



SHE Transmission Innovation Strategy

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About us

Scottish Hydro Electric (SHE) Transmission is the owner of the high voltage electricity assets in the north of Scotland. As the Transmission Owner (TO) we own the 132kV, 275kV and 400kV electricity network in the north of Scotland. Our network consists of underground and subsea cables, overhead lines on wooden and composite poles and steel towers, and electricity substations, extending over a quarter of the UK's land mass and across some of its most challenging terrain.

As part of Scottish and Southern Electricity Networks (SSEN), which includes our sister company Scottish Hydro Electric Power Distribution (SHEPD) (Figure 2) the owner of the adjoining low voltage network, our electricity network is responsible for ensuring a safe, reliable supply of electricity to around 770,000 homes and businesses (Figure 1). We also provide grid access for over 7GW of generation, contributing around one third of GB's renewable energy capacity.

We power our communities by providing a safe and reliable supply of electricity. We do so by taking the electricity from generators and transporting it at high voltages, over long distances through our transmission network for distribution to homes and businesses in villages, towns and cities.

This publication

This document sets out our plans and ambitions for getting the most from innovation before, during and after the Revenue = Incentives + Innovation + Outputs (RIIO) T2 price control period. It supports our RIIO-T2 Business Plan and is split into two main parts. The first describes our innovation objective, definition and how this can be delivered through an innovation framework. This includes where we will focus innovation and how we assess innovation opportunities.

The second part covers how we have developed this stakeholder led strategy, the drivers of change, stakeholder feedback and how it has been accounted for in our innovation plans.

The document finishes with our next steps on innovation and how you can get involved.

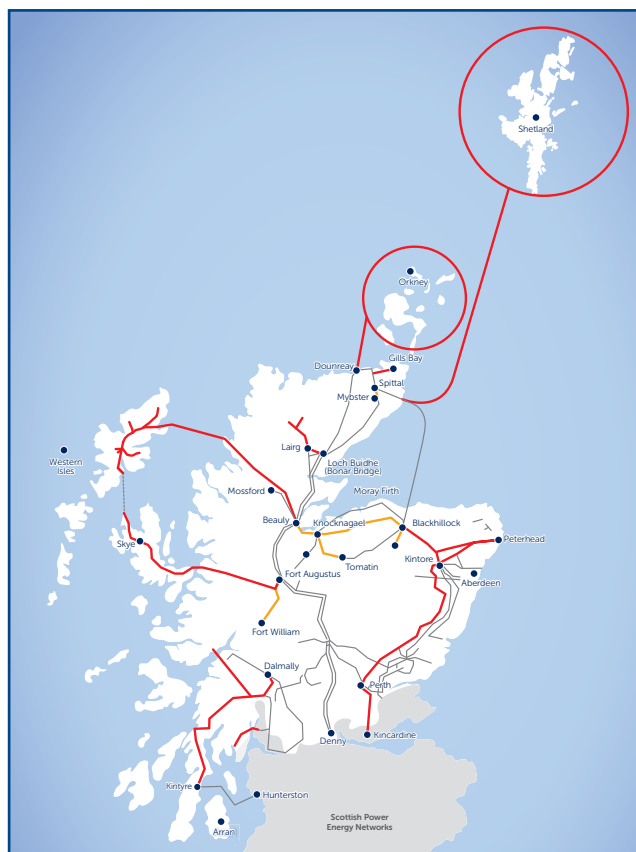


Figure 1 North of Scotland Transmission Network

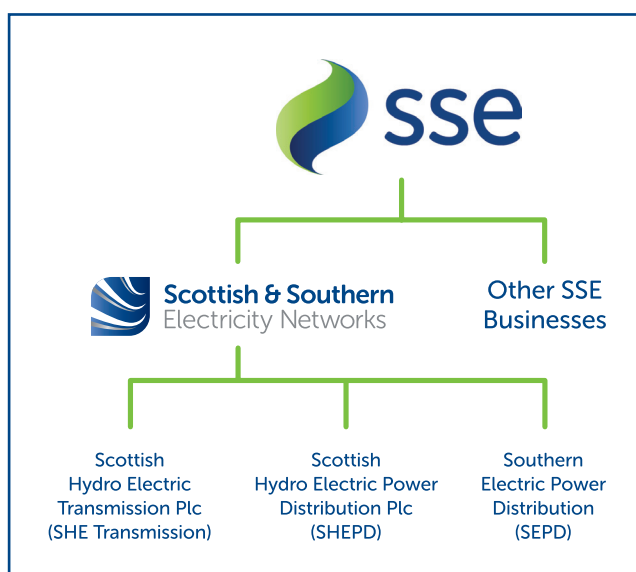


Figure 2 SSE Group structure

Part 1: Innovation Framework

Innovation purpose

In 2018 we refreshed our company's strategic objective to: 'enabling the transition to a low carbon economy', as supported by our T2 Draft Business Plan and associated goals¹. However, what the low carbon economy of the future will look like is not yet clear, so for us to plan for it involves managing some uncertainty. We see innovation as an important part of being able to manage this. New ways of working can be tested prior to wider rollout, which helps better manage risk during the transition. Thus, our innovation objective is where:



We aim to enable the transition towards a low carbon economy, whilst maintaining 100% reliability in electricity supply and ensuring energy remains affordable for all.

When developing this objective our first step was to define innovation. We see innovation as a means of:



Identifying and proving new ways of working for the long-term benefit of our stakeholders and ourselves.

Where stakeholders are defined as "any individual, group of individuals, or organisations that affect and/ or could be affected by our activities, products or services, and/or associated performance", which includes customers and consumers².

In our day to day working, we cover several different activities, from deep technical aspects through to customer facing engagement roles. Having a broad definition ensures that improvements can be targeted throughout our business and in all our joint working with other parties.

We see innovation as doing something that we do not do now, regardless of whether another company in the industry or GB is doing it already, that brings an improvement to the way we do things. We will not just innovate for the sake of it. Rather, we will target improvements where it can add value to our stakeholders and ourselves, without negatively impacting the other. If any innovation does not work for our customers, then it does not work for us.

Identifying best practise

To determine how best to deliver innovation, we first looked to identify best practise by completing two reviews. Firstly, a review of how we had performed on innovation throughout RIIO-T1, and secondly, we engaged Baringa Partners, a consultant, to help determine innovation best practice.

These two reviews identified several lessons which have formed part of our Innovation Framework. Additionally these reviews identified that there were three main elements that were key to delivering value from innovation:

- 1 Once any innovative concept is proven transferring it to Business as Usual (BaU) is key to realising its maximum benefits;
- 2 Working collaboratively with third parties can increase the likelihood of success and increase the benefits derived from innovation; and
- 3 Different sources of funding are important to cover all innovation types

On the following pages we will cover each element of the framework, what areas that framework will be applied to and how we will ensure that innovation delivers value.

¹https://www.ssen-transmission.co.uk/media/3454/draft-business-plan_amended-28619.pdf

² <https://www.ssen-transmission.co.uk/media/3560/shet-stakeholder-engagement-strategy-final-document.pdf>

Strategy

The foundation of our Innovation Strategy is a framework that centres on being a 'responsible innovator'. This could be mistaken for a boring incremental approach that will only achieve the minimum requirement. But it's far from it. Instead it's a core principle that aims to ensure we are focussed on delivering benefits for our customers and wider stakeholder group by taking a proactive and forward looking approach to innovation. This will allow us to identify and prioritise the most appropriate innovations to work on with the correct partners, to then deliver the best value for customers.

The core principle is underpinned by five values shown in Figure 3 below, each of which have been identified as a successful component of delivering successful innovation projects.

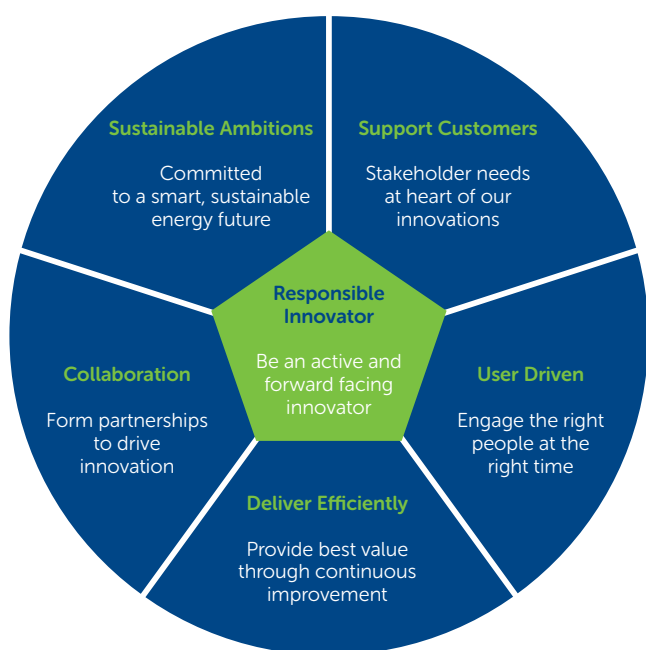


Figure 3 Innovation Framework



Value 1: Support Customer

Our customers must be at the heart of our innovations. The network exists to service them, if it does not work for them, then it does not work for us.

To achieve this, we must know what our customers want from our network. We can only do this if we work closely with them by building strong relationships to ensure we understand their priorities and needs. We need to understand what's important to all our customers to allow us to act as advocates for them across the industry. The principle for customer advocacy is described in our Commercial and Connection's Policy³. Whilst we are working with customers to develop innovation needs and trials, we will also define positions and policies to represent at an industry level on topics such as Distribution System Operators (DSO) and the Whole System.

Success here will lead to well-formed trials that deliver the outputs that our stakeholders want. If those trials are proven successful, we will drive these new innovations into our BaU operations. If the trials are a success, or even if they're not, we will also share the learning with the wider industry to increase overall customer benefit.



Figure 4 Support Customer Innovation Value

Value 2: User Driven

Innovation will engage the right people at the right time, from the design of innovation trials through to BaU transfer.

In delivering innovation, success is dependent on working with the right people all the way through the innovation lifecycle. That starts with identifying where any innovation opportunity could provide most benefit, as well as what is important to any user of that successfully proven innovation.

Understanding the end users' requirements from any innovation increases the chance of success. Taking their requirements, as the starting point for any innovation test, allows the full lifecycle of the proven concept to be considered. That ensures that safety, operation and maintenance, compliance and replacement are all considered from the outset.

Success under this value will increase the transfer rate of proven innovations to BaU, thus increasing innovation benefits.

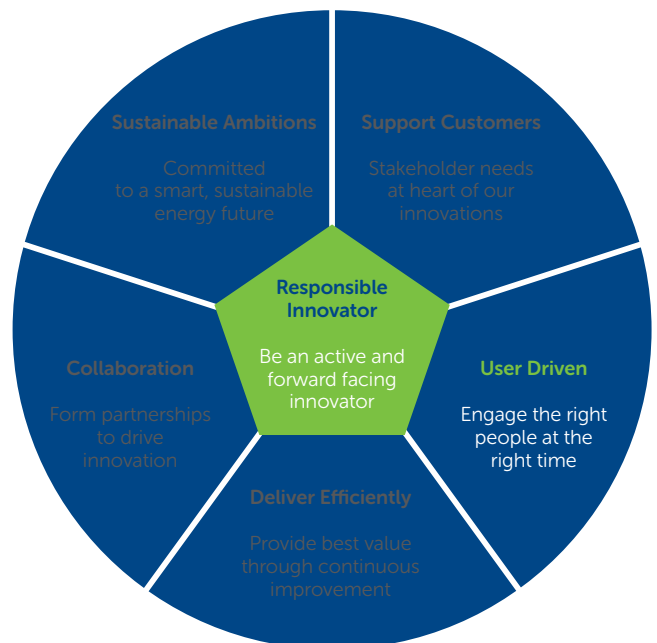


Figure 5 User Driven Innovation Value

³ <https://www.ssen-transmission.co.uk/riio-t2-plan/commercial-and-connections-policy/>

Value 3: Deliver Efficiently

Delivery of successful innovation can only provide best value if a consistent methodology is applied.

Delivering innovation efficiently relies on having a consistent framework to identify opportunities, develop trials and scope any opportunities for deployment. Crucially, this also allows for benefits to be tracked consistently to show value for stakeholders. Having a consistent framework also helps identify any external and internal stakeholders required to be involved in the project.

Furthermore, this provides a framework against which to manage change. This will allow projects to be amended or even ended if they are not going to produce the benefits anticipated. If it changes too much, then an informed decision can be made about whether to continue, change course or stop.

Once completed, this efficient delivery method allows the project to be more readily transferred to BaU. Thus, ensuring that the maximum return is achieved against the original investment.

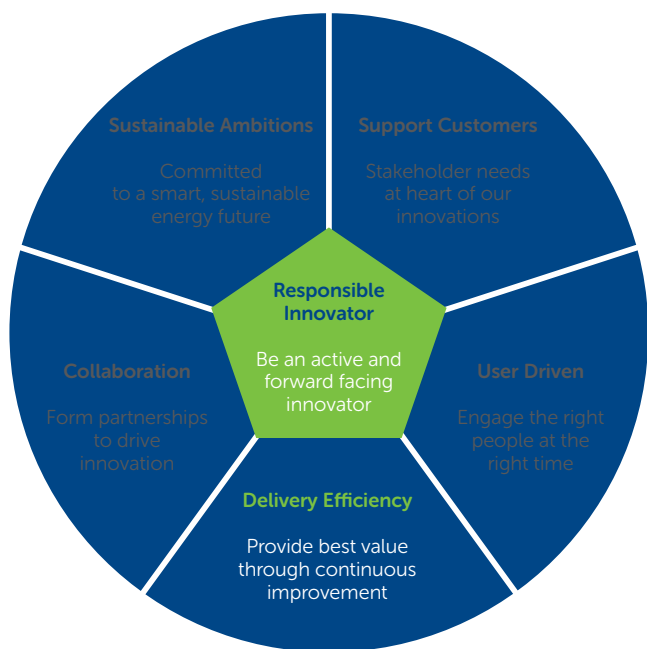


Figure 6 Deliver Efficiently Value

Value 4: Collaboration

Many different parties can benefit from innovation. Those stakeholders need to be involved in identifying, scoping, trialling and rolling out those solutions.

Working in isolation to one another could result in a failure to deliver maximum value from an innovation. By working collaboratively with stakeholders from across the energy supply chain we can increase the overall value and improve the level of benefit for customers.

Large scale industry developments must be thought through as an industry and not in isolation. These developments and other drivers will be better understood when collaborating.

By working with a range of stakeholders, we can identify a wide range of innovation needs and develop projects to respond to these needs. This also gives an opportunity for us to learn from our wider stakeholder group and benefit from their experience to help improve our performance service.

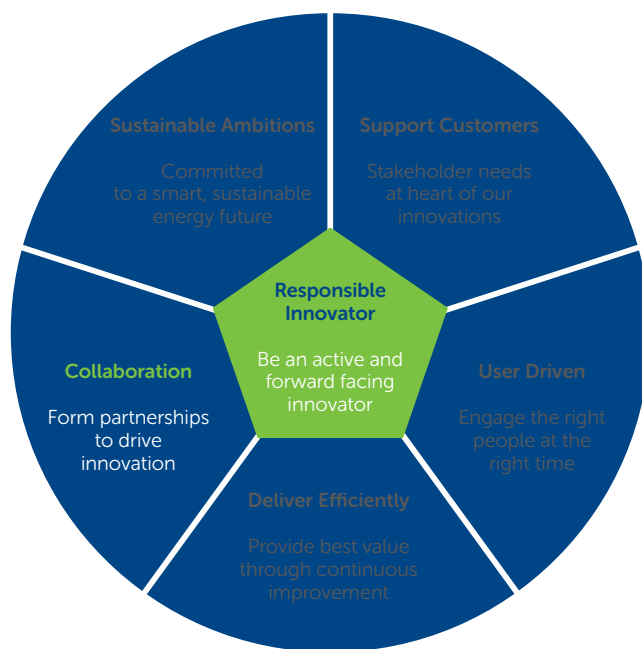


Figure 7 Collaborative Efforts Value

Value 5: Sustainable Ambitions

Delivering innovation that isn't sustainable won't deliver the long-term benefit we target.

Our Sustainability Strategy describes our ambitions in enabling a low carbon future. That ambition is embodied within our approach to innovation as shown in this Innovation Strategy.

When assessing the benefit of any innovation, it is essential to include environmental benefits such as impact on greenhouse gasses, carbon reduction and network losses.

We will not only consider sustainability when we are identifying projects that solely deliver an environmental improvement. We will also look at delivery of all projects to ensure they are developed and delivered sustainably.

Our sustainable ambitions will not just stop with us. We will look to stretch this into our supply chain to ensure that we are not just moving poor sustainability performance down the supply chain. Instead we will work with our suppliers to have an overall improvement across our innovation portfolio.



Figure 8 Sustainable Ambitions Value



Innovation focus areas

Our Innovation Framework explains how we will deliver innovation, but not what we will focus our efforts on. To identify that we will start with alignment to our strategic objective and four supporting themes⁴, as shown in the figure below. Alignment with these themes will make sure that any innovation we progress, helps deliver what our stakeholders want from our network.

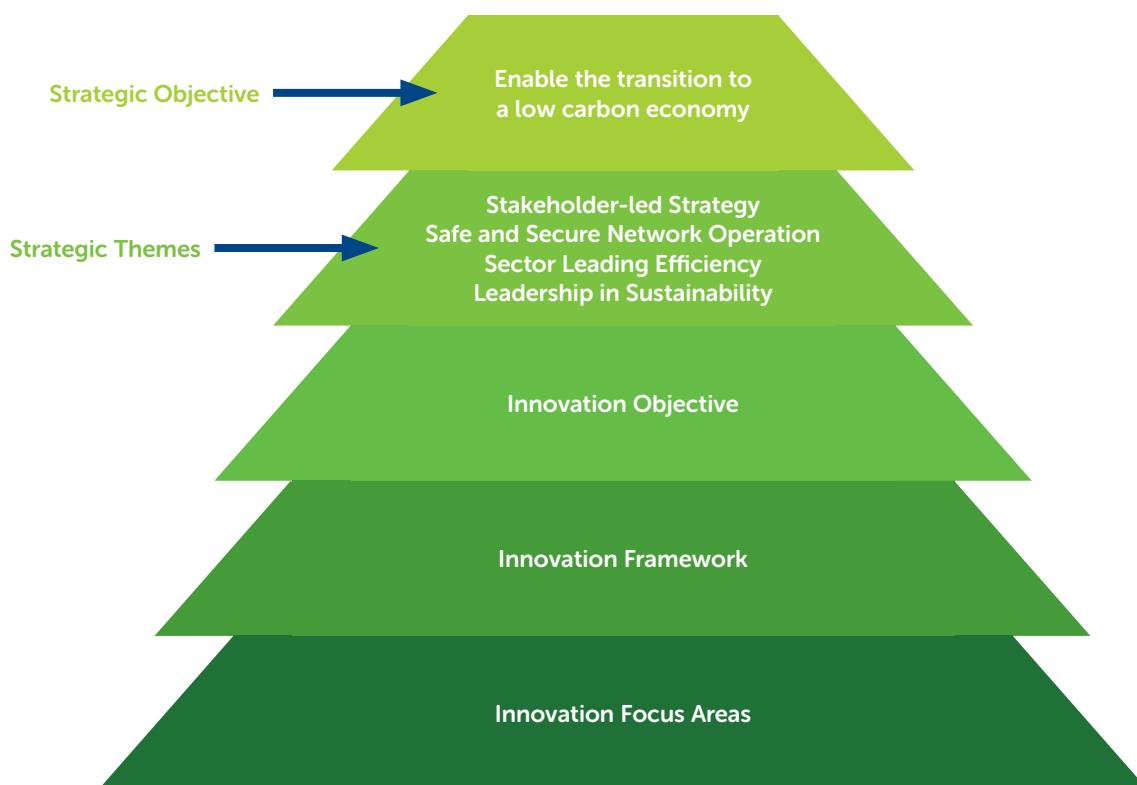


Figure 9 Innovation supporting strategic focus

Supporting the Strategic Themes are our Innovation Objective and the Innovation Framework, both as described earlier in the document. These appear above the Innovation Focus Areas in the diagram as they govern how any innovation will be carried out. What will be innovated on is contained in the lowest layer of the figure, the Innovation Focus Areas.

The Innovation Focus Areas are split into four categories that match the Strategic Themes, namely:

- Stakeholder-led Strategy
- Safe and Secure Network Operation
- Sector Leading Efficiency
- Leadership in Sustainability

Aligning the Innovation Focus Areas with the Strategic Themes allows us to directly track an innovation opportunity through to a theme, which supports the development, approval and operation stages of any trial.

Our approach to innovation must be agile if we are to be successful. If it isn't, then any changes to the strategic objective or themes will take significant time to account for, which would have a knock impact on the innovation benefits being delivered.

The following pages describe each of the Innovation Focus Areas alongside a table showing the potential areas to innovate on.

⁴https://www.ssen-transmission.co.uk/media/3219/she-transmission-riio_t2-emerging-thinking-paper.pdf

Innovation Focus Area 1: Stakeholder-led Strategy

There will be a lot of change in the industry over the coming years. Some of it is driven by stakeholder choice but all of it will impact, either positively or negatively, on stakeholders. It is important to identify those impacts and work to mitigate or improve on them. This will drive a more holistic approach to innovation, across not only our network, but through to other energy networks. The development of 'whole system' is one example of this.

We have reassessed how we design and develop our networks in line with the new concept of whole system⁵. With our sister company, Scottish Hydro Electric Power Distribution (SHEPD), we are looking to define frameworks and supporting policy to get the most out of this new concept. Innovation will play a key role in developing this to make sure that our approach is consistent and can maximise the potential benefits for stakeholders.

Innovation Opportunities

Supporting Our Customers	Wider Energy System Changes	Enhanced Connection Approaches
Innovation Focus Area 1.1 Customer engagement <ul style="list-style-type: none"> • Enable customer choice • Improved service delivery • Provide relevant network information • Improved outage management 	Innovation Focus Area 1.3 Whole system approach <ul style="list-style-type: none"> • Decentralised technologies • Whole system planning • Demand Side Response • Understand DER flexibility 	Innovation Focus Area 1.5 Using network flexibility in connections <ul style="list-style-type: none"> • Accelerated connections • Managing connection flexibility • Active Network Management • Tailored connection solutions
Innovation Focus Area 1.2 Customer engagement <ul style="list-style-type: none"> • Connection queue management • Facilitate DSO transition • Support new commercial models • Commercial arrangement visibility 	Innovation Focus Area 1.4 Energy system transition <ul style="list-style-type: none"> • Support Electric Vehicle uptake • Facilitate decarbonisation of heat • Hydrogen economy development • Collaborate across energy vectors 	Innovation Focus Area 1.6 Facilitating connections <ul style="list-style-type: none"> • Implement smarter connections • Wide area network management • Managing changing network aspects • Interface between TO and DNO

Table 1 Stakeholder led Strategy Innovation Opportunities

Innovation opportunities in this area, as shown in the table above, start with how to engage with customers and giving them access to the information they need. This will allow them to make better informed decisions on connection options, as well as a clearer idea on managing their connection once it is energised. This is a key area where innovation can add value.

From there, innovation opportunities include how best to support the deployment of EVs and how to facilitate the decarbonisation of heating. Coupling that with service flexibility from network parties allows a whole system approach to be taken to deliver the network capacity requirements outside the normal reinforcement approach.

Finally, opportunities lie in facilitating connection flexibility to accelerate connections. Options here could include wide area Active Network Management (ANM), hybrid options between ANM and flexible connections, or improved interfaces between transmission and distribution networks.

⁵ <https://www.ssen-transmission.co.uk/riio-t2-plan/enabling-whole-energy-system-outcomes-policy/>

Innovation Focus Area 2: Safe and Secure Network Operation

Network reliability and integrity is fundamental to SHE Transmission. Maintaining and improving our existing standards at a time of unprecedented industry change is a significant challenge. We must develop new options to accommodate flexibility, new methods of working and facilitating new commercial arrangements whilst maintaining network resilience, and safety.

With this transition will come new technologies that will challenge long established characteristics of stable network operation including fault level, system inertia and power quality. Well established techniques for network management need to be updated and revised to better reflect the changing use of the network. Similarly, new technology can provide improved visibility and transparency of the networks operating characteristics, which allows opportunities to maximise network utilisation.

Innovation Opportunities

Planning and Development	Asset and Network Management	Network Monitoring & Operations
Innovation Focus Area 2.1 Network planning <ul style="list-style-type: none"> Optimised design and development Probabilistic planning tools Detailed network modelling Generation and demand balancing capacity management 	Innovation Focus Area 2.3 Security and resilience <ul style="list-style-type: none"> Network reliability and resilience Countering physical threats Black start capability Extreme event planning and contingency management 	Innovation Focus Area 2.5 Network operations & control <ul style="list-style-type: none"> Network controllability Smart condition monitoring Interactive and adaptive condition monitoring Cyber threats
Innovation Focus Area 2.2 Data driven network development <ul style="list-style-type: none"> Smart network development Network development and stability reinforcement Enhanced data analysis Artificial Intelligence in system modelling 	Innovation Focus Area 2.4 Smart asset management <ul style="list-style-type: none"> Modernised enhanced control room Power quality management Operational technology developments Condition based asset management 	Innovation Focus Area 2.6 Facilitating connections <ul style="list-style-type: none"> Grid monitoring strategy Enhanced transmission fault Enhanced network stability analysis Remote asset monitoring

Table 2 Safe and Secure Network Operation Innovation Opportunities

Innovating on the topics in the table above will improve the way that we work. They start with understanding and developing the network using more detailed data. Combining that with probabilistic planning allows the likelihood of worst-case scenarios happening to be mapped and accounted for. In the long run this will see the deployment of Artificial Intelligence and machine learning.

With these new standards and development options comes impacts on how the network is operated. With the move away from traditional carbon dense generation, resilience and blackstart capability need to deliver the same standards through different means. At the same time, normal network operation needs to understand, and work with, the various new forms of network components and behaviours.

The changing network operation will not work if there is not enough information to feed into operational procedures. With this increased monitoring and data driven decision making, comes an increased threat from the cyber sphere that needs addressed.

Innovation Focus Area 3: Sector-leading Efficiency

In supporting the transition to a low carbon economy, we must make sure that we do so in an efficient way and deliver the best value for consumers. We must balance the long-term benefit with the short-term cost when developing and delivering innovation. To do this consistently we use Cost Benefit Analysis (CBA). This forms the basis for management of the full innovation lifecycle. Starting with assessing opportunities for viability, gaining approval for development, funding selection, checking trial outputs remain valid and tracking successful innovation benefits.

Whilst identifying opportunities we will make sure to leverage maximum benefit from our existing assets, data and relationships. This will include collaborating with other parties to identify industry best practise and learning from their experiences. This helps reduce the risk and improves the potential benefits of deploying any innovation.

Innovation Opportunities

Supply chain efficiencies	Modernising our network	Network monitoring and operations
<p>Innovation Focus Area 3.1 Transformational health and safety</p> <ul style="list-style-type: none"> Continue driving effective safety standards Continually improve process safety, environment and travel performance Transform contractor safety, operational safety and health and wellbeing Minimise human interaction through data and analytics 	<p>Innovation Focus Area 3.3 Integration of new technologies</p> <ul style="list-style-type: none"> Consider novel technologies and materials Drive a smarter network Digital substation evolution Further develop use of HVDC technology 	<p>Innovation Focus Area 3.5 Transparent and robust decision making</p> <ul style="list-style-type: none"> Maximise use of existing asset base Engage customers earlier in the design development Investigate market ready data and analytic platforms Demonstrate efficiency in outcomes
<p>Innovation Focus Area 3.2 Data driven network development</p> <ul style="list-style-type: none"> Demand plan analysis Supply chain engagement to negate noncompliance License to operate Responsible buyer 	<p>Innovation Focus Area 3.4 Efficient network modernisation</p> <ul style="list-style-type: none"> Drive staged smarter network development Big Data management Network stability reinforcement Network modernisation 	<p>Innovation Focus Area 3.6 EFFICIENT PROJECT DELIVERY</p> <ul style="list-style-type: none"> Evaluate new construction means Alternative access arrangements Bespoke network solutions Reduced onsite testing and construction

Table 3 Sector-leading Efficiency Innovation Opportunities

The table above shows the areas in which we can innovate and add value. Improving our operational practise has safety benefits including removing people from operational interfaces through enhanced use of data, monitoring and control. For example, having better monitoring of assets can identify operational safety issues without physical inspection being required.

Using that data and new technologies together we can drive a staged development of a smarter network. This can improve our network performance at the same time as evolving our network to be future requirement compliant. Investment now can be more efficient. When we cannot get any more from our existing network and need to build, we can use new ways and means to make the construction process more efficient. Building and testing components off site and transporting them is more efficient. The way in which we work in these areas can all be improved through the application of innovation.

Innovation Focus Area 4: Leadership in Sustainability

As we deliver innovation, we aim to do so where it provides long term benefit. When thinking into the future, sustainability is a crucial component to consider, be that for environmental, social or economic impacts. Our Innovation Strategy supports those ambitions through looking for and identifying opportunities that will help deliver the net zero target for GB by 2050.

When developing these opportunities, it is important for us to support governmental initiatives. In Scotland there is a government target to phase out fossil fuelled cars by 2032. Recognising this, we need to ensure that we use a whole system approach to deliver the required vehicle charging infrastructure. There are also GB wide targets for decarbonisation. These impact on our network through renewable generation which will require connection and in the longer term facilitating the decarbonisation of heat.

Innovation Opportunities

Maximise Benefit to Customers	Mitigating Climate Change	Reducing our Environmental Impact
Innovation Focus Area 4.1 Supporting communities <ul style="list-style-type: none"> • Enable local communities use of low carbon technology • Realise social and economic benefit from investment • Supporting vulnerable customers • Enable local community engagement in energy markets 	Innovation Focus Area 4.3 Carbon saving emissions <ul style="list-style-type: none"> • Design new more energy efficient substations • Implement energy efficiency to existing substations • Support losses policy • Decrease equipment losses 	Innovation Focus Area 4.5 Promoting natural environment <ul style="list-style-type: none"> • Positively contribute to UN and Scottish biodiversity strategies • Develop environmentally sensitive options • Consider network visual impact • Collaborate on measuring biodiversity net gain
Innovation Focus Area 4.2 Connecting for society <ul style="list-style-type: none"> • Promote decarbonised and decentralised economy • Review wider societal impacts of our investment • Consider our investment affordability for consumers and generators • Deliver low carbon energy connections 	Innovation Focus Area 4.4 Energy efficiency and optimisation <ul style="list-style-type: none"> • Set and deliver science-based targets • Develop and implement SF6 Strategy • Embedded carbon reduction • Reduce direct and indirect Greenhouse emissions from our activities 	Innovation Focus Area 4.6 Optimising resources <ul style="list-style-type: none"> • Life cycle and cost benefits • Promote circular economy principles • Waste minimisation initiatives • Asset replacement strategy

Table 4 Leadership in Sustainability Innovation Opportunities

Opportunities start with supporting society directly, through enabling local communities and vulnerable consumers to engage in the relevant energy markets in a cost efficient way. Also, to ensure that innovations we deliver are affordable for all, when compared against traditional alternatives.

In delivering new builds we need to make sure we are having a positive affect on our environment. Be that through biodiversity initiatives or by looking across the life cycle of any our activities to reduce and mitigate our impacts as much as possible.

Opportunity Development

As the focus areas show, there is a wide range of potential innovation areas that align with our strategic objective. Identifying the right opportunities, and how far to develop them, is important in making sure we deliver what stakeholders want. Cost Benefit Analysis (CBA) provides a clear and consistent way to do this and applies throughout the innovation lifecycle. The figure below shows the five stages of any innovation opportunity that transfers to Business as Usual and what role CBA plays.



- 1 Assess the maturity of the project and identify suitable CBA approach. Start collecting data to undertake CBA.
- 2 Undertake the CBA. Identify key variables which the trial will assess performance against and forecast that performance in CBA.
- 3 Monitor the outturn performance against the key variables in the trial and re-run CBA during the trial.
- 4 Re-run CBA at the end of the trial based on final results. Compare the results to those forecast.
- 5 Monitor outturn results of roll-out to check that impact is similar to that observed in the trial.

Figure 10 Application of CBA throughout the innovation lifecycle

Before the five stage process above is started, any potential innovation opportunity is checked for alignment against the strategic themes. If it does not align, then development of that opportunity is stopped, and the result noted. If it does, then the opportunity passes to stage 1 above. At this stage the maturity of the innovation is assessed, and its technology readiness is categorised into three options: optimise; enhance; and disrupt.

Optimise is closest to current business practise and is the most mature. It has less risk in development but also has less benefits associated though they can be delivered in the short term.

Enhance looks to take current practise and improve upon it by applying more of a future focus and is generally of medium maturity. It has medium level risk with benefits likely to be delivered in the medium term.

Disrupt has the lowest maturity. Its focus is on challenging national policy and regulation, where it makes sense to do so, for stakeholder benefit. It will take the longest time to deliver benefits.

The level of maturity identified drives the type of CBA approach in stage 1, as shown in figure 10 above. Table 5 shows the difference between the three CBA approaches.

Maturity	Optimise	Enhance	Disrupt
Overall CBA approach	<ul style="list-style-type: none"> Detailed cost and benefit line items, including confidence Converted to scenarios Key variables highlighted 	<ul style="list-style-type: none"> Quantify assumptions where possible Highlight level of confidence in each element and include placeholder for unknown costs and benefits 	<ul style="list-style-type: none"> Focus on the overall benefits of enacting that concept
Time horizon	<ul style="list-style-type: none"> Typically, multi-year, covering several price controls, and showing the effect of discounting (align to Green Book) Ensure "end effects" do not hide costs or benefits 	<ul style="list-style-type: none"> Focus on short term (e.g. single year) Note ways in which the CBA would change (e.g. saturation of market, policy change) 	<ul style="list-style-type: none"> Highlight the points in time (or key triggers) where the concept may be required Do not attempt to quantify trajectory of benefits

Table 5 CBA approach vs innovation maturity

The CBA approach defines how much detail to go into around the assumptions, timeframes and levels of confidence used throughout the opportunity development. The approach is used to build up a high-level CBA. Three are developed, one each for an optimised, enhanced and disruptive option that allows a decision to be made on whether to fully assess the opportunity in a trial and to what level.

In highlighting the variables in the CBA, we have identified what we need to investigate in the follow-on trial. The CBA is then repeated throughout the trial to see if the value forecast at the approval stage can still be achieved. If it cannot, or reduces below acceptable levels, then the trial can be paused or stopped until it does make sense to continue.

Having completed the opportunity assessment through trial, the CBA is again repeated to compare what had been forecast to what has been quantified. This allows a final decision to be made on whether the opportunity will be valuable and be incorporated into Business as Usual activities.

The final use of the CBA is then through the wider rollout where it forms the basis for tracking the benefits. The overall costs of developing the opportunity are now known, as are the rollout costs. These can be compared against the benefits being delivered to give a complete picture of the original investment versus the benefits achieved.



Part 2: Strategy Development

In developing our Strategy, we were informed by best practice, our stakeholders, current and emerging industry trends, government policy and our regulatory requirements. Taking a staged approach, as shown in the figure below, we systematically engaged across the GB and European energy industries, with other related industries and with our stakeholders.

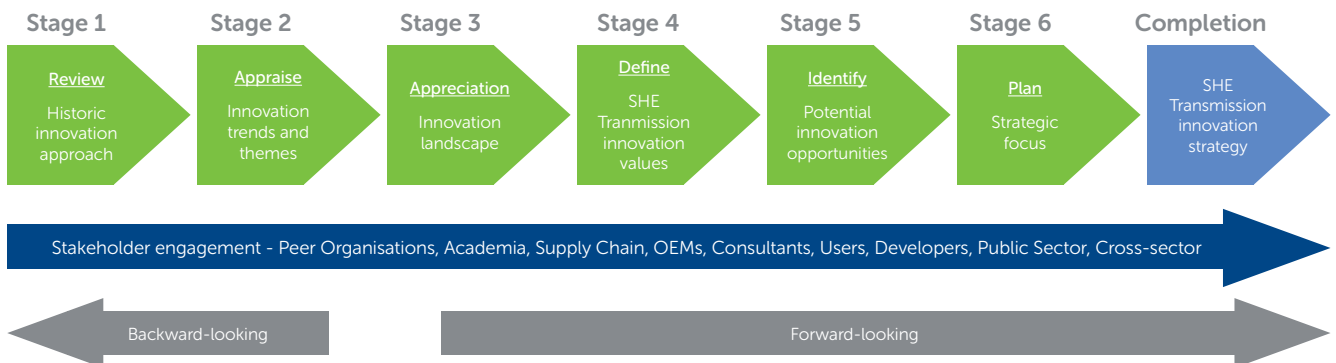


Figure 11 Innovation Strategy Development Plan

Outputs from this process were used to build up our Innovation Framework and our Strategic Themes. After each iteration was completed, the output was tested with stakeholders to make sure it worked for them. If it didn't, then it would not deliver our Innovation Objective and would not work. Feedback from these sessions was captured and used to refine the outputs.

Influences

To understand how to get the most out of innovation, it's important to know how our region is changing. This can be best categorised into four main topics: decarbonisation, decentralisation, digitisation and democratisation. Across those main topics there are a number of significant well known drivers, including: increase of renewable generation, both on and offshore; new technologies; increased penetration of Electric Vehicles (EVs); decarbonisation of heat networks; Distributed Generation; and an increased emphasis on network flexibility.

In August 2018 we published our first iteration of our Future Energy Scenarios⁷. These assessed those topics, and others, to better understand what our stakeholders needed from our network to the end of the RIIO-T2 period. We took that understanding and added to it an assessment of other topics, such as the upcoming network charging review, the development of the whole system concept and the transition to a Distribution System Operator (DSO) model. With this information we were then able to build up a framework for how to deliver innovation, as well as a view for what to innovate on, that was aligned with what our stakeholders needed from the network.



⁶ <https://www.ssen-transmission.co.uk/media/3450/she-transmission-stakeholder-workshop-november-2018-report-final.pdf>

<https://www.ssen-transmission.co.uk/media/3341/riio-t2-connections-innovation-and-whole-systems-stakeholder-engagement-event-february-2019-output-report.pdf>

<https://www.ssen-transmission.co.uk/media/3350/riio-t2-connections-innovation-and-whole-systems-stakeholder-engagement-events-may-2019-output-report.pdf>

⁷ <https://www.ssen-transmission.co.uk/information-centre/industry-and-regulation/future-energy-scenarios/>

Stakeholder influence

In developing our Strategy, we have prioritised stakeholder views and feedback; ultimately if we do not deliver for them then we won't succeed. As a regulated monopoly of national infrastructure, we have a responsibility to many people other than just our shareholders. These vary on location, how they use or are affected by our network, either in construction or day to day operation, as well as how it's all paid for. These relationships tend to be a stakeholder relationship rather than a direct contractual one and include the following:

Electricity bill paying consumers	Large Demand Customers	Generators and Developers	Peer Transmission Owners	Electricity System Operator	Distribution Network Operators	Local and national government	Innovation bodies
Industrial partners	Supply Chain	Small-Medium Enterprises	Regulators	Trade associations	Technology companies	Consultants	Academia

We have engaged across all these parties directly, through workshops, webinars, events and consultations to ensure that our plans are stakeholder-led. Through these events we have replayed what we have heard from our stakeholders to check that we have captured it correctly. We have summarised feedback from stakeholders and refined our plans accordingly. The table below has some examples of that feedback and what we have done to account for it to make sure our Strategy is stakeholder led.

Comment	How we accounted for it
Stakeholders suggested broadening out the definition of innovation, as well as considering it in the context of wider societal ambitions for a low carbon energy system and not just the transmission network.	<p>Took a broad view of innovation to cover all our business activities.</p> <p>CBA approach will include prediction and tracking of benefits and values including wider societal impacts.</p>
Fast pace of technological change poses risk so SHET should ensure customer money is spent wisely.	Developing CBA methodology using Ofgem CBA to ensure value for money throughout the innovation lifecycle. Covers opportunity assessment through to benefits realisation.
SHET should do more to ensure innovation is a core value that permeates through the company.	Implementation refined to include instilling innovation culture with necessary structure and resources in place to deliver.
More information about what the issues are would be good. For example, the kind of things you're doing around cybersecurity.	We will establish new methods of communicating issues, lessons learnt, successes and failures with external parties as part of our Innovation Management System.
Broad support for the proposed innovation values.	Finalised proposed innovation framework.
Whole system, energy system transition and using network flexibility all go hand in hand. Thinking about electric vehicles, the whole decarbonisation agenda fits in there too. Whole system approach is key to developing that innovation piece too. Otherwise it's fragmented and won't encompass disparate elements.	<p>Identified whole system as an innovation opportunity during T2.</p> <p>Built up collaboration value to support joint industry development including government and ENA.</p>
What's the process for taking on these new innovations? There needs to be more clarity.	Implementation will include processes showing how innovation opportunities are identified and subsequently developed with those who it will benefit.

Table 6 Your feedback

Next steps

Our aim is to have the necessary people, process and governance in place before the start of RIIO-T2. That will allow us to deliver substantial innovation value for our stakeholders.

If you would like to be involved with our innovation plans or have any feedback, then please get in touch on:

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