competition on these critical decarbonisation targets must be carefully assessed to ensure that the introduction of competition does not result in unnecessary and avoidable delays.

Many of our projects that have been identified in the shortlist by Ofgem are heavily interdependent with SPTs wider project portfolio, these projects also have challenging and sensitive environmental considerations. We have set out below a summary table of the projects identified in the shortlist and some brief comments on the key factors associated with them.

It is imperative that we deliver these projects at pace and do not introduce any unnecessary delays which will ultimately impact GB consumers. There are global supply chain constraints affecting the delivery dates of multiple projects across various sectors and as such we need to focus our efforts on providing certainty to our supply chains on the level of works we are delivering and the level of resource we will need to deliver the projects at pace. We are committed to mitigating such risks and endeavour to work with key stakeholders to ensure our projects have the appropriate assurances to engage the supply chain, prevent avoidable and unnecessary delays, deliver at pace and maintain a coordinated and efficient programme of works across all of our projects.

Table 11 SPT Projects Identified for Early Competition & Principal Concerns

Scheme Name	Comments
CMN3	There are significant interdependencies and careful coordination is required between CMN3 and WCN2 to route two new OHL routes across B6, alongside environmental restrictions.
HGNC	There are multiple routing challenges associated with this new line which may require mitigation such as technology choices and areas of high amenity.
NHNC	Harburn substation, part of NHNC for tCSNP2 analysis purposes, is being progressed in advance of NHNC for earlier completion to facilitate contracted customer connections.
WCN2	This project is important to ensure significant onshore generation connection activity is connected, alongside the need for careful coordination with CMN3 to route two new OHL routes across B6, alongside environmental restrictions.