

SSEN DISTRIBUTION RIIO-ED2

# ENABLING WHOLE SYSTEMS SOLUTIONS

RIIO-ED2 Business Plan Annex 12.1



**Scottish & Southern**  
Electricity Networks

# Contents

About us .....	3
Purpose of this Annex.....	3
Executive Summary.....	4
The need for a Whole Systems approach.....	4
Action plan for our Whole Systems approach.....	8
Our progress on Whole Systems working to date.....	10
1. Enhanced engagement.....	13
1.1 Final Whole Systems Strategy Testing and Acceptance .....	13
1.2 Enhanced Engagement Triangulation and changes between Draft and Final Plan .....	14
2. Whole Systems Introduction.....	18
2.1 What is Whole Systems? .....	18
2.2 Why is Whole Systems working IMPORTANT? .....	19
3. Our Whole Systems approach.....	21
3.1 Our Whole Systems track record.....	23
3.2 Our long-term Whole Systems vision .....	25
3.3 The ED2 Transition Pathway.....	30
3.4 The role of other SSEN strategies to support Whole Systems .....	32
4. Delivering our long-term vision: the ED2 transition pathway.....	33
4.1 Step 1: Reflecting on progress and lessons learned .....	33
4.2 Step 2: Review internal processes to embed and promote Whole Systems thinking.....	35
4.3 Step 3: Embedding Whole Systems thinking into decision making.....	36
4.4 Enabling the ED2 transition: SSEN’s Whole Systems Change Management Team .....	39
4.5 Whole Systems CVP: Support Package for Local Authorities and community groups .....	41
5. Interactions between Whole Systems and other SSEN strategies .....	47
5.1 SSEN’S Digital Strategy .....	47
5.2 SSEN’s Innovation Strategy.....	49
5.3 Other ED2 Strategies .....	49
5.4 Energy Sector Whole Systems Charter .....	51
6. Ongoing stakeholder engagement plans .....	54
Appendix A: Ofgem’s MINIMUM requirements for whole system.....	56
Appendix B: Case studies demonstrating SSEN already adopts elements of its long-term vision.....	61
Appendix C: Enhanced engagement .....	93

## ABOUT US

**Our electricity distribution networks carry electricity to over 3.8 million homes and businesses across the north of Scotland and central southern England.**

Our skilled teams live and work in the communities they serve, supported by engineering and customer service teams in centres like Reading, Portsmouth, Perth, and Inverness.

We provide a valued and trusted service for everyone in our communities: working 24-hours a day, 365 days a year, to ensure our networks are safe, reliable and responsive to customer needs.

SHEPD: NORTHERN SCOTLAND

SEPD: CENTRAL SOUTHERN ENGLAND



Connected enough renewable electricity to power 3.8m homes



770,000+ vulnerable customers identified on our Priority Services Register



over 3,800 employees across the country



130,000km of overhead lines and underground cables



106,000 substations



100+ subsea cables powering island communities

## PURPOSE OF THIS ANNEX

This Annex provides an overview of our Whole Systems approach from now, through the next price control period from 2023 to 2028, RIIO-ED2 (ED2), and beyond. It supplements the **Whole Systems (Chapter 12)** in the main business plan and includes actions the business is taking now to embed a Whole Systems approach to the way of working within SSEN, building on progress made in RIIO-ED1 (ED1).

# EXECUTIVE SUMMARY

## THE NEED FOR A WHOLE SYSTEMS APPROACH

As the UK Government sets its sights on achieving net zero by 2050 (2045 in Scotland), the energy sector plays a crucial role in enabling these targets to be met. The transition to a net zero energy supply will blur the boundaries between different sectors (such as electricity, gas, and transport) and create interdependencies between them that necessitate a coordinated, or “Whole Systems” approach to manage the system effectively at lowest cost for consumers.

Local communities and authorities will require collaboration with organisations in the energy and transport, telecoms, and water sectors. For example, the decarbonisation of heat, with a range of alternative solutions (hydrogen, electric heat pumps and district heating) requires cross sector collaboration and Whole Systems thinking to optimise costs and investment while meeting environmental commitments.

Our stakeholders and customers have set us the mandate to provide them with a sustainable and reliable energy supply, and to help them realise their net zero ambitions. In addition, Ofgem has introduced a Whole Electricity System Licence Condition and minimum requirements for networks to embed ‘Whole Systems’ thinking, culture and approaches in their ED2 Business Plans. We interpret Ofgem’s expectations as requiring **coordination or cooperation between energy sectors and other vectors with the aim of an overall enhancement in quantifiable consumer benefits and/or societal outcome.**

### *Our goals and expected benefits of Whole Systems working*

Our Whole Systems goal is to embed a new way of thinking and working in our business, and to introduce the supporting policies and processes needed to enable effective coordination and cooperation across the local authorities, communities and other sectors. The ultimate aim of embedding Whole Systems into our business is to enhance consumer benefits and societal outcomes such as:

- increased efficiency in delivery of our services (leading to savings for customers).
- enabling effective and efficient roll-out of low carbon technologies (meeting expectations and avoiding unnecessary customer and societal costs).
- gaining a better understanding of what our customers and stakeholders need from us as part of the wider system (i.e. breaking down silos).

As an example of the benefits Whole Systems working can deliver, customers on Shetland in our North licence area will benefit from the Whole Systems approach adopted by SSEN Transmission and SSEN Distribution to connect Shetland to the GB mainland supply, and customers on the mainland will benefit from Shetland’s renewable energy exports (see Case Study 1).

Embedding a Whole Systems approach into our business is supported by our long-term commitment to work collaboratively with stakeholders and policy makers, and to play a more active role in helping to identify solutions and solve challenges faced by others.

The Whole Systems is a ‘two-way street’. It requires energy networks, their partners and the individuals that work within these organisations to think and behave differently, a process that we recognise will take us some time to achieve. We need to create the space for Whole Systems thinking to develop into Whole Systems solutions.

### ***Key steps we need to take***

This document sets out our strategic vision for Whole Systems working, and the transition plan for how we will integrate this vision into internal processes and decision-making tools during ED2. We begin this transition equipped with knowledge and learnings gained from working with stakeholders on discrete Whole Systems initiatives and pilots during the current price control period (ED1) and earlier. In particular, we have undertaken a number of co-creative initiatives and pilots that are giving us valuable insights on how to work effectively with stakeholders and other networks to maximise benefits as we progress toward achieving net zero.

In setting out this Whole Systems approach, our plan focuses on three key steps we need to take over ED2 to achieve our long-term vision for Whole Systems:

- **Reflecting on progress and lessons learned** including working with third parties to review current Whole Systems working and identifying opportunities to improve.
- **Reviewing internal processes to embed and promote Whole Systems solution delivery** including review of operations and ways of working to raise awareness of Whole Systems solutions.
- **Embedding Whole Systems thinking into decision making** including processes to identify, prioritise and assess potential Whole Systems solutions, and using tools such as the Energy Networks Association’s (ENA) Whole Systems Cost Benefit Analysis (CBA) to inform decision making.

We are proposing to utilise Standard Licence Condition 7A’s Whole System Coordination Register, and our **Whole System Support Consumer Value Proposition (CVP)** to provide transparency on our Whole Systems commitments to Ofgem and our stakeholders. This will be achieved through annual surveys of stakeholder satisfaction in Whole System support, and the development of stakeholder informed matrices to measure success which will form key sections of our annual reporting of Whole System Initiatives. Our proposed process will track stakeholder feedback to measure and assess the tangible changes they see on the ground and their experience working with us from our adoption of a Whole Systems approach during ED2. We will continue to use stakeholder feedback to improve and evolve our approach.

Building on what we have already achieved in aligning with Whole System regulatory requirements we will ensure that our operating model and organisational design is revised to incorporate the expected growth in this area in ED2 and beyond. These changes will see central and local resources positioned either before the start of ED2 or afterwards (affordability permitting) to start enhancing our arrangements and awareness of Whole System such to ensure our Customers and the Communities we serve receive greater value from the opportunities available to us.

To embed the changes that are needed to achieve our long-term vision, we propose to **establish a temporary Whole Systems Change Management team** to take ownership of the change management required to achieve this plan. The team will be responsible for achieving the three steps set out above but, as importantly, will champion the integration of Whole Systems across SSEN, focusing on promoting Whole Systems thinking and ways of working, and ensuring internal accountability for Whole Systems. Our goal, and a measure of success for the team, will be the phasing out of the team toward the end of ED2 once Whole Systems thinking and processes are fully embedded across SSEN as

business as usual (BAU) activity. Ultimately, given the nature of Whole Systems, our transition will be necessarily dependent on third parties and their engagement to work with us in new ways.

We propose a regionally focused approach to engaging with stakeholders. In each of our seven regions we will create a new **Whole Systems engagement coordinator role**, that will have both technical and engagement experience, allowing us to improve our understanding of local considerations and meet the expectations of the increased collaboration required of a Whole Systems approach. Through these people, we will give a baseline level of support to our stakeholders including annual engagement with Local Authorities across our licence areas. This engagement will enable our Distribution Future Energy Scenarios (DFES) process to inform Local Energy Action Plans (LEAPs) and Local Heat and Energy Efficiency Strategies (LHEES) and enable these plans to influence our annual DFES outputs, creating improved data sets which are locally relevant.

We have the potential to play a significant role in supporting our stakeholders (in particular local authorities) to achieve their net zero ambitions and to unlock sources of financial support for projects and trials over and above this baseline level of support. Therefore, we also propose a **Whole Systems Support for Local Authorities CVP**. We recognise there are additional costs associated with delivering our proposed service, however the benefits to local authorities and their communities from our support are significant and, without our support, local authorities will face additional challenges and friction in their efforts to meet their net zero ambitions.

In a letter to ██████████, SSEN's Director of ED2, the Scottish Government confirmed its support for our business plan, recognising the potential for CVPs as a means of creating the right framework to underpin transformation in areas of the energy system that might not otherwise happen.<sup>1</sup> The letter referenced our proposed whole system support for local authorities, acknowledging its potential to provide a valuable resource for local authorities acting on their own decarbonisation ambitions. The letter also stated that "Plans for improving islands connectivity and resilience can help to significantly reduce the significant impact of sub-sea cable outages and reliance on stand-by diesel generation."

### *Our progress so far*

Given the urgency to make progress toward net zero and the collaboration that is required across the energy and other sectors to achieve this, we have already started implementing our Whole Systems approach. For example, we've engaged with stakeholders to give them the opportunity to tell us about their net zero ambitions and incorporated this into our Local Network Plans (LNP) and the baseline scenario for energy demand we use to underpin our entire ED2 business plan. Whole System outputs have already been delivered in investment schemes, such as the Edinbane-Dunvegan project (further detailed in Case Study 7) where over £2m of savings were achieved through Whole System collaboration. Using lessons learned we have also augmented our Investment Decision Pack (IDP) decision making process to ensure there is consideration of Whole Systems costs and benefits for all relevant investments. Similarly, our approach to Whole System has been informed by our transition to Distribution System Operator (DSO), in ED2 and beyond we expect Whole System and DSO development to become co-dependant and as such our Whole System approach will also inform our ongoing DSO activities. Section B provides further detail on the progress we have made on embedding Whole Systems thinking and processes in our business.

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<sup>1</sup> Letter dated 22 November 2021, from the Scottish Government's Energy and Climate Change Directorate, Head of Electricity Networks and Regulation.

Our Whole Systems approach complements the other strategies we have developed to shape our future role in a net zero world. For example, the provision of tools and platforms to make our data more accessible as part of our **Digital Investment Plan Strategy**<sup>2</sup> will enable us to work with stakeholders to develop solutions through collaboration and common approaches. Likewise, recognition of climate-related interdependencies with others (e.g. areas of flood risk) in our **Sustainability Strategy (Annex 13.2)**, will help us identify where a Whole Systems solution may be useful in managing the impacts of climate change on our business, and on our stakeholders' businesses'. We are also integrating options for sharing communications assets such as fibres in submarine cables to bring local value.

In bringing together this strategy and our business plan, we have co-created our Whole Systems approach with a range of external stakeholders. Section 5 provides an overview of the stakeholder engagement we have undertaken to develop our Whole Systems approach. Overall, there has been broad support for our proposed increased focus on Whole Systems working, from partners both within and outside of the energy sector.

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<sup>2</sup> <https://www.ssen.co.uk/DigitalStrategy/>

# ACTION PLAN FOR OUR WHOLE SYSTEMS APPROACH

Table 1 sets out the key actions we commit to undertake to transition to an embedded Whole Systems way of working.

Table 1 - Action plan for Enabling Whole Systems Solutions in ED2

<p><b>A. Establish a Whole Systems Change Management team in 2021/22</b> to drive the changes required to transition to Whole Systems working. This includes raising the profile of Whole Systems within SSEN, external reporting on our Whole Systems progress and delivering our ED2 transition pathway.</p>
<p><b>B. Redefine our internal processes to reflect Whole Systems thinking. Key activities include:</b></p> <ul style="list-style-type: none"><li>▪ At regular intervals on our Whole Systems projects and activities we will host structured lessons learned sessions with all stakeholders involved. Feedback will be documented in the lessons learned log (see below) and summarised in the Whole Systems annual report (see below).</li><li>▪ Maintain a 'lessons learned log', capturing key learnings from Whole Systems working to date, and regularly and frequently updated as new project learnings are revealed. This log will be open and accessible to all SSEN staff and will be shared with external parties on request.</li><li>▪ Host a quarterly Whole Systems review session with relevant SSEN business leads and Directors. This will be a key forum for internal stakeholder engagement on Whole Systems to complement broader external stakeholder engagement activity.</li><li>▪ Through the SLC7A and Whole System CVP processes, we will publish a Whole Systems annual report which includes metrics on our Whole Systems implementation (including stakeholder feedback captured through CVP surveys), and the action plan for the following year, as well as including the integration of learning from the previous year's activity and engagement.</li></ul>
<p><b>C. Engaging with stakeholders to develop Whole Systems approaches</b> including working with our partners across: the ENA Open Networks, Energy Innovation Centre (EIC) which also includes water companies, Power Networks Demonstration Centre (PNDC), Whole Systems Development Forum with SSEN Transmission, Whole Electricity System Joint Forum with the GB Electricity Systems Operator (ESO), Whole Systems Energy Sector Charter and the Electric Vehicle (EV) strategic Partnership with Scottish partners. We will also continue engaging with, and learning from, our SSEN Transmission colleagues on their progress in embedding Whole Systems.</p>
<p><b>D. Develop and deliver a training programme for all SSEN decision makers to ensure Whole Systems thinking is embedded in the organisation</b>, starting in ED1. We will deliver training sessions for all business unit leads on, a) what Whole Systems is, including examples from across the business; b) how teams and individuals can adopt Whole Systems approaches and thinking in their teams; and c) share lessons learned from Whole Systems working to date. This training programme will be co-ordinated by our Whole Systems Change Management team.</p>
<p><b>E. Establish a set of Whole Systems metrics</b> to track the success of our integration of Whole Systems thinking and approaches into our business, and report using a combination of SLC 7A's Whole System register and an annual report on the outputs of our Whole System Support CVP. These processes will capture feedback from those working with us, and we will develop a set of stakeholder informed metrics to measure the effectiveness of our Whole Systems activities.</p>

**F. Continue to review all our ED2 load investments for Whole Systems solutions and for those with a value greater than £2m undertaking a quantified assessment.** This will be done alongside assessing for flexibility options. We will continue to work with the ENA, other Distribution Network Operators (DNOs) and the wider energy sector to test use cases for the Whole Systems Cost Benefit Analysis (CBA) as a decision-making tool on an ongoing basis - i.e. using the Whole Systems CBA in our BAU.

**G. Draw-on investment in Open Data, as set out in our Digital Strategy, to provide a purpose-made data portal that can be used by Local Authorities, community groups and other utilities to enable whole system collaboration.** We will prioritise key datasets identified by stakeholders and develop an interactive tool (most likely via a data partnership). This tool will be developed collaboratively with our customers and stakeholders so it can best meet their needs.

**H. Offer annual engagement on our DFES alongside Open Data to all Local Authorities in our areas to support the production of effective LEAPs) and LHEES.** We propose to support Local Authorities to deliver their net zero ambitions through our baseline commitment of data sharing and DFES collaboration, reflecting the diversity of the regions in which we operate and the needs and ambitions of our different stakeholders. Local Network Plans will continue to form the basis for our annual system planning demand forecasts throughout ED2 and these will be supported by the creation of 7 new Whole System Coordination Roles. These new roles will offer Local Authorities annual engagement in each of our regions, ensuring our data supports LEAPs and LHEES and that forecasting through our DFES accurately reflects local aspirations.

**I. Provide above and beyond support to 200 community groups and 72 Local Authorities to help them transition to net zero, including the production of area specific information and providing bespoke services as part of our proposed CVP.** Above and beyond services we will provide to these groups include, tailored local information packages and guidance and interpretation of the data, scenario and output modelling, advisory support to assist groups to identify, scope and improve the design of Whole Systems opportunities, support with applications for funding for projects, and ongoing technical support during delivery to manage interdependencies with our network and other work.

## OUR PROGRESS ON WHOLE SYSTEMS WORKING TO DATE

While the above actions will largely be delivered in ED2, we have already started to augment our processes and ways of working in recognition of the fact that Whole Systems isn't just a regulatory expectation but an essential way of working and problem solving, and there is no time to wait. Below we set out some of the areas where we have already taken action:

- **Embracing opportunities to work on pilots and Whole Systems initiatives in ED1** including Project LEO (Local Energy Oxfordshire) (see Case Study 4), Regional Energy System Optimisation Planning (RESOP) (see Case Study 5), the Shetland project (see Case Study 1), data sharing to support vulnerable customers (see Case Study 2), SAVE (Solent Achieving Value from Efficiency) and more (see Table 8).
- **Establishing regular, structured engagement forums with key external stakeholders** including with:
  - SSEN Transmission via our Whole Systems Development Forum and Whole Systems Strategy Group (see section 5).
  - Transport Scotland, for example through our A9 Electrification and E-tourism projects, where we have developed relationships through the secondments of our system planners to Transport Scotland (see Table 8).
  - The ENA through the Open Networks Project, the ENA Data and Digitalisation Steering Group and the Green Recovery Investment project.
  - National Grid (as ESO and TO) through Regional Development Programmes (RDPs) and the Whole Electricity System Joint Forum.
- **Raising Whole Systems awareness across our teams, including 1-2-1 conversations where Whole Systems** activity is being undertaken but not realised, presenting on plans for Whole Systems in ED2 team meetings and collating a central repository of Whole Systems projects in SSEN (see Table 8). We have also invested in IT systems including connectivity models and asset data to provide the base data set for our future Open Data Policy.
- **Augmenting processes to include Whole Systems considerations**, such as the introduction of a process to consider Whole Systems solutions in our Investment Decision Packs (IDPs) and undertaking CBAs using the ENA's Whole Systems CBA methodology<sup>3</sup>.
- **Becoming a signatory to the Whole Systems Energy Network Charter** (with Scotia Gas Networks (SGN), SSEN Transmission, National Grid Electricity Transmission (NGET), the GB ESO and Scottish Power Energy Networks (SPEN) which codified how we will work together and support each other's Whole Systems initiatives.
- **Embedding DSO and Whole System ready infrastructure** through the South West Active Network (SWAN) Project, which has installed a new Inter-Control Centre Communications Protocol (ICCP) link (a T-D Interface) and network management system within the SEPD licence area enabling real-time data exchange with the ESO and NGET to optimise Whole System operations across our networks.

There are a number of other Whole Systems initiatives that we started working on in ED1 and will continue into ED2. A brief summary is provided below, and more detail can be found in Table 8.

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<sup>3</sup> <https://www.energynetworks.org/industry-hub/resource-library/open-networks-2020-ws4-p1-user-guide.pdf>

- **Electric Vehicles (EV) Strategic Partnership:** a joint initiative led by the Scottish Government, with the target of a coordinated investment approach for EV charging infrastructure which included embedding SSEN technical resource within the project partners to improve technical and network reviews of optimum charger locations.
- **Heat Electrification Partnership:** A Scottish Government led initiative which is focussed on decarbonising the heat network in Scotland. This is running in conjunction with the EV Strategic Partnership.
- **London Underground Asset Register (LUAR) and National Underground Asset Register (NUAR):** a scheme between 12 local authorities and 35 other organisations focussed on sharing data on underground piping and assets. There are plans to roll out this pilot on a nationwide scale.
- **OZEV Collaboration** to inform the creation of the Automated and Electric Vehicles (AEV) Act 2018, the legislation that mandated the smart requirements in UK for all EV chargers sold, helping to ensure grid stability for DNOs moving forwards.
- **Resilience as a Service (RaaS):** a project providing low-carbon solutions for maintaining network resilience. Note this is set to end in 2022.
- **Riding Sunbeams:** supporting Rail Network Operators aspirations to install Solar PV and Storage at key locations to reduce electricity consumption from networks and achieve net zero objectives.
- **SAVE:** an initiative alongside the University of Southampton and other third parties aimed at assessing the usage of energy efficient measures.
- **A9 Electrification:** working alongside Transport Scotland to provide EV charging ports along the length of the A9 road.
- **E-Tourism project:** an initiative to investigate how EV charging demand will change in various tourist destinations in North Scotland.

Our proposed approach to Whole Systems metrics and performance are provided in Table 3.

Table 3 - Whole Systems outputs

Output	Output type	RIIO-ED2 target	Cost in baseline plan	Consumer benefit
<b>Whole Systems feedback survey</b>	Report	Track key stakeholder feedback annually through a qualitative and quantitative survey	Incremental	Effective Whole Systems solutions delivered, aligned with stakeholder needs
<b>Whole systems engagement for local authorities</b>	SSEN Aim	Support Local Authorities' energy and heat strategy development through provision of relevant data sets and annual engagement on our DFES scenarios	£2.4m	Local authorities are aware of our services and how we can support them in their decarbonisation plans
<b>Embedded whole systems support services for local authorities and community groups</b>	CVP	Provide enhanced support to 72 Local Authorities and up to 200 community groups using people within our business and applying our capabilities to assist communities to develop and deliver viable effective whole system and net zero initiatives that have an interaction with our network.	£12.3m	Net customer benefits of £11.2m from helping to lower long-term costs for customers and local net zero and whole system initiatives through more efficient siting and use of infrastructure
<b>Supporting broadband to island communities through our assets</b>	CVP	Go beyond our traditional activities as a DNO, enabling communities to access and benefit from fibre where they are installed in our assets.	£8.0m	Our proposal will deliver net customer benefits of £27m by enabling a range of benefits across island communities including sustainable economic development, education, healthcare and addressing depopulation through access to good quality digital infrastructure

# 1. ENHANCED ENGAGEMENT



Our Whole Systems strategy has been informed by our Enhanced Engagement programme, full details of which are set out in Annex A 3.1. Our draft plan was underpinned by three phases of stakeholder and customer engagement (illustrated in the diagram above). The details of this engagement and insights are set out in Appendix C to this Annex and provide a clear line of sight between what stakeholders told us and our Whole Systems strategy and outputs.

## 1.1 FINAL WHOLE SYSTEMS STRATEGY TESTING AND ACCEPTANCE

We have refined our final Whole Systems strategy and outputs based on Phase 4 of our Enhanced Engagement, which involved direct testing of the strategy, outputs, and costs with 1,497 stakeholders through seven events. The table below sets out the clear line of sight of the changes between our draft and final Whole Systems strategy and outputs based on this engagement.

## 1.2 ENHANCED ENGAGEMENT TRIANGULATION AND CHANGES BETWEEN DRAFT AND FINAL PLAN

The table below summarises the clear line of sight between stakeholder and consumer insights and our Whole Systems strategy and outputs. For our **draft Whole Systems strategy** and outputs, based on phases 1 to 3 of our enhanced engagement program, we demonstrated how engagement insights had informed our outputs using these keys:



Findings converge to support proposals.



Findings generate new insights that lead to further refinement of proposal.



The proposed approach diverges from the findings.

To demonstrate the line of sight between the scope of **change between draft and final**, based on testing our draft proposals with stakeholders and consumers, we use these keys:

Strategy/Output	Phases 1-3 Enhanced Engagement	Phase 4 Outputs and Cost Testing	Acceptability
<b>Whole Systems strategy</b>	<p><b>Stakeholders said</b> The most effective way to move to a Whole Systems approach is through facilitating access to network data, including LV data and provision of interactive network impact assessments.</p> <p><b>Our response</b>  The strategy explicitly references the role of sharing data and the initiatives in place as part of the Digital Strategy will achieve this.</p> <p><b>Stakeholders said</b> Flexibility and EV and Low Carbon Technology (LCT) growth should be facilitated.</p> <p><b>Our response</b>  The strategy identifies the need to support EVs and an expansion in LCTs as a key driver for adopting a Whole Systems approach.</p>	<p><b>Stakeholders said</b> Stakeholders were broadly positive about the package of outputs for whole systems, particularly around active network solutions and flexibility.</p> <p><b>Our response</b> We intend to continue our engagement with stakeholders to develop our whole systems approach further prior to and throughout ED2. EV Partnership and the Riding Sunbeams project involving solar PV on trains (see Executive Summary).</p>	79% for the <i>Accelerated Progress Towards a net zero World</i> strategic outcome

Strategy/Output	Phases 1-3 Enhanced Engagement	Phase 4 Outputs and Cost Testing	Acceptability
	<p><b>Stakeholders said</b> SSEN should provide dedicated Whole Systems liaison officers.</p> <p><b>Our response</b>   We created the regional Whole Systems Coordinators which will act as the named 'entry point' / contact for stakeholders to discuss Whole Systems.</p> <p><b>Stakeholders said</b> SSEN should be represented in local system initiatives.</p> <p><b>Our response</b>   The strategy commits to engaging with LA's and Communities to support their own initiatives (in particular through the CVP).</p>		
<p><b>REFINED</b> <b>Output:</b> Track key stakeholder feedback annually through a qualitative and quantitative survey</p>	<p><b>Our response</b> We believe that stakeholder feedback should be part of the annual reporting Licence Condition SLC7a.</p>	<p><b>Our response</b> An annual survey is more appropriate given the timeframes for project development.</p>	Not tested
<p><b>ENHANCED</b> <b>Output:</b> Support Local Authorities' energy and heat strategy development through provision of relevant data sets and annual engagement on our DFES scenarios</p>	<p><b>Stakeholders said</b> SSEN should work with LAs on regional network constraint/curtailment studies.</p> <p><b>Our response</b>   ED1 projects are exploring these issues (e.g. Project LEO) and lessons will feed into the ED2 Transition Pathway actions (e.g. updating internal processes)</p>	<p><b>Stakeholders said</b> The most effective way to move to a Whole Systems approach is through facilitating access to network data.</p> <p><b>Our response</b> We have included provision of data sets and proactive engagement on DFES as part of our whole systems strategy so that local plans both influence and can be influenced by our network investment. This will be delivered by the regionally based whole systems co-ordinators so we have a better awareness of the challenges faced by our stakeholders.</p>	Not tested

Strategy/Output	Phases 1-3 Enhanced Engagement	Phase 4 Outputs and Cost Testing	Acceptability
<p><b>REFINED</b></p> <p><b>Output (CVP):</b> Provide enhanced support to 72 Local Authorities and up to 200 community groups using people within our business and apply our capabilities to assist communities develop and deliver viable effective whole system and Net Zero initiatives that have an interaction with our network.</p>	<p><b>Stakeholders said</b> SSEN should be part of regional development.</p> <p><b>Our response</b>  Our strategy calls out the need for regional approaches drawing on lessons from RESOP.</p> <p><b>Stakeholders said</b> Are there specific plans for collaboration in infrastructure planning?</p> <p><b>Our response</b>  The strategy outlines the process we will undertake to do this (including the amended IDP/EJP process) and identifies collaboration on subsea cables and broadband as a priority area.</p> <p><b>Stakeholders said</b> Local Authorities need greater support for their Local Area Energy Plans</p> <p><b>Our response</b>  We will add to our current approach by considering what can be provided on a regional/geographical basis, potentially an ambassador role, to provide support for LAs including on data availability and local development plans. This will be in addition to our ongoing engagement with our connection’s stakeholders within Local Authorities.</p>	<p><b>Stakeholders said</b> Local Authority and political stakeholders recognised this CVP could address the shortfall in expertise in some LA’s and move from a reactive model of interaction e.g. responding to flooding, to a pro-active model. Issues were raised about the limited effectiveness of “one size fits all” and that area bespoke data, information and analysis were also key to enable Net Zero initiatives at the local and community level.</p> <p><b>Our response</b> We have further clarified the process through which the CVP would be delivered, some of the elements offered including the potential to embed technical expertise in projects where resource of knowledge may need support, as per our A9 Electrification project. In addition, we propose to build a Whole System ‘Support Pack’ as part of the CVP, offering accessible data sets, stakeholder details and example case studies to help ongoing delivery of net zero projects.</p>	<p>Not tested</p>

Strategy/Output	Phases 1-3 Enhanced Engagement	Phase 4 Outputs and Cost Testing	Acceptability
<p><b>REFINED</b>  <b>Output W(CVP):</b> Go beyond our traditional activities as a DNO, enabling communities to access and benefit from fibres where we they are installed in our assets</p>		<p><b>Stakeholders said</b>  Support for the concept of utilising SSEN assets to enhance broadband access to Island community by political stakeholders. Consumer group representatives questioned whether it was appropriate for a DNO to undertake this activity.</p> <p><b>Our response</b>  We have received positive feedback from engagements with Scottish Government and three Local Authorities (Orkney, Shetland and the Western Isles) who have taken this up or plan to engage further. To progress this CVP we will seek regulatory approval of the activities and ensure compliance with the Communications (Access to Infrastructure) regulations of 2016.</p>	<p>Not tested</p>



## 2.WHOLE SYSTEMS INTRODUCTION

### 2.1 WHAT IS WHOLE SYSTEMS?

Transitioning to net zero creates opportunities for greater coordination between sectors (e.g., electricity, gas, transport, water, telecoms, etc.) as they converge. As there is increasing potential for overlap between key vectors to meeting consumers heating, power and transport needs and as outlined by Ofgem<sup>4</sup>, the actions of network companies are increasingly having large impacts on one another. A coordinated, or 'Whole Systems' approach is necessary to manage the system effectively at a low cost for consumers, with network companies working together and with other stakeholders to take a wider view of the energy system when they make decisions and act. As such, Whole System thinking, consideration and strategy are a key element of our transition to DSO as well as informing our approach and utilisation of Flexibility, we firmly believe Whole System underpins not only our ED2 Business Plan but will also be the key foundation of future price controls.

Whole Systems is a relatively new and evolving area of the energy sector regulatory framework. In 2019, Ofgem defined Whole Systems as:

*“In context of Open Networks, Whole Systems means making optimal network investment and operational decisions for the whole electricity system, not just the transmission or distribution networks in isolation from all the equipment connected to the network”.*

Ofgem’s Whole Systems thinking has evolved significantly since then and continues to develop. Evolution in Whole Systems thinking is being driven particularly by government policy changes, including the need to achieve net zero by 2050 in England, and 2045 in Scotland in a cost-effective manner. To achieve this, it is recognised that the energy sector cannot deliver this alone. Cooperation and collaboration are required across a wide range of industries that either work directly with or alongside the energy sector, including water, telecommunications, and transport, as well as the local authorities who oversee the Whole Energy Systems within their regions. As Whole Systems thinking evolves to include a wider range of vectors, our interpretation of Ofgem’s current requirements for energy companies participating in Whole Systems is:

*“Coordination or cooperation between energy sectors and other vectors with the aim of an overall enhancement in quantifiable consumer benefits and/or societal outcome.*

In practice, this means embedding a culture and way of working right across our business that embraces opportunities to work collaboratively with others and problem solve. Whole Systems also requires sharing plans, data, information, skills and foresight with others to support the delivery of net zero and maximising the benefits we deliver for customers.

Whole Systems includes:

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<sup>4</sup> Ofgem December 2018 RII0-2 Sector Specific Methodology consultation. Available at: <https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation>

- Delivering projects jointly with one or more third parties, generally with a focus on working collaboratively towards net zero (e.g. Project LEO<sup>5</sup> with partners from across academia, industry, local councils and community groups in Oxfordshire, see Case Study 4).
- As part of a [Digital Strategy](#), sharing our data to help other parties deliver projects and meet their objectives (e.g. sharing data on Priority Services Register (PSR) customers to enable more effective targeting of support to consumers across sectors, see Case Study 2).
- Coordinating projects with third parties to provide benefits (or minimise negative impacts) to customers (e.g. co-ordinated asset management programmes with water companies, particularly for underground assets).
- Coordinating across sectors to improve service levels for customers, for example through our PSR Scotland initiative, where we invited Scottish Water and SP Energy Networks to join us in an innovative partnership to help customers better understand the support available to them.
- Working across the energy sector to develop industry-wide strategies and approaches for Whole Systems working, including through our Whole Systems Charter with the ESO, the gas distribution networks (GDNs), Transmission Owners (TOs) and other DNOs.

Box 1: Stakeholders agree with our understanding and interpretation of Whole Systems working

In our March 2021 Whole Systems stakeholder engagement workshop, we tested our understanding and interpretation of what Whole Systems means, and 100% of attendees agreed or strongly agreed with our interpretation.

## 2.2 WHY IS WHOLE SYSTEMS WORKING IMPORTANT?

There are a number of key benefits to our and other sectors' stakeholders and customers to Whole Systems working including:

- **Providing more support to our stakeholders.** For example, helping others to address their challenges rather than being solely focused on solving our own problems.
- **Realising economies of scale and scope across the energy and other vectors.** For example, co-delivering Whole Systems projects with other energy companies to realise synergies, such as our work with SSEN Transmission to connect the Shetland Islands to the GB mainland energy supply (see Case Study 1).
- **Removing barriers and frictions.** For example, by working alongside local authorities and other local stakeholders where working relationships have not historically been established. Also, the removal of friction from processes to speed up and aid the realisation of our stakeholders' Whole Systems ambitions.
- **Reducing costs.** For example, by adopting flexible solutions to minimise additional infrastructure investment required (and subsequent customer bill increases) to meet demand.
- **Minimising duplication and negative impacts on customers.** For example, working with other utilities to minimise potentially duplicative activities such as road closures to access underground assets. Minimising duplication also enables a reduction in costs.

<sup>5</sup> Project LEO is a collaborative project to develop a large smart grid in Oxfordshire. Case Study 4 provides a detailed overview of Project LEO and key lessons we are taking forward.

Whole Systems thinking is aligned with our ED2 strategic outcomes and core principles, which we developed collaboratively with stakeholders, and how we can have a positive impact on society.



Figure 1 – Our strategic outcomes for ED2

Figure 1 shows our three Strategic Outcomes for ED2. These strategic outcomes are supported by three core principles which guide how our overall business plan has been built. **These three core principles are:**

- **Value for money** - focusing on efficiency and creating value for customers and communities
- **Innovation** - embracing new ways of doing things for the benefit of customers and communities
- **Transparency** - being open and accessible in our activity and engagement

To achieve our long-term vision, we are committing to a transition plan throughout ED2 which is focused on integrating Whole Systems thinking into internal processes and decision-making tools (including the ongoing use of Whole Systems CBAs). We have tested the long-term Whole Systems vision and ED2 transition plan with a range of external stakeholders, and ensuring it delivers value for money for our customers.

We continue to learn from our interactions and collaboration with others. Table 2 outlines key learnings from ED1 we are applying as we plan our approach for ED2. In response to the ambition of our customers to embrace low carbon technologies and our collective goal of achieving net zero, as well as the increasing linkages between energy sector companies and other network vectors, a more structured and well-defined approach to Whole Systems working is required.

# 3. OUR WHOLE SYSTEMS APPROACH

## Box 2: Actions to deliver our Whole Systems approach

### Whole Systems actions

- A. Establish a Whole Systems change management team in 2021/22
- B. Redefine our internal processes to further embed Whole Systems thinking
- C. Engaging with stakeholders to develop Whole Systems approaches
- F. Continue to review all our ED2 load investments for Whole Systems solutions and for those with a value greater than £2m undertaking a quantified assessment.

Our approach is designed to embed Whole Systems thinking, culture and decision-making processes across SSEN. This will enable us to maximise the benefits for our customers and broader society. The approach leverages our experience of Whole Systems activities in ED1. Table 8 outlines a range of examples where we already undertake Whole Systems approaches to collaborate with others and make decisions guided by Whole Systems thinking. We recognise the need to increase our ambition and use this experience to define a formal approach for Whole Systems to support the transition to a net zero economy at the lowest cost to customers. We consider our approach to Whole System as a key element in enabling net zero which is expanded upon in *Our Network as a Net Zero Enabler chapter (Chapter 10)* of our business plan.

Figure 2 illustrates our approach to enable Whole Systems solutions. We've mapped out an ED2 pathway that builds on our ED1 approach to achieve our long-term vision by the end of ED2. Our long-term vision is to work collaboratively with stakeholders where we play a more active role in helping to identify solutions and solve challenges faced by others, as well as our own. In the same way that electricity networks have embedded consideration of flexibility into their business-as-usual processes, a transition process is needed to embed Whole Systems working as the norm throughout SSEN. This new way of working will be more resource intensive, so we also need to carefully manage the pace of change and communicate clearly with stakeholders on how we are managing any resource constraints. Therefore, as well as developing a vision for Whole Systems, we have mapped out how we will make progress towards that vision during ED2, and the key strategies and support structures required to enable the transition.

## Box 3: Stakeholder engagement has informed our approach to Whole Systems working

### Stakeholder engagement and support for our plan

When asked what our most important enabler to Whole Systems success was, our stakeholders suggested that 'collaboration' and 'open data' were the most important. Other important enablers included 'working with local authorities' and 'flexibility'.

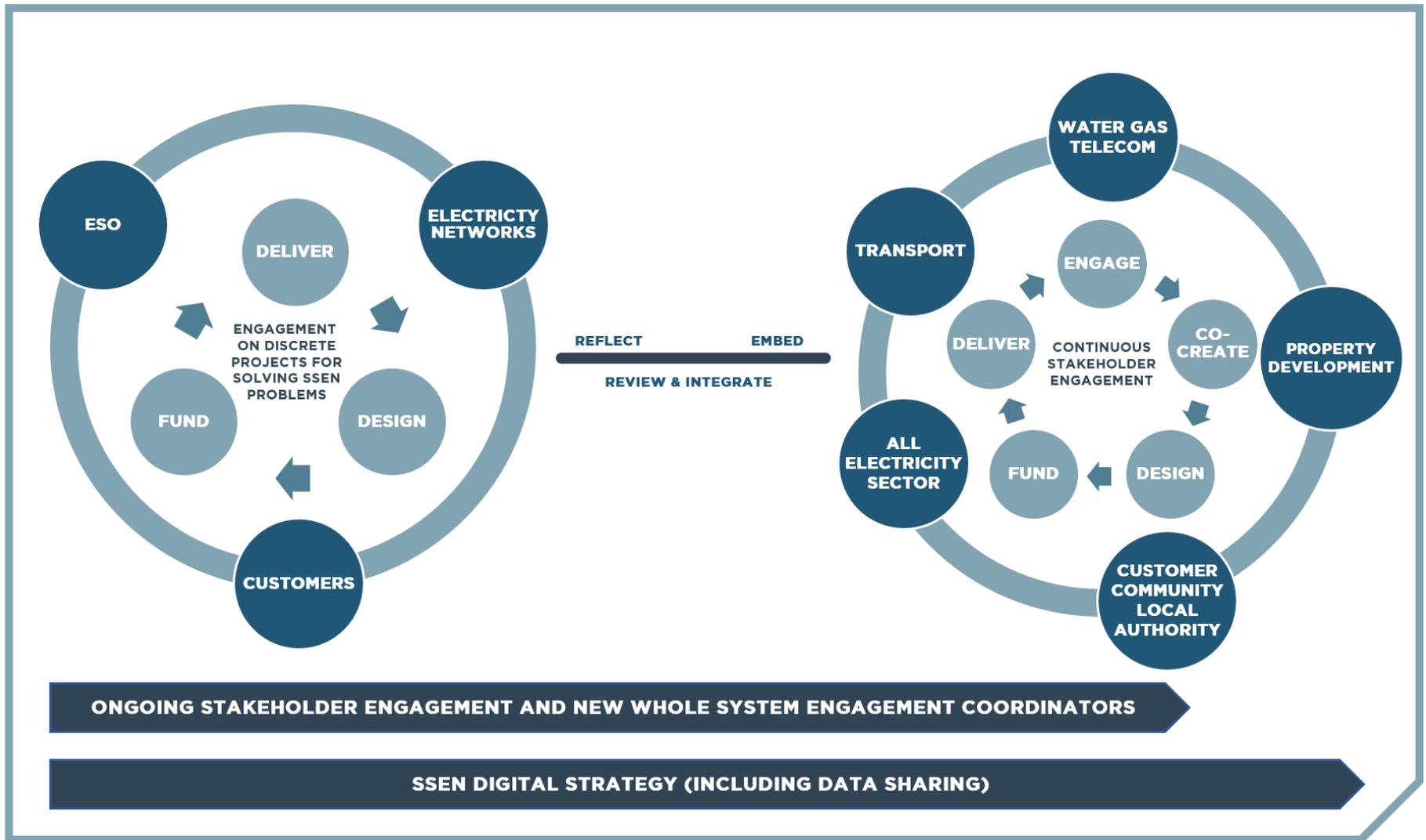


Figure 2 - SSEN's approach to enable Whole Systems solutions

### 3.1 OUR WHOLE SYSTEMS TRACK RECORD

Our track record to Whole Systems working in ED1 started by delivering discrete, mainly pilot-based projects which have been primarily about exploring a range of options to solve SSEN’s challenges or joint challenges with others, for example, a new shared transmission and distribution network connection to Shetland.

Our Whole Systems track record is based on the following high level three stage process:

- **Design:** we identify an opportunity to work with others to solve specific SSEN issues or as part of a pilot initiative to test new ideas, often but not exclusively through our Innovation Programme. Solutions are typically designed and tested collaboratively with our stakeholders. An example of where we have done this in ED1 is in the Aberdeen Hydrogen Project (see Table 8). These initiatives have informed how we design, review and support Whole System initiatives in ED1 and into ED2.
- **Fund:** we work with third parties together to secure funding to deliver initiatives. Funding can be sourced from external sources, such as the Network Innovation Allowance (NIA) or can be jointly funded by SSEN and its counterparts. For example, Project LEO is funded through £13.8m from the Industrial Strategy Challenge fund (managed by Innovate UK) and £26m of private funding from the project partners including SSEN. Our understanding of the challenges posed by securing adequate funding for Whole System projects has helped to inform several of our CVPs within our ED2 Business Plan.
- **Deliver:** we co-deliver these initiatives with our counterparts. This involves establishing joint programme governance structures, agreed project specific ways of working and sharing outputs and learnings with a wider set of stakeholders. For example, on the Shetland connection we are working with Ofgem, SSEN Transmission, the ESO and other stakeholders to finalise implementation arrangements ahead of the transmission connection to the Shetland distribution system in late 2024.

Examples of the lessons we have learned through Whole Systems projects in ED1 are provided in Table 2. Further detail on our ED1 projects can be found in Table 8. Case studies 1-5 provide further detail on selected Whole Systems projects from ED1, including specific lessons learned from each.

Table 2 - Examples of lessons learned from our Whole Systems working and projects in ED1

Examples of lessons learned from Whole Systems working in ED1	ED1 projects that supported these learnings
Working with other organisations and new third-parties allowed us to improve our communication with stakeholders and the importance of leading through people. We’ve learnt when working with other organisations it is important to ‘speak the same language’ particularly when working across vectors i.e. across transport, heat and energy.	Project LEO, RESOP, Heat Electrification Partnership, Green City Vision, 4D Heat, LUAR, EV Strategic Partnership, South West Active Networks (SWAN), RaaS, SAVE, A9 Electrification, OZEV Collaboration, Scottish Government E-Tourism Project, PNDC, ENA Engagement, UK EIC

Examples of lessons learned from Whole Systems working in ED1	ED1 projects that supported these learnings
When developing partnerships, shared responsibilities, goals and outcomes should be developed and agreed upfront.	Project LEO, Priority Service Register (PSR) data sharing, OZEV Collaboration
When forming partnerships that will directly benefit customers, they should be formed across SSEN’s North and South areas to ensure service improvements can be delivered consistently across our licensed areas.	PSR data sharing
Changing cultures and mindsets within organisations, including our own, can take time and it is unrealistic to expect teams to embrace ideas “overnight”. Pilots and trials can help build and test cultures and ways of working first, and they can then be rolled out more widely.	UK EIC, RESOP, SWAN
Data exchanges and sharing information is critical to enable accurate decision making, and Whole Systems working presents significant opportunities for widespread data sharing.	Project LEO, Heat Electrification Partnership, Green City Vision, 4D Heat, LUAR, EV Strategic Partnership, SWAN, RaaS, SAVE, A9 Electrification, E-Tourism Project, PNDC, ENA Engagement
Working with a wide range of stakeholders exposes us to new technologies and additional tools we can use for our Whole Systems working. For example, we’ve learnt how we can use complex economic forecasting to enable low carbon technologies and flexibility.	Project LEO, Heat Electrification Partnership, Green City Vision, 4D Heat, LUAR, EV Strategic Partnership, SWAN, RaaS, SAVE, A9 Electrification, E-Tourism Project, PNDC, ENA Engagement
Working with others has opened up opportunities for access to new markets, and we have been able to generate routes to market for some smaller assets.	Project LEO

Whole Systems activities in ED1 have been delivered by teams across our organisation. We recognise that in some cases, our teams are unaware that what they are doing in their day-to-day roles is in fact helping us to achieve overall greater societal benefits through stakeholder collaboration in the way envisaged under Whole Systems, and key to our ED2 approach is raising awareness of Whole Systems working and its benefits. A comprehensive, transparent and structured Whole Systems approach will enable us to fully embed the necessary culture, thinking and processes across our business and focus our efforts where they will have the greatest societal impacts. This is the goal we have set for ourselves for ED2.

#### Box 4: Stakeholder feedback on their experience working with us has informed our approach

##### Stakeholder engagement on our plan

45% of stakeholders at our Whole Systems workshop agreed (and 55% somewhat agreed) with our assessment of the feedback we have gathered through our range of ED1 activities. This feedback included that we are willing to be involved in a wide range of projects and share our knowledge, but that our limited resources mean we can't respond to all requests for support and that we can be too focused on delivering cost efficient solutions and solving our own challenges to help others.

When asked to expand on their answers, attendees noted that they have found a "lack of ability to access end customer data" and that "historically (our approach) has been narrowly focused and internal". Furthermore, it was suggested that "there are too many different parts to SSEN which results in no single point of contact to take through schemes".

## 3.2 OUR LONG-TERM WHOLE SYSTEMS VISION

Our long-term Whole Systems vision is a blueprint for how we want to work with stakeholders by the end of ED2. As shown in Figure 2, it is a collaborative approach that builds on the current 'Design', 'Fund' and 'Deliver' activities we do today. In the long-term, we will undertake two additional activities: 'Engaging' and 'Co-creating'. These are focused on working with stakeholders at an earlier stage to identify a broader set of challenges and stakeholder objectives where SSEN can play a role in working together to develop potential solutions.

Our vision is informed by feedback received from our stakeholders on their experience of working with us in the past (see Box 4 and section 2), and how they would like to work with us in the future (see section 2). To achieve our long-term vision, Whole Systems thinking, and mindsets will need to be embedded across SSEN, which will require changes to processes and ways of working during ED2 (see section 4).

#### Box 5: Adopting learnings from embedding flexibility into our business

##### Learning from embedding flexibility into SSEN

We have recent experience of embedding new ways of thinking into SSEN through our approach to flexibility. Flexibility services already play a big part in avoiding the need for expensive reinforcement to accommodate the growth in low carbon technologies, helping to keep costs down for customers. Like Whole Systems, we started through a series of innovation-funded pilots (Northern Isles New Energy Solutions (NINES) and the Orkney Energy Storage Park) to learn lessons on how flexible connections and flexibility services could be used to help us manage our network. We applied these lessons and in 2015 expanded our approach into a series of targeted areas of network constraints to test and learn how to work with flexibility providers to resolve network constraints.

We have now adapted our standard processes for optioneering by incorporating a 'Flexibility First' approach and extending the use of flexibility to our entire network. Since 2016 we have been reaching out – ahead of need – to existing (or potential) flexibility providers across our entire licence areas who control assets that could provide solutions. This allows us to better assess the opportunities to purchase flexibility and react more quickly as and when the need arises.

We make all of our Flexibility service requirements visible to all our stakeholders on our webpages and through marketplaces like Flexible Power, and through engagement sessions and webinars we call on flexibility providers to register to benefit from the opportunities from existing and future flexibility requirements.

We have also led on the development and implementation of an industry Common Agreement for flexibility services through the ENA Open Networks project. The Common Agreement is now in its third revision since inception and will now be utilised by both DNOs and the ESO, meaning all providers across the UK will experience the same contract regardless of their geographical location, the services they provide and the Network Owner or Operator they provide them to. Flexibility will play a key role in both our Transition to DSO and our Whole System strategies as well as being an enabler for net zero. Further detail of our approach to Flexibility as part of our DSO transition can be found in our *DSO Strategy, (Annex 11.1)*.

In Table 3 we provide an overview of the importance of each of the five components of our long-term Whole Systems vision as shown in Figure 2.

Table 3 - Components of our long-term vision for Whole Systems

Components of our long-term vision	Why this is important to Whole Systems in the long-term
<p><b>Engage</b> - continually communicating with our stakeholders to identify issues or challenges we can address together</p>	<p>While we currently engage with many third-party organisations, continuous engagement will enable us to identify needs and opportunities for Whole Systems solutions early. The level of stakeholder engagement required to fully embedded Whole Systems working will require coordination to ensure engagement opportunities are prioritised across the business. Our proposed Whole Systems Change Management team will be set up to coordinate and support the necessary engagement over the early years of ED2 which will be delivered externally by our Whole System Coordinators working in each of our 7 regions. This external engagement will be further strengthened by our Whole System Support CVP which will enable far greater levels of engagement across key stakeholder groups.</p>
<p><b>Co-create</b> - working alongside stakeholders to consider solutions to challenges</p>	<p>Stakeholder feedback to date suggests that our present way of working does not always allow for sufficient co-creation of solutions. Genuine Whole Systems working will require collaboration in co-creating solutions, not just delivering them. While it is helpful to approach solution development with some ideas about how best to solve the problem, this co-creation stage will also allow SSEN to be more involved in developing solutions for challenges faced by others, and expertise and knowledge can be shared early. Our approach to completing a Whole System CBA for our Fleet-Bramley scheme is an example of this co-creation which has also been informed by discussions and outputs from the Whole Electricity System Forum coordinated by the ESO.</p>

Components of our long-term vision	Why this is important to Whole Systems in the long-term
<p><b>Design</b> - working with stakeholders to develop solutions and select the mutually preferred option</p>	<p>Similar to the co-creation phase, the design phase will allow for knowledge and insight to be shared at critical stages of the solution development process. At this stage it is expected more concrete solutions will be designed and would include assessment of the various options. For larger projects, this options assessment would include use of the ENA's Whole Systems CBA to support decision making (see Case Study 6), which requires working with stakeholders to collect the necessary data to model the cost and benefit impacts of the different solution options on all parties. Through the Whole System Support CVP we plan to offer bespoke support to wider Whole System projects and initiatives, for example offering embedded technical expertise within projects such as the A9 Electrification and EV Strategic Partnership projects or offering to complete Whole System CBAs where project resources or experience are insufficient.</p>
<p><b>Fund</b> - working with stakeholders to source and agree appropriate funding to deliver a solution</p>	<p>Critical to the implementation of Whole Systems solutions to achieve net zero is ensuring there is sufficient funding available. While there are some external funding streams available such as: through the Network Innovation Allowance, the £4.7bn of funding being made available by BEIS for innovation trials in the energy sector to achieve net zero<sup>6</sup>, funding will also be required from within SSEN and other stakeholders to deliver schemes and support stakeholders to access these funding sources.</p> <p>It is at this stage of the process where we anticipate an assessment of whether the Coordinated Adjustment Mechanism (CAM) offers an appropriate funding route to share costs among energy sector licensees. The CAM is an annual mechanism that allows energy networks to trade outputs and funding between them to deliver cost-effective network solutions for consumers.</p>
<p><b>Deliver</b> - working with stakeholders to implement a solution</p>	<p>There are also Whole Systems opportunities in the way unrelated projects are delivered, for example repairs to electricity and telecoms assets coordinating maintenance programmes could benefit consumers by reducing disruption. For related projects, it could mean establishing joint program governance structures, project specific ways of working and processes to share outputs and learnings with a wider set of stakeholders will all be critical in delivery of Whole Systems solutions. Case Study 4 on Project Leo and Case Study 5 on RESOP highlight some of the key learnings from our experience delivering Whole Systems Solutions with local authorities and other stakeholders.</p>

**Box 6: Delivering Efficiency in Operations through Whole System collaboration**

<sup>6</sup> £4.7bn has been made available through the Industrial Strategy Challenge Fund (ISCF), a UK Government programme through UK Research and Innovation UKRI.

## Delivering Efficiency in Operations through Whole System collaboration

As part of StreetWorks UK and the HAUC UK Group we contribute to developing processes enabling the collaborative approach to StreetWorks and Excavations. This initiative enables multiple Utilities and Highway Authorities including 3rd party contractors to better coordinate the planning and where possible, collaborative delivery of street works while maintaining our core commitment to safety. The benefits of collaboration include:

- The ability to reduce the duration and impact of works on the highway and minimise the inconvenience to road users and pedestrians. This allows for shared works under a single road closure so reduces noise pollution and delays through multiple traffic management schemes.
- Encourages shared space in the highway through ducts and a single excavation and reinstatement as opposed to numerous works from different utilities. This reduces cable strikes and consequential damage to the highway.
- Reducing costs and timescales for businesses by a reduction in permit fees, materials, reinstatement and traffic management charges.

In the last 12 months we have actively collaborated on 141 separate operational sites, from planning of works across third parties, sharing traffic management equipment and 18 examples including sharing trench works with other organisations.

From 2022 and into ED2 our focus within the collaboration space will explore process improvements to offer confidence on approach, cost allocation and responsibilities, building a register of other organisations who may benefit from this initiative to expand its application and maximising participation and benefits realisation for our stakeholders.

At the heart of our Whole Systems long-term vision lies continuous stakeholder engagement. This reflects our commitment to the Whole Systems as a collaborative approach to achieving net zero ambitions, and the importance of continually engaging with others to deliver. Surrounding the five stages of our approach we call out groups of stakeholders who are critical to the success of Whole Systems working in the long-term. We already work with all of these stakeholders in some capacity. We recognise there may be additional stakeholder groups who are becoming increasingly important over time to achieving net zero. Our customers are key partners to delivering net zero and are captured in our long-term vision as part of community organisations. Whole Systems working is expected to deliver benefits to all of our stakeholder groups, and below we outline some of the expected benefits of working with each group.

Table 4 presents our expectation of the benefits to stakeholders from Whole Systems approach to working.

Table 4 - Key stakeholder groups and expected stakeholder benefits from Whole Systems working

Stakeholder group	Benefits we expect will be delivered to our stakeholders from working together in a Whole Systems way
Other DNOs and the ESO	<ul style="list-style-type: none"> <li>▪ <b>Data sharing to enable accurate, real-time decision making</b> - controlling balancing costs and large amounts of distribution connected generation that ESO needs visibility of to help manage the systems</li> </ul>
TOs	<ul style="list-style-type: none"> <li>▪ <b>Reduced duplication (and therefore costs) in service delivery</b> - Sometimes separate investments are needed by both TOs and DNOs to address similar or interdependent challenges. Cost efficiencies can be realised by delivering a joint approach to solving the problems faced by each party. For example, the Shetland Project (see Case Study 1) demonstrates the significant benefits (£140m saved on Distribution solution) from DNOs and TOs collaborating in a Whole Systems way to meet the energy needs of both customers on Shetland, and export energy from Shetland to the mainland via a single transmission connection (rather than distinct distribution and a transmission solutions).</li> </ul>
Water companies	<ul style="list-style-type: none"> <li>▪ <b>Meeting demand and managing energy costs</b> - Water companies are a significant consumer of energy and rely on affordable energy to deliver value for money water and wastewater services. Collaborating to explore further use of flexible solutions and demand management (e.g. reducing water sector energy demand during peak periods) will help manage water company energy costs and ensure reliable supply of energy to households and other customers.</li> <li>▪ <b>Coordinating maintenance of assets</b> e.g. underground assets, reducing costs and disruption-related complaints from customers</li> </ul>
Telecoms sector	<ul style="list-style-type: none"> <li>▪ <b>Increased access to shared infrastructure, improving services</b> provided to customers due to the similarities in support infrastructure required to deliver telecommunications services. In the past there has been duplication of investment to roll out services to telecoms and energy customers. Increased collaboration and Whole Systems working will enable further sharing of infrastructure to deliver improved services to customers, for example through sharing access to fibre within the subsea cables to the Scottish Islands.</li> </ul>
Transport sector	<ul style="list-style-type: none"> <li>▪ <b>Roll out of low carbon technologies in line with their ambitions</b> - The transport sector has high ambitions to deliver low carbon technologies that will depend on provision of a reliable energy supply. Collaboration between the Transport and Energy sectors will be critical to meeting decarbonisation goals, particularly for EVs.</li> </ul>

Stakeholder group	Benefits we expect will be delivered to our stakeholders from working together in a Whole Systems way
Local Authorities	<ul style="list-style-type: none"> <li>▪ <b>Increased accuracy in forecasting local energy needs</b> - The Future Energy Scenarios (FES) developed by the ESO don't account for all local / regional specific circumstances that impact future energy demand. Enabling stakeholders to input into the development of LNPs allows for adjusted baseline positions to be developed that inform future investment needs.</li> </ul>
Property developers	<ul style="list-style-type: none"> <li>▪ <b>Planning alignment to meet future energy demand needs</b> - Better quality, affordable homes need to be built for the future, for example by enabling low carbon heating and EV charging. Key benefits attributable to working with property developers (and GDNs) include developing the most appropriate heat source connection and addressing network constraints and requirements for EVs (e.g. super-fast charging infrastructure). This is also aligned with our pledge to support SGN's (the gas distribution network in our region) commitment to work together on new gas connection requests during RII0-2.</li> </ul>
Community organisations	<ul style="list-style-type: none"> <li>▪ <b>Providing customer and community voices in Whole Systems planning</b> - there is a risk that without dedicated customer and community engagement, Whole Systems planning loses sight of who is ultimately paying for these investments: GB energy customers. By engaging with community organisations customers will have a direct line into Whole Systems planning and can influence decision making.</li> </ul>

**Box 7: Stakeholders agree our Whole Systems vision aligns with their vision to work together**

**Stakeholder engagement and support for our plan**

91% agreed and 9% strongly agreed that *our* Whole Systems vision represents *their* views on Whole Systems working together.

In preparing our ED2 plan we have engaged with our stakeholders considered where Whole Systems opportunities and solutions that align with our long-term vision can be adopted to address the challenges we and others face. Our programme of work around subsea cables and providing broadband fibre to Scottish Islands has been identified as a priority area for Whole Systems working in ED2, see Box 8 for more information.

### 3.3 THE ED2 TRANSITION PATHWAY

Our ED2 transition pathway outlines how we plan to transition our current Whole Systems approach to reflect our more collaborative and embedded long-term vision. To achieve this, we outline three main sets of actions:

- **Reflecting on progress and lessons learned** including assigning internal accountability for Whole Systems and adopting a more regional approach to working with Local Authorities;

- **Reviewing internal processes to embed and promote Whole Systems thinking**, such as working with SSEN Transmission to review Whole Systems solutions and promoting Whole Systems thinking through increased reporting of initiatives; and
- **Embedding Whole Systems thinking into decision making** including by producing and implementing guidance on how and when to use the ENA Whole Systems CBA tool.

While the pathway will prepare us for Whole Systems working to become BAU during ED2, as we have finite resources available to respond to requests for support, in some cases we may not be able to provide the full extent of support others would like from us. Through our regular stakeholder engagement, we will identify priorities and seek to minimise the impact where it may not be possible to provide all the support requested. Our Whole System Support CVP has been specifically created to ensure enhanced support can be offered to Local Authorities and Community Groups when designing, planning and delivering Whole system outputs.

#### **Box 8: Subsea cables and broadband - a priority Whole Systems opportunity for ED2**

##### **Subsea cables and broadband - a priority Whole Systems opportunity for ED2**

In preparing our ED2 Business Plan, we have engaged with stakeholders to identify areas where there are specific Whole Systems opportunities. Our programme of work around **subsea cables** is one such area which we have prioritised on which to focus. This programme includes **working with broadband providers to develop options for sharing communications assets such as fibres in submarine cables to Scottish island communities**.

The fibre optic within our subsea cable assets provides an opportunity to enable additional broadband capability for many island communities which are digitally poor. Our ED2 Business Plan includes a CVP proposal to connect our island communities with fibre optic broadband for the very first time by expanding our Operational Technology Network (OTN). Our SHEPD network covers 59 islands, including some of the most remote and challenging locations across GB which puts us in a unique position. We can utilise the fibre core in submarine cables to ensure that remote communities have access to multiple benefits arising from better connectivity, enabling broadband services to critical community sites and improving the service we provide to homes and businesses.

As a proof of concept, we successfully worked together with Shetland Island Council to ensure high-capacity resilient connectivity for Yell and Unst which supported the delivery of:

- 95% Next Generation Broadband across Shetland by 2019 and 100% by 2021.
- Minimum of 100Mbps connectivity for Mid Yell and Baltasound Junior High and 10Mbps for all primary schools.
- Provided public access to high-speed broadband in all Council premises in Yell and Unst by 2020.
- Enabled high speed broadband and mobile coverage in all NHS locations across Yell and Unst by 2020.
- Enabled benefits to be delivered to Fetlar in a further phase.

Our subsea cables programme of work reflects a genuine Whole Systems Opportunity and solution to work with the telecoms sector to deliver benefits to customers on the Scottish Islands, and we will prioritise the delivery of this Whole Systems solution early in ED2.

We have identified 14 islands where we can provide this increased level of service through our subsea cables in ED2 and will proactively work with Island Councils and communities to improve the connectivity via our assets. We have assessed the potential project coverage, inclusive of location, population and likely costs as part of the CVP preparation as well as completing Social Return on Investment (SROI) calculations on the benefits of this initiative.

Further detail is provided in our ***Scottish Islands Strategy (Annex 8.1)*** and our ***Consumer Value Propositions (Annex 5.3)*** in our business plan.

We provide further details on our ED2 transition pathway in section 3.

### 3.4 THE ROLE OF OTHER SSEN STRATEGIES TO SUPPORT WHOLE SYSTEMS

The introduction of a more formalised approach to Whole Systems working will have a wide impact on our business as we roll out new approaches and ways of working. Our approach integrates other Whole Systems activities and commitments we have already identified through other business strategies. This includes those within the ED2 Business Plan (such as the ***Innovation Strategy (Annex 14.1)*** where Whole System is a key theme for ED2, and broader strategies (such as our ***Digital Investment Plan (Annex 5.1)*** published in January 2021 and ***Sustainability Strategy (Annex 13.2)***). Section 4 provides further detail on the interactions between our Whole Systems approach and other SSEN strategies.

Key to Whole Systems working is data and information sharing. Our ***Digital Investment Plan*** outlines how we will use digital tools to deliver benefits to our customers as well as supporting the net zero transition. Our ***Digital Investment Plan*** will support our Whole Systems approach through enabling data and information sharing partnerships (with common tools and languages), developing investment plans, coordination across utilities and supporting EV uptake (see section 5.1 for further detail on our Digital Strategy).

Our ***Sustainability Strategy (Annex 13.2)*** and ***Environmental Action Plan (EAP) (Annex 13.1)*** also support Whole Systems working (and vice versa), as these strategies share many of the same underlying goals and ambitions as our Whole Systems strategy.

Achieving our sustainability goals requires working collaboratively with our partners, particularly to deliver EV charging infrastructure rollouts and assessing the impact of climate change on our business and our stakeholders' businesses. Further detail is provided in section 5.1.

Additionally, Whole Systems thinking and approaches play a key role in our ***Heat Strategy***. The decarbonisation of heat, with a range of alternative solutions including hydrogen, electric heat pumps and district heating requires cross sector collaboration and Whole Systems thinking to optimise costs and investment while meeting environmental commitments.

## 4. DELIVERING OUR LONG-TERM VISION: THE ED2 TRANSITION PATHWAY

We have developed a set of specific steps we will undertake during ED2 to support our transition to the long-term Whole Systems vision. These steps define our ED2 transition pathway and bring to life how we will transform our Whole Systems approach. Below we outline the three main steps we will take:

- Step 1: Reflecting on progress and lessons learned;
- Step 2: Reviewing internal processes to embed and promote Whole Systems thinking; and
- Step 3: Embedding Whole Systems thinking into decision making.

We provide further details on the specific actions within each category below.

### 4.1 STEP 1: REFLECTING ON PROGRESS AND LESSONS LEARNED

Through our work to date we have made progress on Whole Systems working and learnt lessons, including on how best to work with others. In this first step, we will undertake detailed reflections on our Whole Systems progress and feedback to date, and act upon the lessons already learned.

In addition to the learnings presented in Table 2, below we highlight other key lessons we have already learned in relation to how to engage with stakeholders from previous Whole Systems activities:

- **Regional approaches:** We distribute electricity to a wide-ranging area covering both the central southern England and northern Scotland. The distribution requirements of these areas differ significantly, meaning that a consistent Whole Systems approach is inappropriate. Therefore, we are looking to adopt a more regional approach that focuses on the needs of the individual areas we serve and is aligned with the specific local authorities and stakeholders in those regions. We recognise it is important for us to design our Whole Systems approach to allow for regional differences, and key to this will be high levels of engagement with local authorities.
- **Learning lessons across the SSEN businesses:** We host joint lessons learned sessions with our Transmission colleagues where they share their experiences from augmenting internal processes to ensure Whole Systems solutions are considered. We engage with our Transmission colleagues on an ongoing basis, and section 5.1 includes further details on this engagement.
- **Clear internal accountability:** As we learned with flexibility, clear accountability to drive this kind of cross-cutting initiative is vital. To ensure Whole Systems working is cemented as a high priority for the business going forward, we have assigned Director responsibility for Whole Systems and propose to establish a Whole Systems Change Management team to drive the cultural change, new thinking and process augmentation that is required (see section 4.4.4).

The Director accountable for Whole Systems participates in the 6 weekly Whole Systems Development Forums and quarterly Whole Systems Strategy Group (which reports to the SSEN board) with SSEN Transmission. Further detail on the forum and strategy group are provided in section 4).

- **Single point of contact:** Stakeholders have previously found that we need a single point of contact within SSEN for the Whole Systems. We will address this internally through the Whole Systems Change Management team (see section 4.4.4) and externally this will be delivered by our Whole System Coordinators who will become a centralised point of contact for Whole Systems communications.
- **Resource requirements:** From our pilot projects such as Project LEO and others, we know that once stakeholders have begun thinking about how SSEN can support them with their objectives they have high expectations. More broadly, we have found the consideration of a wider range of issues and solutions to problems is resource intensive. We also need to maintain clear boundaries of responsibilities for activities it is appropriate for electricity consumers to pay for and those which should be funded by stakeholders themselves. As such, we will prioritise the Whole Systems opportunities we can support and communicate these clearly to stakeholders.
- **System and Data requirements:** From our SWAN project we know that data visibility will be critical for stakeholders, to inform optimum locations for connection as well as enabling more efficient, sustainable operation of networks in general. Through this project SSEN, the ESO and NGET have agreed data exchanges in real time to release significant generation capacity across our southern licence area and have implemented new interfaces and supporting systems to support this. As a result, we have also enabled ability to avoid and manage conflicts across the Whole Electricity system from the increase of DER while future-proofing our system against further development of flexibility in ED2. The increased data flows will also inform how we can develop data visualisation tools in ED2, with projects feeding into the Open Data initiative and our DSO Transition IT development being informed by this project.

We have also reflected on the challenges for our stakeholders to work with us in the way envisaged by a Whole Systems approach. For example, our reflections on the maturity of local authorities and their capacity to engage in Whole Systems discussions has shaped our CVP proposal set out in section 4.4.5.

#### Box 9: Actions to deliver our ED2 transition pathway

##### Actions to deliver our ED2 transition pathway

- A. Establish a Whole Systems Change Management team in 2021/22
- B. Redefine our internal processes to reflect Whole Systems thinking
- C. Engaging with stakeholders to develop Whole Systems approaches
- H. Offer annual engagement on our DFES scenarios alongside Open Data to all Local Authorities in our areas to support the production of effective Local Energy Action Plans (LEAPs) and Local Heat and Energy Efficiency Strategies (LHEES)

## 4.2 STEP 2: REVIEW INTERNAL PROCESSES TO EMBED AND PROMOTE WHOLE SYSTEMS THINKING

To integrate Whole Systems as part of the day-to-day working of SSEN and the mindset of our staff, we will need to update our internal policies and processes to ensure they provide the necessary prompts and opportunities to do things in a way which reflects the long-term vision. We are proactively reviewing our internal processes to identify and make changes to integrate Whole Systems thinking and approaches. We consider Whole System and our DSO strategy as co-dependent, so as we transition to DSO, we will also embed Whole System thinking across our entire business.

This is a significant undertaking which will take some time to complete. Therefore, for Whole System we have prioritised those processes which will have the most significant effect on the development of our ED2 Business Plan; those linked to decision making on investment planning (which we explain further below). Further detail can be found in our *DSO Strategy (Annex 11.1)*.

We have also identified a number of specific actions focused on building awareness and changing behaviours, which we will take alongside our review of all internal processes. Our plan includes:

- Promoting Whole Systems thinking and ways of working among all teams across SSEN with a focus on raising awareness and understanding of what Whole Systems is and how its principles and thinking can be integrated into day-to-day activities. For example, working with business leads to introduce a Whole Systems agenda item into regular team meetings to ensure teams are actively discussing and considering whether there may be a Whole Systems solution available as part of our BAU activities.
- Regular reporting of our progress and outcomes to raise the profile of Whole Systems initiatives and ways of working. The focus of this will be two-fold:
  - raising awareness internally of Whole Systems to help embed the thinking in our culture; and
  - providing information to stakeholders (including Ofgem) on the Whole Systems initiatives we are undertaking, including progress, benefits and lessons learned.

This information will be published via an annual report on our website and shared widely across our networks. This commitment to external reporting aligns with our proposed Whole Systems annual reporting which will also include stakeholder feedback (collected via surveys) on their experiences working with us.

- Continuing to work closely with SGN, SSEN Transmission, NGET, the GB ESO and Scottish Power Energy Networks (SPEN) to deliver the Energy Sector Whole Systems charter. The Charter was developed as a series of shared commitments on working together towards a Whole Systems approach. The charter outlines 4 key principles, which are: work together, through coordination and cooperation, manage uncertainty, develop Whole Systems tools and processes, and demonstrate our commitment to net zero. See section 4.4 for further details on the Energy Sector Whole Systems Charter.

## Box 10: Actions to deliver our ED2 transition pathway

### Actions to deliver our ED 2 transition pathway

- A. Establish a Whole Systems change management team in 2021/22
- C. Engaging with stakeholders to develop Whole Systems approaches
- D. Develop and deliver a training programme for all SSEN decision makers to ensure Whole Systems thinking is embedded in the organisation
- E. Establish a set of Whole Systems metrics

## 4.3 STEP 3: EMBEDDING WHOLE SYSTEMS THINKING INTO DECISION MAKING

Our third set of actions is to introduce steps in our decision-making processes to consider where a Whole Systems solution may be suitable. As part of our Whole Systems long-term vision, we will play a greater role in identifying, prioritising and assessing any potential Whole Systems opportunities, both to resolve our own challenges and those of our stakeholders.

This requires changes in processes across the business, some of which we have already introduced. Firstly, we have updated our investment planning and Engineering Justification Papers (EJPs) processes to ensure Whole Systems is considered at an early stage and to determine where a Whole Systems CBA may be a useful decision-making tool. Secondly, we have introduced Whole Systems thinking into the process for developing our baseline scenarios for our ED2 investment plans.

- **Investment planning:** In developing our ED2 business plan, we have amended our existing approach to developing and assessing solutions for network constraints. We have developed an approach to identify when it may be appropriate to use the ENA's Whole Systems CBA framework to support decision making and integrating this into the existing process. Our new process applies a five-stage framework to consider Whole Systems issues including whether a Whole Systems CBA would be useful. It builds on the three tests established by the ENA for undertaking a Whole Systems CBA. We have included the five-stage framework in all our ED2 EJPs within Case Study 6. There are a number of Whole System CBAs which have either been completed or are in completion for the ED2 business plan, summary details of these schemes are below with further detail available in our ***Load related Plan build & Strategy (Annex 10.1)***
  - Fleet-Bramley 132kV Reinforcement – SSEN have worked with NGET to complete a full Whole System CBA as part of the project justification and in reflection of the cost of the scheme. The CBA is now nearing completion and preliminary outputs confirm that the proposed SSEN reinforcement provides the most cost effective, sustainable and timely solution when considering the forecasted load growth and the connection requests which are now queued for this area. The CBA will be completed and the above confirmed post final plan submission.

- Pentland Firth – SSEN have undertaken a full Whole System CBA and will work with SHE Transmission to review the potential for alternative, Whole System solutions against the proposed SSEN reinforcement. Preliminary studies and engagement with SHE Transmission currently suggest that the Distribution reinforcement offers benefits against overall cost and time to connect when compared with the high-level alternatives. SSEN is committed to completing a full Whole System CBA for this scheme in ED1.
- Skye-Uist - SSEN have undertaken a full Whole System CBA and will work with SHE Transmission to review the potential for alternative, Whole System solutions against the proposed SSEN reinforcement. Preliminary studies and engagement with SHE Transmission currently suggest that the Distribution reinforcement offers benefits against overall cost and time to connect when compared with the high-level alternatives. SSEN is committed to completing a full Whole System CBA for this scheme in ED1.
- There are also cases where Whole System CBAs (Pre-ENA framework and template) have been undertaken within ED1 to investigate and justify Whole System approaches, these cases have provided increased benefits for our stakeholders and helped to inform our baseline ED2 business plan, some examples of these are below;
  - Skye Generation Connections – In ED1 there have been a number of generation connection acceptances to the 33kV SHEPD Distribution network at Dunvegan 132/33kV GSP on the Isle of Skye. These applications have driven the need for SHE Transmission to offer SHEPD a new 120 MVA transformer along with additional GSP works. This was the best solution at the time of each offer, but this caused an issue with distribution circuit routing conflicting with the proposed 132kV transmission circuit. Given the complexities of the project, the need to reduce costs and time impacts to connecting customers SHE Transmission and SHEPD have developed a Whole System proposal for this region which generated over £2m cost savings against the original solution. Further detail is available in case Study 7.
  - Shetland – The Shetland Islands face two concurrent and complementary energy issues. First, is the need to ensure continued energy security for the Islands. The second is the need to provide developers with network connections, enabling them to exploit the abundant wind energy resource and export the low carbon generation to the mainland electricity system in support of the Government’s net zero ambition. Encouraged by Ofgem to resolve Shetland’s security of supply requirements and recognising the potential for our customers to benefit from being part of a joined-up Whole Systems solution, we started to explore whether this would be possible and could offer the best solution from technical and cost-benefit perspectives. We developed a bespoke methodology to assess the services that the transmission link could bring to the Shetland distribution system, and we worked with National Grid ESO and other stakeholders to develop a new approach in transmission charging methodology, through an open governance process, which would allow us to contribute towards the cost of the link. Further detail is available in case study 1.

- **Developing baseline scenarios:** We have, and will continue to, work with stakeholders to develop Local Network Plans. These are co-created plans, where we give local communities the opportunity to feed in information about their own net zero ambitions, aims or local targets into the DFES. They will help us to bring a regional focus to Whole Systems. Where justified and supported with evidence, stakeholder modified baselines are then being used as the EJP baseline scenarios to inform future investment needs. This will help us to make investment decisions that reflect the needs of local communities rather than SSEN making decisions in isolation of other factors which will affect future demands on the network. One of our lessons from this process is the relatively low level of technical maturity in many local authorities in considering how the net zero transition may affect their communities. In the future, additional support might be required to get the maximum benefit from these collaborative planning processes. We plan to continue updating and developing our Local Network Plans through ED2 and beyond. Case Study 8 provides further detail and **Chapter 9** expands on our approach to **Forecasting and Scenarios**.

As we are early in the journey of embedding Whole Systems solutions across our business, we have not yet identified all the ways in which we can augment processes to include Whole Systems thinking. The purpose of our ED2 transition pathway is to work with leads across our business to identify where processes can be changed, and to roll out revised processes. We will also reflect on where we have amended processes, how successful the changes have been and whether there are further improvements we could make.

#### Box 11: Actions to deliver our ED2 transition pathway

##### Actions to deliver our ED2 transition pathway

C. Engaging with stakeholders to develop Whole Systems approaches

H. Offer engagement on our DFES scenarios alongside Open Data to all Local Authorities in our areas to support the production of effective Local Energy Action Plans (LEAPs) and Local Heat and Energy Efficiency Strategies (LHEES)

#### Box 12: Stakeholders support our ED2 transition pathway

##### Stakeholder engagement and support for our plan

100% either agreed or strongly agreed that we were taking the right actions to support Whole Systems

## 4.4 ENABLING THE ED2 TRANSITION: SSEN'S WHOLE SYSTEMS CHANGE MANAGEMENT TEAM

We are creating a Whole Systems Change Management Team, which is tasked with implementing the actions we've set ourselves as part of our ED2 transition pathway. The team's primary role will be to drive the adoption and integration of Whole Systems thinking into SSEN, including driving the internal process changes and stakeholder engagement required as part of the ED2 transition. The team's objectives are:

- **Promoting Whole Systems thinking and ways of working across the business.** For example, attending regular SSEN team meetings and ensuring Whole Systems agenda items are included and into meeting agendas.
- **Developing a roll out plan for the Whole Systems Strategy,** including developing timelines, budgets and resourcing requests to fully embed Whole Systems thinking over ED2. The roll out plan would also include prioritisation of activities over the timeline to ensure the highest priority activities are resourced sufficiently.
- **Planning and coordinating Whole Systems external stakeholder engagement,** including participation in Whole Systems forums such as the Whole Systems Development Forum (WSDF) and Whole Systems Strategy Group (WSSG) with SSEN Transmission (further detail on our plans for Whole Systems external stakeholder engagement are provided in section 5).
- **Establishing and leading Whole Systems forums across the energy sector** and with other sectors (e.g. water companies). This would include leading SSEN's participation in the Energy sector Whole Systems charter (further detail on this charter can be found in section 4.4).
- **Ensuring internal accountability for Whole Systems,** for example hosting monthly cross SSEN Whole Systems meetings with representatives from across the business sharing updates on their Whole Systems progress and reporting to the Director responsible for Whole Systems.
- **Leading on published reports on Whole Systems activity** as outlined in section 4.3.2.
- **Acting as a Whole Systems critical friend within SSEN.** The purpose of the team is not to undertake all the actions within our Whole Systems approach. Rather, the team will be there to track, monitor, support and challenge the relevant parts of the business in meeting our Whole Systems vision.

Success for the Whole Systems Change Management team would mean that the team could be dissolved once the processes, culture and ways of working have been embedded across SSEN and individuals and teams prioritise and take responsibility for Whole Systems working. Ideally, the team could be phased out before the end of ED2, once we have completed our ED2 transition pathway journey and the Whole Systems is sufficiently embedded across the business.

The Whole Systems Change Management Team will initially consist of 3 full time staff, with consultancy support for around 18 months. Following this, we will look to streamline the team, targeting having one full time member of staff dedicated to the Whole Systems with the purpose of reporting and monitoring for the remainder of ED2. The external engagement with our stakeholders, delivered through our Whole System Coordinators and the Whole System Support CVP will be maintained throughout ED2 to ensure our external stakeholders have a sustained, efficient and effective engagement and support route.



### Box 13: Actions to deliver our ED2 transition pathway

#### Actions to deliver our ED2 transition pathway

A. Establish a Whole Systems change management team in 2021/22

## 4.5 WHOLE SYSTEMS CVP: SUPPORT PACKAGE FOR LOCAL AUTHORITIES AND COMMUNITY GROUPS

As part of our plan to embed fully Whole Systems thinking in ED2, we are proposing a CVP to provide additional Whole Systems support and information to local authorities and community groups. Local communities and authorities increasingly require support from energy networks to help them design and implement projects and secure funding to support the net zero transition. Significant funding is being made available to local authorities for energy sector innovation, including c.£4.7bn from Department for Business, Energy and Industrial Strategy (BEIS)<sup>7</sup>, to undertake trials and other activities to enable them to transition to net zero.

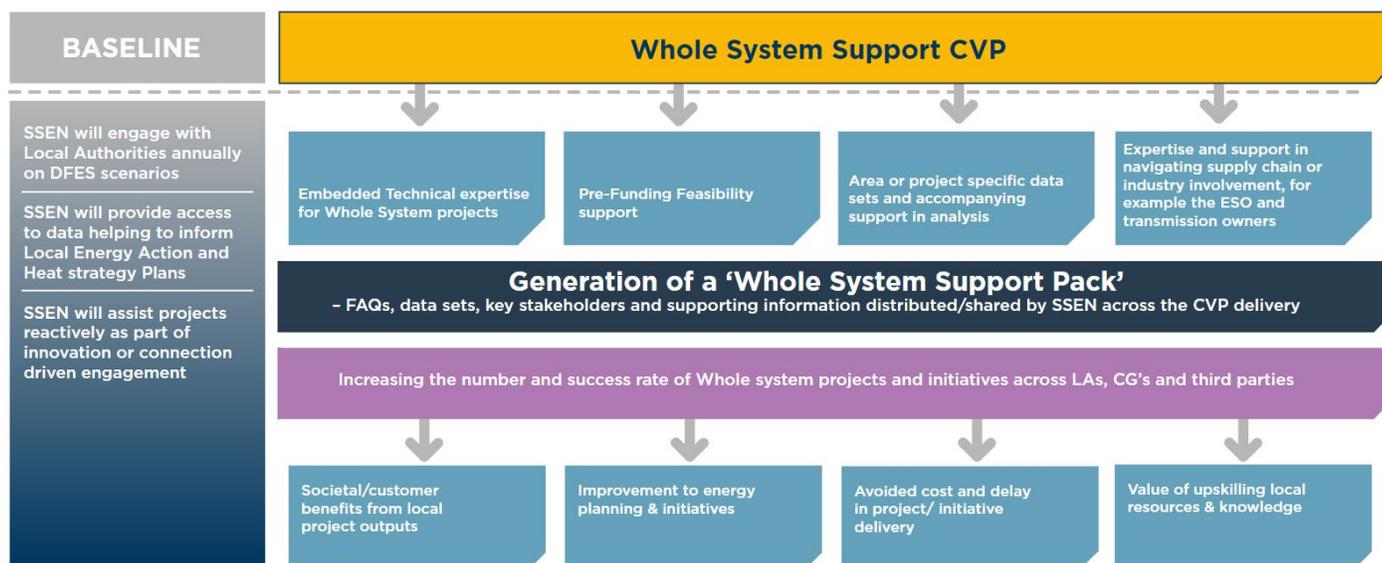
Whilst funding has been allocated, there is a need for local authorities to bid for and secure access to this funding and to design and situate projects to optimise their cost effectiveness. We have the expertise to help design and implement these projects, providing information on the most efficient and cost-effective locations. There are however limits to the support we will be able to offer local authorities as part of our baseline funding to take proactive action on decarbonisation. While we will offer engagement to all 72 Local Authorities and community groups within our licence area across ED2, without further funding this engagement would be limited to reactionary services within the baseline provision of network data and DFES.

Our proposed CVP is to provide in-house support to local communities from people within our business who have the relevant experience of delivering network solutions and network related projects from end-to-end, and to proactively engage with all 72 Local Authorities and 200 Community groups. This enhanced support should increase the uptake and success of Whole System and net zero projects and initiatives across our licence areas while improving the knowledge base and skillsets of Local Authorities and Community groups, further supporting future projects.

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<sup>7</sup> £4.7bn has been made available through the Industrial Strategy Challenge Fund (ISCF), a UK Government programme through UK Research and Innovation UKRI.

# WHOLE SYSTEM SUPPORT



We are already working closely with a small number of local authorities net zero related projects, such as Project LEO and RESOP. Our proposed CVP reflects two key lessons from these initiatives:

- There is a heavy reliance from local authorities on detailed and technical information and experience which resides in SSEN. In particular, where local authorities are tendering to participate in projects or secure external sources of funding, it can result in a large number of requests for support, bespoke data and planning services; but where we provide that support, it has a positive material impact on their submissions.
- We know there is a strong demand from local authorities and other organisations for assistance in developing their thinking and planning. Examples of this assistance includes data, expertise and regulatory insights, commercial and engineering specialist advice. Whilst data sharing is a crucial part of our Digital Strategy, the real value we can provide is through the full range of assistance. Whilst historically we have been able to support a maximum of two significant Whole Systems projects concurrently, the net zero transition will see projects, plans and initiatives increase across the 72 local authority areas in our licence area.

We are proposing four above and beyond services as part of the CVP, these can be offered individually or combined from project to project, dependant on the needs of our stakeholders:

- Local Information Package:** SSEN already makes standardised data about its network available to stakeholders including local authorities and community groups as part of baseline expectation and this will be readily available to stakeholders during ED2 inclusive of area based on our DFES. This package delivers additional value by offering tailored data sets matched to the stakeholder requirements with associated network insights along with expert guidance on the interpretation, application, and limitations of these data sets. Network data is complex and for those unfamiliar with the technical detail, it can be difficult to interpret.

This will include providing detailed guidance on tools for the interpretation use of the data set to meet their local whole system aspirations, including the ability to utilise the advanced whole system modelling tool from our RESOP project. This tool will be able to map project outputs and benefits against the network area specific to the project, supporting scenario modelling and CBA works to identify the optimum delivery a project should undertake. This will all be done with the aim of spreading best practice and accelerating the early stage in the development of viable whole system and net zero transition plans. It will help local authorities and community groups to make better decisions in identifying and designing projects that involve low carbon technologies thereby bringing forward the benefits of deployment. In addition, we expect efficiency savings in these organisations by giving them access to our expertise and understanding, so they can form insights more quickly than would otherwise be the case.

- **Whole Systems Opportunity Advisory Package:** This package of support will enable Local Authorities and community groups to explore cost-effectively projects which are directly (e.g. upgrading heating solutions in a housing association development) or indirectly related to the energy system (e.g. an EV charging network). It will give them access to SSEN experts to “be in the room” and help the design of such projects. As part of this package, our experts would be directly involved in scoping and optioneering workshops as local whole system solutions are identified to help ensure that all options are identified and that the full range of costs and benefits can be assessed by the stakeholder. The RESOP whole system modelling tool will also add value to this package. This service will offer input to scenario modelling to understand infrastructure sharing and flexibility opportunities. Using the in-house support expertise, this service with advice on best practice and collaborative options to ensure best value for money in terms of the network. It will offer stakeholders access to offer knowledge sharing around market segments, understanding any existing constraints, the time frames and sequencing impacts of investment. Early engagement will allow for targeted monitoring and network configuration optimise any whole system solution such as flexible connections, peer to peer trading facilitation, curtailment studies and active network management interface design. It will add value by helping to improve the design and selection of schemes that local authorities and others choose to promote in their areas.
- **Pre-funding bid support Package:** As part of the Government’s commitment to the net zero transition, it has launched a range of different funding schemes to support the deployment of low carbon technologies and testing and trialling of new innovative technologies. Local Authorities and Community apply for a range of ‘green’ funds to support the roll out of Low carbon technologies. Over ED1, we have regularly been asked to provide technical assistance and support in the creation of these applications, which we have sought to provide as effectively and promptly as possible. Acknowledging the known increase in funding for these initiatives, a growing awareness of net zero and the role Local Authorities and other stakeholders can play we expect a significant increase in requests for this kind of above and beyond support. Our baseline funding would not allow us to support such an increase in requests for technical assistance and expertise. This support is critical to the success of local ambitions, as a result and through this CVP we will offer more in-house support to ensure success. We expect it will create value in two forms: firstly, in helping more Local Authorities and community groups to secure funding for projects and secondly, improving the quality of the projects that are successful, so they maximise the benefits and minimise the costs.
- **Technical delivery support package:** This package will provide ongoing support during the delivery phase from SSEN for large complex projects (like Project LEO and SAVE). It will focus on ensuring the

interdependencies with broader SSEN activities are identified and managed and that any complementarities are realised. Our experience in projects such as LEO have shown that the level of support and coordination required during deployment is significant, often covering multiple business units and the absence of this support can act as a barrier to the successful delivery of local whole system options. With the net zero transition (and increase in funding for such projects) increases, and with these projects moving away from being innovation-funded, our baseline funding would not provide for SSEN to play a proactive role in the management of these projects, for example offering advice on regulatory issues, flexibility options, commercial process best practice and the manipulation of existing data models. Through the package, we will build awareness amongst stakeholders of the considerations, options and data available from a network perspective to through the delivery of any local whole system initiatives. Over time, this capacity building will enable Local Authorities and others to be able to deliver projects more effectively with less SSEN support.

As our licenced areas in the North and South cover hundreds of councils, local authorities and Community Groups, to ensure the services we provide to our stakeholders are high quality an application process will be introduced to access our above and beyond support. The process will be designed to ensure councils with the highest need and greatest potential benefits from our services receive our support, and to identify where it may be more appropriate for local authorities to engage consultants and other advisors for support. As we deliver the CVP, we will also build and continually refine a 'Whole System Support Pack' which can be shared proactively across our stakeholders. The pack will contain an overview of both our baseline and CVP support available, frequently asked questions, how to access data and instructions on how to use it, key wider stakeholders from across the Whole System who can offer guidance and support and case studies of projects we have supported. This information pack should over time reduce the level or frequency of the additional bespoke support needed from across our stakeholders and provide useful information to a wider stakeholder base.

We feel we're best placed to provide this service thanks to lessons learned from innovation projects such as LEO, SAVE and RESOP, where direct interaction with Local Authorities and Community groups have identified the value of Whole System thinking and technical knowledge at a local level. DNOs benefit from existing relationships and awareness of the needs and challenges of stakeholders at every level of Whole system project, from those wishing to deliver or support or those who may be impacted by these projects. Our technical expertise also means we're ideally placed to offer a range of additional services to Local Authorities in delivering Whole System outputs beyond the annual engagement and data sharing covered by our baseline commitments. Collectively, this experience, expertise and core positioning within Whole System increases the probability that Local Authorities and community groups can develop ambitious, deployable local area energy plans and initiatives across both of our licence areas.

### **Co-creation with customers/stakeholders**

This CVP proposal has been developed with inputs from key stakeholders and local authorities. A large source of this customer engagement came from a series of twelve ED2 Open Discovery and key BAU events between December 2018 and August 2020, in which 4,351 stakeholders and consumers were in attendance. At these events, the following feedback was obtained:

- Stakeholders were concerned about the capacity of network cables in large scale EV uptake.

- Stakeholders in Central and Southern England further argued that with the roll-out of heat pumps the load on the network will increase considerably and we would need to be proactive in our approach.
- There was a call for us to support councils and provide guidance on EVs and charging stations.
- Stakeholders agreed that expenditure of connecting flexible technologies is justified by benefits delivered at the national level.
- community councils called for a closer collaboration with us around investment infrastructure.
- Local authority representatives stated that access to DNO information that could help the overall planning process is very difficult to access at present.

In addition to this, we hosted a stakeholder engagement workshop for twelve of our key stakeholders in March 2021 and we have hosted three bespoke sessions with local authorities, community groups, delivery partners and academics in September and October 2021. See section 5 for more information.

### Customer benefits

This proposed CVP will provide significant benefits to customers. Firstly, there will be cost and efficiency benefits at the design, delivery, and operational stages. These will be achieved via the increased economies of scale from taking a joined-up approach to developing utilities.

Another key consumer benefit is that we will ensure that there will be equitable access to low carbon technologies for all households and communities. This can be achieved by enabling infrastructure as a universal service expectation.

In addition to this, the proposed CVP will be able to facilitate an accelerated uptake of low carbon technologies. This will lead to a faster rate of decarbonisation and journey to net zero.

### Going above and beyond

While Ofgem outlines significant expectations for companies to deliver Whole Systems approaches and initiatives over ED2, the support we propose to provide local authorities as part of this CVP is above and beyond Ofgem’s expectations for our baseline activity. For example, Ofgem’s requirements only specify that Business Plans include “plans and processes for joint planning with other network companies and/or the system operator (and evidence of that already undertaken)”<sup>8</sup>. As part of this CVP we propose to provide a wide range of specialist support, generating above and beyond value by the scale of empowerment of local authorities to deliver bottom-up local infrastructure plans as part of Local Area Energy Plans included within ED2. Further detail on this CVP can be found in our **Consumer Value Proposition (Annex S 3)**.

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<sup>8</sup> RIIO-ED2 Business Plan Guidance, February 2021. Available at: [https://www.ofgem.gov.uk/system/files/docs/2021/02/ed2\\_business\\_plan\\_guidance\\_-\\_published\\_1\\_february\\_2021.pdf](https://www.ofgem.gov.uk/system/files/docs/2021/02/ed2_business_plan_guidance_-_published_1_february_2021.pdf)

**Box 14: Actions to deliver our Whole Systems CVP – Local authority support service**

**Actions to deliver our Whole Systems CVP – Local Authority support service**

H. Offer annual engagement on our DFES scenarios alongside Open Data to all Local Authorities in our areas to support the production of effective LEAPs and LHEES.

I. Provide above and beyond support to 200 community groups and 72 Local Authorities to help them transition to net zero, including the production of area specific information and providing bespoke services as part of our proposed CVP.

**Box 15: Stakeholder support for our above and beyond Whole Systems services**

**CALL OUT BOX: Stakeholder engagement and support for our proposal to support local authorities**

‘DNO representation in local whole system initiatives’ was the initiative considered by the attendees to have the greatest value for local authorities and communities. ‘Regional network constraint/curtailment studies’ and ‘Dedicated regional whole system liaison officers’ were also ranked as important initiatives. Attendees said that “appropriate granularity”, “ease of use”/ “user friendly interface”, and “cost of service over increased value of data” were all factors in how much they would use the service.

## 5. INTERACTIONS BETWEEN WHOLE SYSTEMS AND OTHER SSEN STRATEGIES

The introduction of a more formalised approach to Whole Systems working will have a wide impact on our business as we roll out new approaches and ways of working. Our approach integrates other Whole Systems activities and commitments we have already identified through other business strategies. Below we provide a summary of some of the key strategies that will support our transition to embedding the Whole Systems over ED2.

### 5.1 SSEN'S DIGITAL STRATEGY

Our Digital Strategy is driven by our vision to be a progressive network owner, using digital to enhance social and economic value, deliver a leading experience for our customers and to enable the energy system to support net zero carbon emissions. Whilst our digital strategy and data sharing is broader than just the Whole Systems, much of it is essential to support our ED2 transition plan and develop clear ways of working and sharing information with our stakeholders:

- **Open data enabled planning partnerships.** We will actively share data to drive collaboration across the utility's ecosystem. Such collaboration could include other utility companies or local authorities working together to develop common plans. We committed in our digital strategy to use open platforms to provide access and develop an agreed catalogue of data that serves the needs of each party. We are already doing this alongside the Greater London Authority for the London Underground Asset Register initiative (see Table 6). Providing open data will enable utilities to coordinate around local authority/local government decarbonisation strategies to develop a joined-up plan that will reduce the time taken to complete large scale multi-utility whole system developments. We have also committed to improving our IT systems to provide clarity on network capacity at a street level, so local authorities have access to more granular information to develop more detailed plans. This use of data sharing reflects how we are already 'Engaging' and 'Co-creating' as per the components of our long-term vision for the Whole Systems.
- **Developing optimal investment plans across the energy system.** We will provide our planning partners and policy makers with a single digital platform to align their assumptions and desired outcomes to better drive planning decisions. Innovation investment is one area where we can reduce costs for customers. For instance, identifying areas in local electricity generation that can use Hydrogen, which is an example of how we 'Deliver' as part of our Whole Systems approach. Another example is using AI to identify the most efficient solutions, which reflects the 'Design' component of our long-term Whole Systems vision.
- **Closer coordination in operations across utilities.** We will provide a single register of all flexible energy assets to identify opportunities for more coordinated operations. We are bringing forward a planned asset replacement initiative, where we will work with water companies who are already digging in our asset locations to coordinate. By working together, the work becomes more cost effective and less disruptive. This is an example of 'Co-creation', as per our Whole Systems long-term vision.

- **Plan efficient investment to support EV uptake.** We will use a range of technology tools to encourage EV uptake. For example, we will work together with local authorities, the ESO and charge point operators to deliver the sufficient network capacity. This reflects the ‘Engage’ and ‘Co-create’ features of our Whole Systems approach. In addition to this, we will use real-time data from Network Monitoring to offer EV flexibility products. This can provide value to customers and avoid expensive reinforcement in our low voltage network. This is an example of where we will ‘Deliver’ as part of our Whole Systems long-term vision.

#### **Box 16: Actions to deliver our Whole Systems approach – aligning with our Digital Investment Plan**

##### **Actions to deliver our Whole Systems approach – aligning with our Digital Investment Plan**

G. Draw-on investment in Open Data, as set out in our Digital Investment Plan, to provide a purpose-made data portal that can be used by Local Authorities, community groups and other utilities to enable whole system collaboration

#### **Box 17: Stakeholder engagement and support for our Digital Investment Plan**

##### **Stakeholder engagement and support for our Digital Investment Plan**

As part of testing our Digital Strategy, in our March 2021 Whole Systems workshop we asked stakeholders what data and tools we could provide and share that would be most useful to them. Key results from our engagement include:

- 67% of the attendees thought that ‘Interactive network impact assessment’ was the most useful dataset or service to facilitate Whole Systems collaboration. 33% said ‘Network data’ was the most useful.
- When the attendees were asked to rank the collaboration activities in order, ‘Infrastructure planning’ was considered the priority, followed by ‘Regional development’ and ‘Flexibility’.
- ‘Community empowerment’, ‘simpler access to data’ and ‘unanticipated innovation’ were all listed as stakeholder benefits of collaboration or open data.
- 60% of attendees believed that a ‘Graphical/ Geospatial system’ should be our priority platform for Whole Systems collaboration.
  - When attendees were asked what benefits, this would have for them, they said that it would “Enable local communities and local authorities to plan activity driving towards net zero” and provide “Visibility of all the initiatives, so that we can leverage each initiative's efforts and avoid reinventing the wheel”.

## 5.2 SSEN'S INNOVATION STRATEGY

Our Innovation Strategy provides a critical foundation for us to transition to Whole Systems working in ED2. Whole Systems working is a key focus of our Network Innovation Allowance (NIA) portfolio and is a target area where NIA funding is expected to be delivered going forward. In delivering our Innovation Strategy we will continue testing Whole Systems models as part of our NIA portfolio, and in line with our Whole Systems approach outlined in this annex, we will be integrating Whole Systems thinking into operation and planning process, learning and testing the best forms of engagement to promote Whole Systems solutions.

Elements of our Innovation Strategy that support our Whole Systems Strategy include:

- Establishing projects to better understand the commercial and societal impact of electrification of transport, including working with the Power Networks Demonstration Centre (PNDC) to bridge academia and the energy sector, and the EIC (see Case Study 3) to collaborate in a whole system way.
- Our work with UK Power Networks (UKPN) on the Future Control Room NIA Project ([Future Control Room | NIA\\_SSEN\\_0053 | Smarter Networks](#)). The project with Whole Systems elements to understand, design and plan how our network control rooms could look in the future as part of the distribution system operator (DSO) transition. The project involves investigating, researching and planning what new capabilities, skills, systems and hardware will be required to run our control rooms in the year 2035 and beyond – halfway between now and the government's net zero carbon emissions target.
- Using the innovation portfolio to engage with the tourism and hospitality sector around E-tourism. We are working with the tourism sector to consider options for alternatives to conventional reinforcement to meet tourist driven demand peaks for EV charging. For example, we are engaging with Isle of Wight tourism operators to mitigate the impact of tourism and electrification of carparks to provide charging infrastructure.
- Our work with Dundee City Council and SGN on RESOP (see Case Study 5)

### Box 18: Integration of Whole Systems with Innovation and NIA.

#### Integration of Whole Systems with Innovation and NIA

K. Integrate Whole Systems into our Innovation Strategy and Network Innovation Allowance (NIA) Portfolio

## 5.3 OTHER ED2 STRATEGIES

There are a number of other strategies in our ED2 Business Plan and wider business (outside of ED2) that align or overlap with our Whole Systems approach. Below we summarise how our Whole Systems strategy is being embedded into our other ED2 strategies. Further details can be found in each business plan annex, chapter and strategy.

- **Sustainability Strategy and Environment Action Plan (EAP):** Our Sustainability strategy and EAP (see *Environmentally Sustainable Network (Chapter 13)* of our business plan) outlines a range of ways Whole Systems working can be adopted to support us to achieve our goals for sustainability. This includes strategies around diesel consumption on the Scottish islands, sharing EV charging infrastructure with other parties and our joint work with other DNOs and the ENA on the use of Sulphur hexafluoride (SF6). The roll out of low carbon technologies, particularly EVs, also requires significant collaboration and Whole Systems working to deliver the ambitions of our customers and stakeholders.
- **DSO:** Co-ordinating with the ESO is a priority for us in ED2, both as part of our Whole Systems strategy and also to enable our DSO transition. To enable the DSO transition, we will need to work with the ESO in a Whole Systems way to create new co-ordinating functions around the three principle areas of development, markets and operations. Our DSO operational plan captures further detail on the engagement required with the ESO over ED2. Additionally, our DSO strategy builds on our flexibility first strategy of embracing flexible electrical solutions to consider wider opportunities across vectors to deliver flexibility, including district heating schemes, hydrogen networks and integrated transport approaches.
- **Connections:** Our Connections Strategy draws on our Whole Systems approach to better align with the ESO, NGET and SSEN Transmission on timing for roll out of new transmission and distribution connections. We are also engaging with local authorities, property developers and other utilities (e.g. water companies) to align on timing for works to be completed. We are collaborating to align timing of our works with works proposed by others to minimise disruption to customers and costs associated with multiple site excavations. We are also engaging with the EV industry (including original equipment manufacturers (OEMs) and retailers) to collect data on EV sales and enquiries to get an early view of future EV demand hotspots, enabling us to be better prepared with connections to service this demand.
- **Cables, regional factors and reliability:** Building on the successful Whole Systems working with SSEN Transmission, the ESO and Ofgem to develop the Shetland connection in ED1 (see Case Study 1), we've considered Whole Systems solutions in our cables, regional factors and reliability strategies for ED2. Our subsea cables programme of works has been identified as a priority area for Whole Systems solutions in ED2, particularly in collaborating with the telecommunications sector to deliver fibre broadband and improve connectivity of the Scottish Islands, delivering benefits directly to customers. Further detail on this important opportunity can be found in Box 7 of this annex and our *Scottish Islands Strategy (Annex 8.1)*.
- **Consumer Vulnerability Strategy (Including Customer Experience Strategy):** Working with other organisations to support our customers is critical to delivering the best possible service. Supporting vulnerable customers including customer service is a particular focus for our *Vulnerability Strategy (Annex 4.2)*, and the data sharing with water companies and other organisations that has been pioneered through PSR data sharing projects provides important examples of the customer and societal benefits that can be achieved through working in a Whole Systems way. Through our membership of The Institute of Customer Services we are also working in a Whole Systems way with utilities and other sectors (e.g. banking, retail and the UK Government) to share best practice customer service strategies, and we are learning from others who are highly regarded for their delivery of exceptional customer service. We also recognise customers as an important Whole Systems stakeholder, and our ED2 customer strategy

establishes a customer focus group we will work with to directly challenge and inform us as we continue to shape our service offering and co-create solutions with our customers (see Case Study 2).

- **Heat strategy:** because of the complexity and mix of technologies that will be needed, the decarbonisation of heat requires collaboration across sectors and with local authorities. It necessitates a Whole Systems approach to enable ambitions to be achieved. Our Heat strategy outlines the ways in which the Whole Systems working with stakeholders can enable the necessary decarbonisation and deliver our Heat strategy. For example, we are participating in the Scottish Government-led Heat Electrification Partnership, to identify potential opportunities and local challenges to understand risks to communities and the timely sharing of information to support innovative Whole Systems, such a pilot of domestic heat pumps combined with storage to provide sources of flexibility.
- **Load:** Our ED2 *Load related Plan build and strategy* incorporates a Whole Systems approach for load-related expenditure decision-making to ensure we fully consider alternative (non-conventional) approaches to conventional solutions to network constraints and non-compliances. As the capacity required to be supplied from our distribution system is set to increase significantly over ED2, due to the continued electrification of heat and transport, the drive towards net zero and the potential impacts of the Access SCR, it will be increasingly important to optimise solutions across generation, demand, gas network, roads and transport. As we begin incorporating Whole Systems ways of working for load, we will also draw on our recent experience embedding new ways of thinking into SSEN through our approach to flexibility. Flexibility services will play a big part in avoiding the need for expensive reinforcement to accommodate the growth in low carbon technologies, helping to keep costs down for customers and avoiding connection delays while reinforcement is undertaken. Flexibility will feature frequently in Whole System solutions in ED2 and we will benefit from our experience in evolving Flexibility in general, our commitment to 'Flexibility First' combined with the learning generated from projects like the South West Active Network (SWAN) project where new systems, data exchanges and relationships between network operators, network owners and connected customers are helping to avoid significant reinforcement costs at Transmission Level. Data and scenario modelling to improve forecasting will also be critical in producing effective Whole system CBAs, projects such as RESOP and our planned ED2 IT developments such as Connectivity+ and Tailored Insights will allow us to dynamically invest ahead of need while utilising flexibility and Whole System solutions to ensure investment is targeted and efficient.

Further detail is provided in each of the above listed strategies and business plan annexes on the importance of Whole Systems to their strategies.

## 5.4 ENERGY SECTOR WHOLE SYSTEMS CHARTER

We have worked with all the other energy networks who operate in the same regions as ourselves in Scotland including SGN, SSEN Transmission, National Grid Gas Transmission, the ESO and Scottish Power Energy Networks (Transmission and Distribution), to produce a Whole Systems Charter. The Charter captures a series of shared commitments for how we will work together to support an industry-wide Whole Systems approach and realise benefits for society.

The Charter sets out 4 key principles for how all signatories will work and seek to embed Whole Systems in our organisations:

- **Work together, through coordination and cooperation:** we need to create a common set of structures for sharing information and this will be instrumental to forming a Whole Systems approach.
- **Manage uncertainty:** energy networks are long-term investments, with asset lives often covering 40 years. Networks need to find the balance between the short-term certainty against the longer-term uncertainties of the energy system.
- **Develop Whole Systems tools and processes:** to deliver the net zero transition will require new tools and processes. To do this, we must share our understanding of the evolving energy system and identify the key intervention points between gas and electricity networks and facilitate the delivery of reliable low carbon solutions.
- **Demonstrate our commitment to net zero:** Our networks are at the heart of the transition to net zero. There is no single defined route to reach this target, flexibility and coordination between us will be key. Commitment to this charter provides a platform for an interlinked strategy, driven by data and analytics aligned behind the goal of delivering net zero emissions.

The Charter also identifies a number of thematic areas where there are key Whole Systems enablers. We are already making progress against these thematic areas through the actions set out in this strategy. For example, through our Local Network Plans we have created mechanisms for bottom-up inputs from local communities to influence our Planning Assumptions and Scenario Analysis.

The Charter provides a platform for us to align our aspirations in helping Scotland meet the net zero emissions targets in 2030 and 2045. Over time, the Charter is anticipated to be extended to other GB network companies to further enable Whole Systems solutions in order to meet the UK net zero targets of 2050 (2045 for Scotland). See Figure 3 for the Whole Systems Charter key themes.

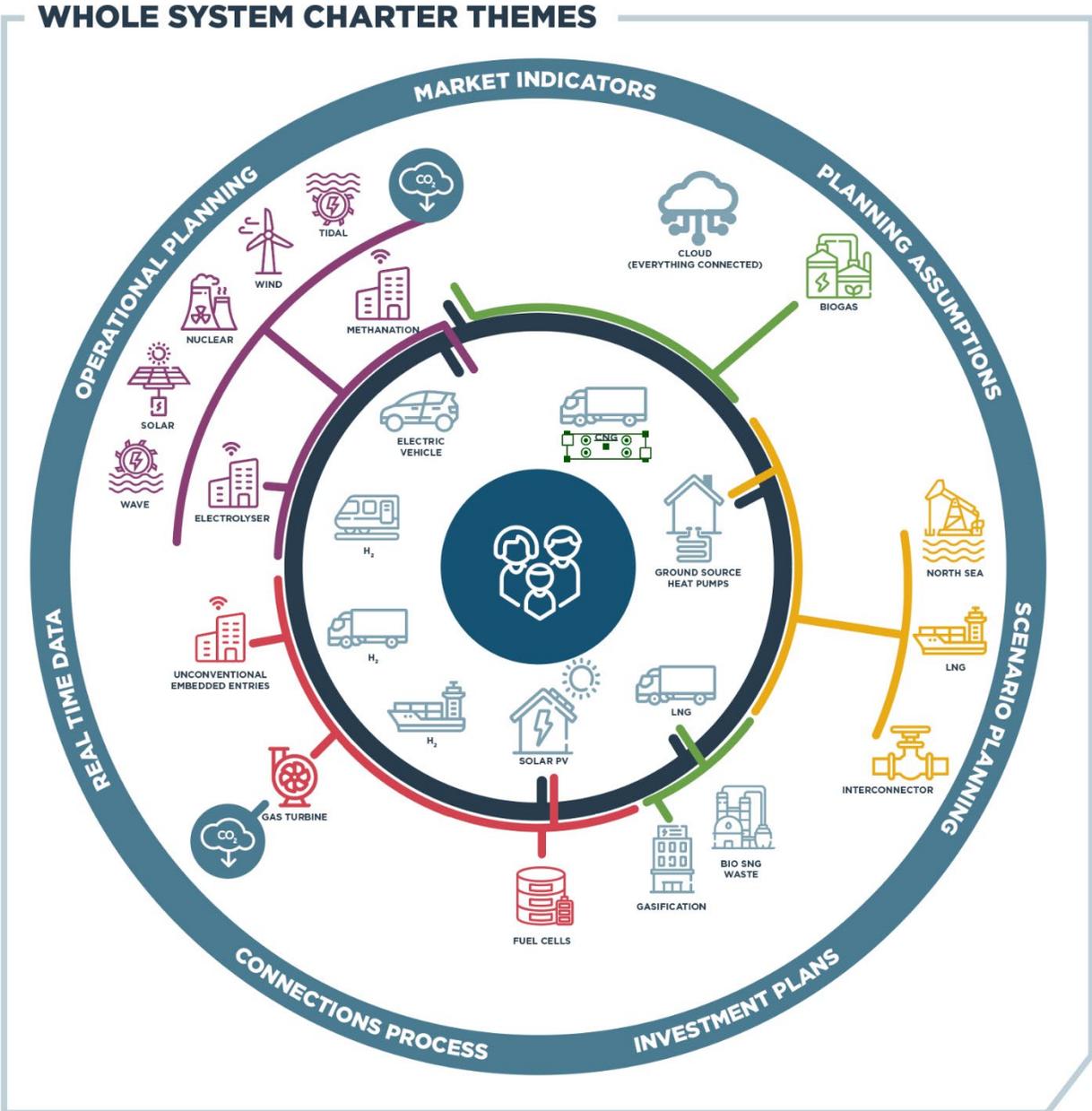


Figure 3 - Whole Systems charter themes

**Box 19: Actions to deliver our Whole Systems approach**

**Actions to deliver our Whole Systems approach**

C. Engaging with stakeholders to develop Whole Systems approaches

## 6. ONGOING STAKEHOLDER ENGAGEMENT PLANS

We recognise that forward planning for engagement is key because stakeholder engagement is critical to our successful transition to fully embedded Whole Systems ways of working. Below we outline key stakeholder engagement forums and channels we commit to participating in from now and during ED2. We expect that our proposed Whole Systems Change Management team will drive much of the engagement with our stakeholders in the early stages of ED2, with a view to transitioning engagement to people across the business as Whole Systems approaches are more deeply embedded, and this engagement becomes BAU. Key stakeholder engagement will include:

- Participating in the Scottish Energy Networks Strategic Leadership Group and ENA Open Networks project as part of implementing the Whole Systems Energy Sector Charter with SGN, Scottish Power Energy Networks, National Grid Electricity System Operator and National Grid Electricity Transmission (see section 5d).
- Running the Whole Systems Development Forum and Whole Systems Strategy Group with SSEN Transmission (see section 6a).
- Holding regular bilateral discussions with key energy system stakeholders including Ofgem, the ESO, NGET, SSEN Transmission and SGN.
- Participating in the Energy Innovation Centre (EIC) to coordinate and engage with other DNOs (see Case Study 3).
- Engagement with Western Power Distribution, Northern Powergrid, Electricity North West and Scottish Power Energy Networks as part of the Flexible Power initiative (see Table 6).
- Project based engagement with key stakeholders such as:
  - The ESO, Ofgem and SSEN Transmission via our Shetland project (see Case Study 1).
  - Thames Water, Wessex Water, Scottish Water, Bournemouth Water, Southern Water, SPEN and Portsmouth Water via PSR data sharing (see Case Study 2).
  - Low Carbon Hub, EDF energy, Nuvv, University of Oxford, Piclo, Oxford City Council, Oxford Brookes University, Oxfordshire County Council, Origami via Project LEO (see Case Study 4).
  - Dundee Council and SGN via the RESOP project (see Case Study 5).
  - Scottish Government, Transport Scotland, Scottish Futures Trust and SPEN via our EV Strategic Partnership.
  - Scottish Government and SPEN via our Heat Electrification Partnership (see Table 6).
  - Twelve local London authorities and 35 other partnering organisations via the London Underground Asset Register and National Underground Asset Register schemes (see Table 6).
  - Orkney Islands Council, European Marine Energy Centre, Solo Energy, Aquatera, community Energy Scotland, Heriot-Watt University and Doosan Babcock via a range of initiatives on Orkney.
  - E.ON and Costain via the RaaS project.
  - University of Southampton, DNV GL and Neighbourhood Economics via the SAVE initiative.

- Vanhool, BOT and Aberdeen City council via the Aberdeen Hydrogen project.
- Transport Scotland via the A9 Electrification and E-Tourism projects.

Our goal, and a measure of success for the team, will be the disbanding of the team by the end of ED2 once Whole Systems thinking and processes are fully embedded in business-as-usual activities. To track our progress in implementing the changes required to achieve our long-term vision, we propose to survey our customers and to produce an annual report on Whole System activities. We will agree a set of stakeholder informed metrics for Whole System implementation, using the SLC 7A activity register and CVP annual reporting to present results and outputs. This approach will capture feedback from those working with us, and we will develop a set of metrics with stakeholders to measure the effectiveness of our Whole Systems progress and activities. The SLC 7A and CVP annual report will be supported by quantitative and qualitative stakeholder survey data. If our CVP is approved, we will design the survey and create a baseline of stakeholder satisfaction on their experience of working with us on Whole Systems opportunities. The survey will cover areas such as: our responsiveness to requests for information/support and our understanding of stakeholders' context and the extent to which is reflected in decision making. During ED2 we would repeat the survey on an annual basis to give us regular feedback on our progress in embedding the new ways of working Whole Systems requires.

#### **Box 20: Actions to deliver our Whole Systems approach**

##### **Actions to deliver our Whole Systems approach**

A. Establish a Whole Systems Change Management team in 2021/22

C. Engaging with stakeholders to develop Whole Systems approaches

E. Establish a set of Whole Systems metrics

F. Continue to review all SSE ED2 load investments for Whole Systems solutions and for those with a value greater than £2m undertaking a quantified assessment

I. Continue working with local stakeholders through development of Local Network Plans

H. Offer engagement on our DFES scenarios alongside Open Data to all Local Authorities in our areas to support the production of effective LEAPs and LHEES.

# APPENDIX A: OFGEM'S MINIMUM REQUIREMENTS FOR WHOLE SYSTEM

Mapping our work and plans for Whole Systems to Ofgem's minimum requirements.

While our primary driver for building on our ED1 and earlier work on Whole Systems is the essential role collaboration is playing in delivering net zero ambitions for ourselves and our stakeholders, we recognise Ofgem has set specific requirements for companies to deliver Whole Systems as part of ED2. Table 5 maps our progress and plans for Whole Systems working to Ofgem's requirements as outlined in April 2021, and cross references to where further detail can be found.

Table 5 - Enabling whole system solutions- detailed expectations from Ofgem.

	Ofgem minimum requirement	Where and how this is addressed in the narrative
4.29	As a minimum requirement under Stage 1 of the BPI, DNOs must set out their approach to enabling whole system solutions in their Business Plan. This must include:	
(a)	Plans and processes for joint planning with other network companies and/or the system operator (and evidence of that already undertaken).	Evidence of our ED1 joint planning and engagement processes with other network companies and how these have informed our baseline plan can be found in sections 3a, 6a-d and ED1 case studies contained within this annex. Evidence of how we plan to work with other network companies and our cross sector and vector stakeholders in ED2 can be found in sections 3b-c, 4a-e and 6a- 6c of this annex.
(b)	Evidence of effective identification and adoption of potential Whole Systems solutions and approaches, reflecting how they have taken account of the impacts and opportunities of their actions for the wider system, and vice versa, and accounted for those in their cost benefit analyses.	Our subsea cable programme including connect fibre broadband to the Scottish Islands has been identified as a priority Whole Systems solution opportunity for ED2. A summary of this solution is provided in section 3c and further detail provided in our <b>Scottish Islands Strategy (Annex 8.1)</b> .  Adoption of Whole System solutions in Skye, the SWAN project, Regional Development Programmes and the Whole System CBA works for Fleet-Bramley (see our Case Studies), in addition to some of our ED1 Whole Systems initiatives (including key learnings) all provide effective evidence of how SSEN has identified and adopted Whole System solutions in ED1, and how this has informed our ED2 baseline. More extensive list of ED1 Whole Systems initiatives including those extending into ED2 can be found across the Annex. The Whole Systems approach we have adopted for six specific projects can be found in Case Studies 1-5 and 7.

Ofgem minimum requirement	Where and how this is addressed in the narrative
<p>(c) Demonstration of long-term whole system thinking and value for consumers and the wider society, including identification of uncertainties and mitigation, and how these relate to a range of different forecast pathways.</p>	<p>Information on our revised processes for assessing investments to take account of wider system costs and benefits is set in Case Study 6.</p> <p>Our RESOP, LEO and SWAN projects (Appendix B) provide evidence to the commitment to long-term Whole System approaches SSEN is undertaking, in addition to the adoption of the ENA Whole System CBA and the embedding of Whole System understanding as part of our BAU and a core responsibility of the Whole system change management team (Section 4.4). Whole Systems benefits for specific projects we have already undertaken (or are currently undertaking) can be found in Case Studies 1-5.</p> <p>Information on how we have taken local plans and stakeholder inputs into account in the planning scenarios we use for investment planning is set out in section 4c and Case Study 7.</p>
<p>(d) Demonstrable cross-sector engagement, optioneering, and planning with sectors other than their own.</p>	<p>Key examples of how we have developed cross-sector engagement to support Whole System outcomes in our RESOP and Vulnerability projects can be found in case studies 2 and 5, and in sections 6a-6c of this Annex. Stakeholder engagement that has been undertaken as part of Whole Systems projects we have already undertaken (or are currently undertaking) can be found in Case Studies 1-5 and Table 10. Details on our cross-sector engagement via the Energy Sector Whole Systems Charter can be found in section 5d.</p> <p>Our long-term vision (see section 3c) sets out the central role of cross-sector engagement in our Whole Systems approach and how we will work with stakeholders on optioneering and planning in the future. Our ED2 transition pathway and plan (see section 3) outlines changes we are making to transition to continuous stakeholder engagement.</p>
<p>4.30 Under this requirement, where a company proposes an activity which coordinates with, or generates benefits for, any broader area of the economy or society, the DNO's Business Plan must evidence and quantify these impacts as part of their justified and costed proposals for whole system outcomes and solutions. Such activities must demonstrate:</p>	
<p>(a) That they meet all the same requirements for 'non-whole system' activities (costs, engineering justifications, etc), and how uncertainty mechanisms, including reopeners, could support them. We expect companies to apply proportionality</p>	<p>The ENA has developed a guidance methodology for the sector on how to perform a Whole Systems CBA. We have adopted this methodology as the approach we will use to assess Whole Systems options and take account of wider costs and</p>

Ofgem minimum requirement	Where and how this is addressed in the narrative
	<p>benefits. We have also delivered Whole System Outputs, such as our Skye Project (case study 7) prior to the ENA methodology being available.</p> <p>Through the Open Networks programme, we are continuing to work with the ENA to develop the Whole Systems CBAs in accordance with the Ofgem guidance and informed by our portfolio of Whole System projects, examples of which can be found throughout this annex.</p>
(b) That there are net benefits for their sector’s consumers and which type(s) of benefit the activity will generate for consumers, e.g. lower bills, reduced environmental damage, improved reliability and service. The distribution of costs and benefits over time should also be demonstrated (i.e. for existing and future consumers).	<p>Further information on how we have implemented the ENA CBA guidance on Whole Systems CBAs can be found in Case Study 6: Amending our investment decision process to include Whole Systems considerations.</p>
(c) The value – and methodologies for calculation – of the activity for other sectors, towards achieving broader goals (e.g. decarbonisation), and for other aspects of the economy (e.g. telecommunications).	<p>We have identified our Subsea Cables programme and connecting islands CVP as a priority area for identifying Whole Systems solutions and our Business Plan includes costed proposal, in line with the ENA Whole Systems CBA guidance. Further detail is provided in <b>Chapter 7 (‘Maintain a Resilient Network’)</b> of our business plan and our supporting <i>North of Scotland</i> strategy.</p>
(d) The level of coordination and potential provisional agreements that have already been secured to support these proposals, including a justification that the split of costs and benefits between the company and the whole system partner(s) are appropriate.	<p>Our Whole System Support CVP will enable SSEN to support a far wider selection of Whole System projects, engage more effectively and more frequently with our local stakeholders and support increased levels of cross-sector collaboration than our baseline position. Further detail within section 3.5 of this annex</p>
(e) Why a market solution could not, or should not, be utilised to deliver the activity, and that all options have been considered on a level playing field.	<p>The ENA has developed a guidance methodology on how to perform a Flexibility CBA, which we have already adopted as part of our investment planning process. This will enable us to assess all options on a level playing field.</p> <p>Our approach to assessing whether a Whole Systems CBA is required considers whether the ENA’s flexibility CBA is a sufficient decision-making tool, see Case Study 6.</p>
(f) That the activity is not BAU, and expenditure which sets the activity as above BAU should be clearly identified and delineated	<p>The ENA has developed a guidance methodology on how to perform a Whole Systems CBA, including delineating BAU expenditure from above and beyond expenditure. We have cross-checked the ENA guidance and find that it meets Ofgem’s 4.30 requirements. Therefore, we are working alongside the ENA to develop the Whole Systems CBAs in accordance with the Ofgem guidance.</p>

	Ofgem minimum requirement	Where and how this is addressed in the narrative
		<p>Further information on how we are implementing the ENA CBA guidance on Whole Systems CBAs can be found in Case Study 6: Amending our investment decision process to include Whole Systems considerations. We have also delivered Whole System Outputs, such as our Skye Project (case study 7) prior to the ENA methodology being available.</p> <p>Our Whole System Support CVP will enable SSEN to support a far wider selection of Whole System projects, engage more effectively and more frequently with our local stakeholders and support increased levels of cross-sector collaboration than our baseline position. Further detail within section 3.5 of this annex.</p>
(g)	<p>How changes have already been made in the RIIO-ED1 operating period – in response to changing market conditions, stakeholder expectations, or potential licence changes – and outlines how these practices will be embedded and improved in RIIO-ED2.</p>	<p>Section 3a sets out key lessons from ED1 Whole Systems projects we have used to shape our overall approach for ED2.</p> <p>Our approach to <i>Enabling Whole Systems Solutions</i> is aligned to our overall strategic outcomes for ED2 as set out in section 2b, which have been developed to meet our stakeholders’ expectations of SSEN to have a positive impact on society, in particular to support the net zero transition.</p> <p>We set out in section 6, how we have engaged with stakeholders to understand their expectations in developing our overall approach to Whole Systems working. Case studies 1-5 also outline how we have worked with stakeholders in a Whole Systems way, and how learnings from those projects are being brought into ED2.</p> <p>The specific steps we will undertake in ED2 are outlined in sections 4a-c. section 4c in particular sets out two key processes we have already augmented to incorporate Whole Systems thinking. This includes introducing processes for local communities to directly feed in their expectations of SSEN, based on their own local area plans, into our investment planning processes.</p>
4.31	<p>Where a company has not identified any potential opportunities for proposed Whole Systems outcomes and solutions, DNOs must provide evidence of their engagement and attempts to discover such opportunities.</p>	<p>N/A - we have proposed our Subsea Cables Programme as an area for specific Whole Systems solutions in ED2. Our Whole Systems approach further outlines the specific steps we will undertake in ED2 to continue identifying Whole Systems opportunities – these are outlined in section 4a-c of this annex. Engagement we will undertake from</p>

	Ofgem minimum requirement	Where and how this is addressed in the narrative
		now into ED2 and beyond to continue identifying Whole Systems opportunities is outlined in our action plan and sections 3b-c.
4.32	Additionally, as a minimum requirement under Stage 1 of the BPI Business Plan, sections on innovation must contain consideration of whole system approaches as potential solutions to the barriers being addressed by the innovation proposals.	Our <i>Innovation Strategy</i> provides important foundations for our Whole Systems strategy to be delivered, and likewise our Whole Systems approach is being adopted in our Innovation strategy as we continue to pursue ways we can do things better by working with others. Details on the interplay between Whole Systems and our Innovation strategy can be found in section 5b of this annex, and our <b><i>Innovation Strategy (Annex 14.1)</i></b> .

# APPENDIX B: CASE STUDIES

## DEMONSTRATING SSEN ALREADY ADOPTS ELEMENTS OF ITS LONG-TERM VISION

There are a range of examples of where we undertook initiatives in ED1 (and into ED2) that embody aspects of the long-term vision for Whole Systems we are working towards implementing across the whole business. Five case studies are provided below: Shetland project, Priority Service Register (PSR) data sharing, our work with the Energy Innovation Centre (EIC), Project LEO and RESOP.

### CASE STUDY 1: SHETLAND PROJECT

#### Background

The Shetland Islands face two concurrent and complementary energy issues. First, is the need to ensure continued energy security for the Islands. The second is the need to provide developers with network connections, enabling them to exploit the abundant wind energy resource and export the low carbon generation to the mainland electricity system in support of the Government's net zero ambition.

The Islands are not currently connected to the electricity network in mainland Scotland; therefore, Shetland has to be capable of meeting all its own electricity needs at all times. For this, Shetland currently relies primarily on Lerwick Power Station to meet the electricity needs however, the power station is expected to cease full duty operations by 2025.

In parallel, the process to develop a new electricity transmission link from Shetland to the mainland is underway, triggered by the need to connect new windfarm developments.

#### Proposed Whole Systems solution

Encouraged by Ofgem to resolve Shetland's security of supply requirements and recognising the potential for our customers to benefit from being part of a joined-up Whole Systems solution, we started to explore whether this would be possible and could offer the best solution from technical and cost-benefit perspectives.

We developed a bespoke methodology to assess the services that the transmission link could bring to the Shetland distribution system, and we worked with the ESO and other stakeholders to develop a new approach in transmission charging methodology, through an open governance process, which would allow us to contribute towards the cost of the link.

We engaged with a wide range of stakeholders, including local councils and developers, and the UK and Scottish Governments, to share information on our approach and seek views. We also engaged with stakeholders on

Orkney and the Western Isles recognising the potential for similar arrangements to be implemented there. We published material on our approach<sup>9</sup>, and Ofgem also consulted on our proposals<sup>10</sup>.

In November 2018, we made our recommendation to Ofgem on the Shetland Whole Systems solution, which was subsequently approved by Ofgem in summer 2020. Through our solution, Shetland's future energy needs will be met for the vast majority of the time through the sharing of a transmission link to Shetland from mainland Scotland. This Whole Systems solution allows costs to be shared among the distribution network and developers, who both use and benefit from the link, allowing both users to benefit from lower costs compared to development of separate solutions to the transmission and distribution challenges. This approach has the potential to be applied in other island contexts where transmission links are developed. The proposed Whole Systems transmission link can be seen in Figure 5.

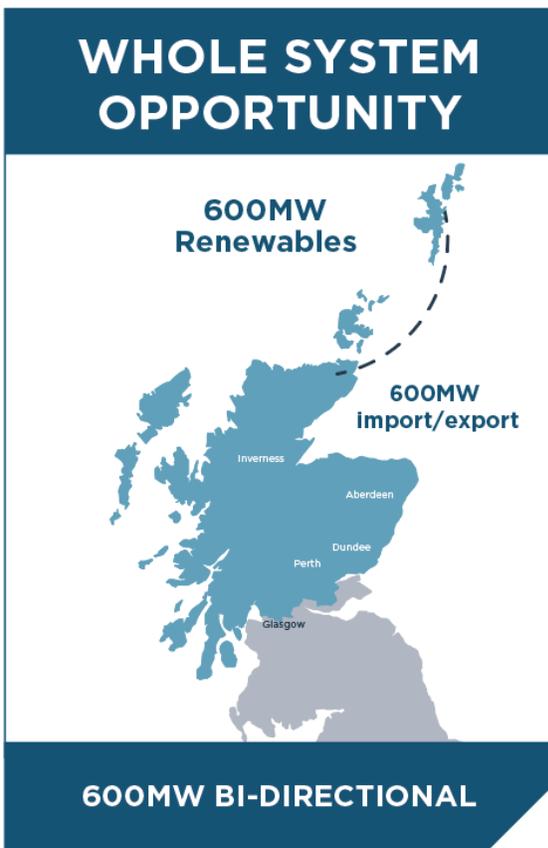


Figure 4 - The proposed Shetland transmission link

<sup>9</sup> <https://www.ssen.co.uk/WorkArea/DownloadAsset.aspx?id=17161>  
<https://www.ssen.co.uk/WorkArea/DownloadAsset.aspx?id=17162>  
<https://www.ssen.co.uk/WorkArea/DownloadAsset.aspx?id=16822>

<sup>10</sup> <https://www.ofgem.gov.uk/publications-and-updates/decision-scottish-hydro-electric-power-distribution-s-proposals-contribute-towards-proposed-electricity-transmission-links-shetland-western-isles-and-orkney>

## How the Case Study reflects SSEN's long term vision for Whole Systems

The Shetland Case Study demonstrates that we are already delivering elements of our long-term Whole Systems vision, including:

- **Engage:** as part of the plans to connect the electricity network of Shetland to the mainland, SSEN Distribution worked with SSEN Transmission and a range of other island and GB stakeholders, showing Whole Systems engagement. The collaboration was focused on technical aspects including what services the link would bring to the distribution system, how and when the distribution system would be connected to the transmission system, and how distribution system security of supply would be retained through the implementation of the subsea cable, and implementation arrangements including how services from the link would be valued, and how our contribution would be made in a fair and transparent way.
- **Co-create:** The Whole Systems solution on Shetland is an example of co-creation as the approach has involved working concurrently with a range of stakeholders on the islands and in GB. Separately, both groups face very high solution costs. Together, developers and the distribution network can share the cost and avoid constructing two solutions when one is clearly more efficient.
- **Deliver:** We continue to work with Ofgem, National Grid ESO, SSEN Transmission and other stakeholders to finalise implementation arrangements ahead of the transmission connection to the Shetland distribution system in late 2024.

## Benefits of a Whole Systems approach

This Whole Systems approach will reduce costs to consumers of the distribution solution by around £140m compared with the next best alternative option, representing the best value for Shetland and GB consumers. We are contributing around £251m towards the Shetland transmission link, which includes:

- £123m: Peak Demand Support (the role of the link in meeting the Islands' peak demand)
- £118m: Control Support (carbon reductions from enabling access to lower carbon electricity from mainland GB)
- £10m: Reduced Losses (the improvement in losses a transmission link brings compared to the best alternative, a distribution link).

Our analysis previously submitted to Ofgem suggests the next best solution would cost roughly £400m.

## Key lessons for our RIIO-ED2 and long-term approach

There have been a number of key learnings gained from working with the various stakeholders on the Shetland project. Below we present a summary of the key Whole Systems learnings including:

- Through joint working with other licensees, customer and industry stakeholders, and specialist partners, we have been able to identify new and efficient solutions, and to implement these in innovative ways, in the interests of Shetland customers and wider GB consumers. This has provided us with rich experiences

to draw from in preparing for the goals, challenges and opportunities we will progress moving into and through ED2.

- In working together on a solution which brings benefits to several groups of stakeholders, we have found ways to meet stakeholder needs more efficiently and avoid duplication of significant investment. We will continue to apply this approach to other whole system projects going forward.
- In collaboration with our partners and stakeholders we have broken new ground in developing novel methodologies and models for implementing whole system arrangements, for example in identifying and valuing benefits which are bespoke to specific stakeholder groups, and in finding ways to reflect cost-sharing mechanisms in industry codes through open governance processes. We will look to apply these ways of thinking, and to capitalise on these experiences and relationships, as we assess future whole system initiatives.

# CASE STUDY 2: SUPPORTING VULNERABLE CUSTOMERS

## Background

We deliver electricity to 3.8million homes and businesses and the number of people we serve is approximately 8.5million. The difference between the regions across both our licensed network areas does not stop with the size and age of the population. To fully understand our customer's requirements and meet their needs in the most efficient way we need to know the communities we serve in far more detail.

Our role is to provide a safe and reliable supply of electricity to the communities we serve in Scotland and England, unfortunately there are times when the power does go off and on other occasions, we need to turn the power off to carry out essential maintenance so it is important that we understand the needs of our customers in particular those in vulnerable situations so we can better support them when this happens.

Our Customer Mapping tool helps us to identify geographic locations where there are pockets of vulnerability. We compare this data with the locations of our existing PSR customers, helping us to identify strategies to increase the registrations within areas where levels of PSR registrations are significantly lower than the number of eligible customers. This also helps us to identify the most appropriate locally trusted intermediary to help us connect with customers. In ED1 we have worked hard to engage in our communities, working with a wide range of partners to close the gap and raise awareness of the Priority Services Register (PSR) so that people can benefit from the support we offer. The current PSR gap is 34.2% and we aim to close that gap further in ED2. We will do this through enhanced engagement and targeting our PSR gaps using the customer mapping tool, which will allow us to reach in excess of an additional 250,000 customers.

It is important for us make sure that we continue to engage in our communities and work build new partnerships so that more customers can benefit from the support we offer, such as our 24/7 priority services phone line, priority updates, communication in formats that suit a customer's needs, pre warning when we are expecting severe weather, welfare and portable generation for those who use medical equipment/aids reliant on electricity during prolonged power cuts.

While Whole Systems is often thought of as a way of working with others across energy and other vectors (e.g. water, telecoms, transport) to deliver infrastructure investment or net zero focused solutions, our approach to PSR data sharing and supporting vulnerable customers embodies Whole Systems thinking as well. We are collaborating and sharing data with our partners across the energy and wider utilities sector (e.g. water) to identify and support these customers and improve overall societal outcomes.

In our work supporting vulnerable customers we have also expanded our partnerships with fuel poverty organisations and have engaged with over 200 stakeholders in regard to fuel poverty. We recognise that addressing fuel poverty requires close cooperation between organisations and sectors to provide practical solutions for our customers. As the energy landscape changes due to the pandemic and the move to net zero this will be even more important therefore, we will increase the number of stakeholders we engage with to 2,000 in ED2.

We have also demonstrated Whole Systems collaboration through our work with Citizens Advice. For example, during the COVID-19 pandemic, we provided funding to Citizens Advice so that they could work in an agile way and carry on with the important work they do to raise awareness for the PSR.

## Our Whole Systems solution

Our approach to supporting vulnerable customers has been built around creating partnerships to support vulnerable customers in areas where we may not have the expertise necessary to fully meet their needs. It's customer-centric, recognising that vulnerable customers may need support in relation to all their utilities and other essential services, rather than thinking just about how SSEN can provide them with the additional support they need. When there is potential to join forces with other utility companies, we work together to maximise benefits for customers and reduce costs.

We have developed our Whole Systems approach to PSR data sharing through extensive stakeholder engagement. Part 3 of our 2019-20 Stakeholder Engagement and Consumer Vulnerability (SECV) submission details the engagement we have undertaken to ensure our activity and strategy to supporting vulnerable customers is informed and scrutinised. This included undertaking 12 targeted stakeholder events and workshops covering a broad range of topics and attended by a wide range of stakeholder groups.

We have worked with a wide range of stakeholders to support vulnerable customers on a number of different initiatives including Thames Water, Wessex Water, Scottish Water, Bournemouth Water, Southern Water, SP Energy Networks and Portsmouth Water. Further detail on the work we have done to support vulnerable customers can be found in ***Vulnerability Strategy (Annex 4.2)*** of our ED2 business plan.

## How the Case Study reflects SSEN's long-term vision for Whole Systems

Much of what we are doing to support our vulnerable customers reflects our long term Whole Systems vision components of 'Engage', 'Co-Create' and 'Deliver' in particular:

**Engage:** We engage with stakeholders (including customers) and third parties to inform our vulnerability approach on an ongoing basis. For example, Consumer Vulnerability continued to be one of three engagements featured at six of our stakeholder workshops in 2019-20 across England and Scotland. Similarly, in 2019-20 we performed over 2,000 face-to-face and 600 in-depth telephone surveys with PSR customers to help improve our services. We introduced our Expert Panel in 2015/16, made up of independent experts from a variety of different areas such as Dementia and mental health who challenge our performance and guide us on our approach to supporting consumers in vulnerable situations. In addition to this we have a Cross Utility Group, made up of all the water and gas distribution companies across both our licensed areas, who meet regularly to share best practice, improve data held on vulnerable consumers and gain efficiencies by working together jointly to promote the PSR.

**Co-create:** We are involved in a wide range of co-creation with stakeholders as part of our joint approach to supporting vulnerable customers. For example, as part of the Cross-Utility Group meetings we worked with Affinity Water and Thames Water to co-create a process to make the process to register for the PSR easier for customers in Slough, by establishing a 'one stop shop' underpinned by cross company data sharing. Similarly, we held a joint event with Wessex Water and others to promote PSR data sharing benefits to 45 stakeholders.

**Deliver:** Our work to support vulnerable customers also demonstrates our ability to deliver initiatives with our partners. For example, we work with Thames Water and Royal Berkshire Hospital Discharge to reach vulnerable customers as they are discharged from hospital. We work directly with two discharge teams in elderly care wards to identify potentially vulnerable customers and have them added to our PSR. In another example, we have also built on our partnership with Wessex Water and Citizens Advice Purbeck to promote working with health professionals (e.g. occupational health) and leveraging the outreach work carried out by six departments in the Purbeck region of Dorset.

## Benefits of a Whole Systems approach

Through a Whole Systems approach to supporting vulnerable customers, we have achieved a number of tangible benefits and outcomes. For example, the number of direct PSR registrations increased by 47.3% last year, up from 22,699 in 2018-19 to 33,441 in 2019-20. Working with the partners we have built in ED1 such as Water, Gas, fuel poverty organisations, and local NHS groups, through data-sharing we have been able to collaboratively work together to reach more customers which has helped increase the direct sign ups year on year as those partnerships evolve and grow stronger.

In addition, collaborative initiatives to support vulnerable customers have delivered significant value and wider social benefit to a range of stakeholders. Table 6 highlights the significant social benefits generated through initiatives delivered with others to support vulnerable customers.

Table 6 – Total social benefit from collaborative initiatives to support vulnerable customers.

Initiative name	Partners	Total social benefit	NPV
Young Carers Project - Working with NEA and water utility partners we educated young carers in energy and water efficiency	NEA, Wessex Water, Thames Water, Southeast Water	£50,986	£38,498
Energy Adviser Programme - A first-of-its kind partnership funding CAS to have recruit specialist energy advisors who could provide support for customers across Scotland	Citizens Advice Scotland (CAS)	£115,750	£56,773
Gap Funding Programme - Providing energy advice through outreach initiatives	WarmWorks	£32,194	£22,083
Hospital Discharge Programme - Providing energy advice through hospital settings and working with Occupational Therapy teams and raising awareness of the PSR	CSE	£6,775	£4,131

Initiative name	Partners	Total social benefit	NPV
Energy Advice Referral	Home Energy Scotland and YES Energy Solutions	£17,448	£25,556
	LSX	£31,781	£28,678
CSE Wiltshire - Providing outreach on fuel poverty and PSR.	Centre for Sustainable Energy	£136,813	£164,916
COVID-19 Partnerships - Funding provided to Citizens Advice so that they could work in an agile way and carry on with the important work they do to raise awareness for the PSR.	CAS and CA Hampshire	£115,032	£72,495

## Key lessons for our RIIO-ED2 and long-term approach

There have been a number of key learnings gained from working with the various stakeholders on PSR. Below we present a summary of the key learnings:

- Through good management of our partnerships, we have been able to jointly work together to increase the awareness of the PSR
- Our partnerships were formed with shared responsibilities, goals and outcomes in mind so that we all achieved what was best for our customers and something we were very strong in and will continue to do when forming future partnerships
- Using our Customer Mapping Tool, we have been able to identify partnerships with trusted intermediaries who are able to help us connect with a wide range of customers, including those hard to engage groups. We will continue to do this to close the gap in PSR especially as we move into ED2 and do more to ensure we help customers in vulnerable situations with the energy transition to net zero.
- We have learned during ED1 that we need to ensure our partnerships are geographically spread across both our licensed areas such as our fuel poverty partnerships so that we can provide a consistent service to all our customers across both licensed areas
- We have built strong relationships with partners to benefit from their expertise and reach of customers that we would otherwise not have ourselves. Many partners have different relationships with their customers such as water, who have more of a financial relationship and can potentially draw on their own partnerships increasing their reach. We will continue to do this and develop more partnerships as focus increases to include supporting those with the energy transition and form new partnerships with local community groups who can help with us educating customers on the benefits of low carbon technologies.

Further detail on our work to support vulnerable customers can be found in **Vulnerability Strategy (Annex 4.2)** of the business plan.

# CASE STUDY 3: ENERGY INNOVATION CENTRE (EIC)

## Background

The UK Energy Innovation Centre (EIC) is a not-for-profit organisation that provides a trusted open innovation platform to support the development of innovation across the energy sector. The EIC was established 13 years ago as a low cost, low risk, agile and efficient gateway for innovators and energy companies to come together and deliver collaborative innovation.

At the EIC we work alongside both gas and electricity companies including Cadent, NGN, National Grid, UK Power Networks, SP Energy Networks and Northern Powergrid together with a community of over 8,000 national and international innovators to address collective challenges across the energy system.

## Our Whole Systems solution

The EIC embodies what it means to undertake Whole Systems working, as open, transparent collaboration is at the heart of the organisation and its culture. The EIC provides a platform for us to collaborate with other subject matter experts in our shared innovation community which extends to Water utilities, Network Rail and Highways England.

### Box 3.1: Whole Systems projects with the EIC - BVLOS

**CALL OUT BOX: Whole Systems working through beyond visual line of sight (BVLOS) project**

An example of a Whole Systems project driven by the EIC is the beyond visual line of sight (BVLOS) project, which is exploring the use of drones to conduct aerial inspection operations. The successful deployment of this solution will have a transformational impact in the industry with inspections being conducted in a more efficient way and deliver financial savings. Trials have already been carried out in segregated airspace and the EIC project team is currently in the process of agreeing trials with the CAA in open airspace for 3 different types of inspection operations, including powerlines. BVLOS is an example of genuine cross energy sector Whole Systems collaboration as we work with Cadent, Northern Gas Networks, Northern Powergrid, UK Power Networks, Wales & West Utilities and National Grid Gas Transmission on the project.

The EIC provides us with an opportunity to access the expertise and experience of the whole innovation community. We work with both innovators and other utilities/sectors regarding challenges that arise allowing us to seek alternative or novel solutions that we may be unable to address internally or where we wish to benchmark best practice. The EIC acts as a Whole Systems facilitator on a wide range of issues through “Dragon’s Den” style calls for innovation. This provides us with the opportunity to present our challenges to the whole community and have follow up discussions with a shortlist of innovators. This approach often results in multiple small businesses/innovators working together with us to deliver a solution. The EIC also provides a single gateway to innovators and new market entrants to bring forward innovation to the industry.

## How the Case Study reflects SSEN's long-term vision for Whole Systems

The purpose of the EIC is fully aligned with our long-term vision for Whole Systems working, and is an example of how we are already working in a Whole Systems way:

- **Engage:** the EIC provides a dynamic platform for DNOs/GDNs/TOs and other sectors to engage with each other, as well as directly with innovators. The DNOs who are partners of the EIC meet every 6 weeks at an operational level and every 6 months at a strategic level, where we discuss opportunities and challenge our collaborative ambition, performance and pace.
- **Co-create:** Calls for innovation set out the desired customer / network outcome we are seeking to achieve, which enables parties to come forward with possible solutions. The selected solution is then crafted with operational experts from our business or from across the sector to co-create the best possible solution.
- **Fund:** Historically innovation through the EIC has been delivered through the Network Innovation Allowance (NIA) funding mechanism. In ED2 however we are committed to exploring wider funding mechanisms to increase our breadth and pace of innovation. The EIC also supports innovators to access available funding, for example by providing guidance on navigating the complex funding environment for energy innovation.

## Benefits of a Whole Systems approach

Our work with the EIC delivers benefits to SSEN, our EIC partners including innovators and our customers, such as:

1. **Efficiency savings:** Analysis undertaken by NGN and the EIC in March 2021 found EIC partners can achieve up to 50% internal cost savings on innovation activity, largely driven through the shared costs, de-risking innovation and fast paced collaboration enabled by the EIC.
2. **Driving culture change required for Whole Systems & multi sector collaboration:** Engaging with the EIC helps support the acceleration of collaborative technological, cultural and behavioural innovation.
3. **Funding Leveraging:** For every £1 invested in innovation projects through the EIC, SSEN leverages on average a further £1.60. In excess of £5m has been leveraged by SSEN over the past 5 years.
4. **Wider benefits to the innovation community including:** Giving innovators the ability to influence and affect change in network firms' behaviours and culture, and providing innovators with a collective voice, high quality of interaction and ability to influence and change industry practice.

## Key lessons for our approach to Whole Systems in ED2 and long term

There are a range of key learnings we've gained from working with the EIC and its partners including:

- 1. The value and importance of working in forums alongside other DNOs:** often SSEN is undertaking Whole Systems or collaborative activities with gas, transmission or organisations from other sectors (e.g. water, telecoms, transport etc), however our work with the EIC has highlighted the significant opportunities DNOs have to collaborate with each other.
- 2. The importance of being open to new ideas and suggestions, and the new relationships that can come from that:** SSEN has sourced a number of solutions from the EIC innovation community, and only through being open to these ideas has a practical solution been able to be identified.
- 3. The challenges with changing cultures and mindsets within an organisation:** our involvement in the EIC is not yet a BAU activity, and has been seen by some as additional work, rather than engagement which can help with their work. We are working to change cultures and mindsets across our business. An example is the Super EZ Tool Trial in 2020, which involved a Maintenance inspection Team from SSEN. After the trial the Team Manager is now working with ourselves and the EIC to set up a Call for innovation on Oil Handling and Transportation. Internally we are actively introducing the EIC to our business. At our internal meetings we offer the EIC as a way of seeking out solutions to problems that have not been solved internally. Knowledge of the EIC across our business is growing with each reach out for response to Proposals and calls. We have incorporated this learning into our Whole Systems long-term vision and ED2 transition pathway timelines, reflecting it takes time to change individual behaviours and organisational culture.

# CASE STUDY 4: PROJECT LEO

## Background

The electricity system of the future has to be dynamic and responsive, carefully managed to ensure the best use of its capacity. Working in silos is just not an option, and through Project LEO, we have brought together partners from across the energy system; academia, industry and local communities to collaborate on developing a 'Whole Systems' approach to the Energy Transition. This has enabled the level of co-creation needed to tackle such a complex systems project.

LEO has the vision to be the first building block in the decarbonisation of the entire county of Oxfordshire, and the purpose to free up space on the electricity network by proactively managing generation and demand to enable more local renewable generation and the uptake of Low Carbon Technologies such as EVs and heat pumps. The LEO project is the first time that funding streams from Ofgem and BEIS have been brought together. The Ofgem funded TRANSITION project which forms part of LEO concentrates on the markets and technology aspects of the project, and LEO brings the collaboration and co-creation specifically looking at the people elements of a socio-technical system. The partnership includes: the Low Carbon Hub, a social enterprise with renewable assets throughout Oxfordshire, both local Universities looking at whole systems thinking, data and mapping, new start up Piclo working with EdF and V2G partner Nuvve looking at platform development, and both councils looking at planning for net zero.

LEO is delivering a series of end-to-end trials of flexibility on the electricity network. The energy transition is going to take place at the local and domestic level with those connected into the LV network. This part of the electricity network is least understood and well monitored so one of the first things the project had to do was install LV monitors at the sites closest to the assets, and clustered to be able to tell what was happening at this side of the system.

We have adopted the agile technique of minimum viable systems for our battery trials, with the Oxford Bus Company re- configuring their asset to deliver power back to the system, the Sackler library owned by the university has been able to reduce demand using its BMS (Building Management System) and Sandford Hydro has been able to increase and decrease its generation to order.

A key project challenge is to get enough assets behind a potential constraint to test a market for flexibility, which involves an approach to the most important part of the whole system, the people. As part of LEO, we have narrowed down our search areas to 6 key Bulk Supply Points and are actively recruiting for participants. Alongside this technical angle, the Low Carbon Hub have been building relationships in the local area for the best part of 10 years, unique relationships which are being leveraged as part of the project.

Quotes from key Project LEO partners highlight the value and importance of the Project to achieving net zero and emphasise the critical role SSEN is playing in delivering this.

- "The University of Oxford, as part of the LEO consortium, is generating knowledge and understanding from LEO's trials about how the whole energy system needs to adapt and change to enable technologies for a zero-carbon world. These include both the technologies to provide the required renewable energy and the green technologies that deliver green mobility and heating services.

These new technologies are all connected by the distribution network. We are learning that making a change at one level in the distribution network has an impact elsewhere - only by taking a whole system view can we appreciate what these consequences might be. "████████████████████ - Associate Professor in Engineering Science and Group Leader of the Energy and Power Group at the University of Oxford

- "As a flexibility market platform, Piclo understands the important of reducing barriers to entry and ensuring everyone can access and take part in emerging markets. Simplifying and streamlining processes from a whole system perspective is the only way the country will realise the full potential of flexible energy. That is why we are part of the LEO project and supporting the reach of, and the participation in, its flexibility market trial." ██████████ ██████████ – Project Manager at Piclo
- "Oxfordshire County Council (OCC) is committed to becoming Carbon neutral by 2030. We are fortunate that Oxfordshire has a thriving community energy scene with projects being delivered around a wide range of energy issues facing a county that is expanding fast. There is no one single solution as to how we can deliver the electrification of heating and transport – by looking wider at the whole system in the way that LEO is doing, OCC can make the informed decisions needed for the future to achieve our decarbonisation aims, we are also taking the system learnings from LEO and applying across wider sectors and also embedding the principles of how to measure large system change into other countywide projects, we believe that only through continual development and learning through projects like LEO can we achieve the best outcomes for all our residents." ██████████ ██████████ - Head of Innovation at Oxfordshire County Council
- "As well as the technical aspects of LEO, the Low Carbon Hub has been able to share with LEO it's experience of working with the communities in Oxfordshire in ensuring that we find ways to meet our energy needs in a way that's good for people and good for the planet. The project has really benefited from taking a whole system approach to ensuring the networks of the future are fair, ethical and offers opportunities for all of us to benefit.", ██████████ ██████████, Low Carbon Hub

LEO is a £40m, flagship project for Innovate UK, from the Industrial Strategy Challenge Fund (ISCF) as part of the Prospering from the Energy Revolution Programme (PFER).

## Whole Systems Approach

A Whole Systems approach has been developed around the key aspects of Project LEO. A summary of the Whole Systems approach aligned to Project LEO

- **Community:** LEO is developing a skilled community of people at the very local level, with nine different areas identified, each focussed on different parts of the energy transition, for example EVs, Heat, and low-income considerations with careful models of the communities to find out more about behaviours. Oxford was selected as a location for the trial given the local communities' attitudes to innovation and exploring new ideas, for example the first Park and Ride in the UK was trialled in Oxford.

- **Technology:** The technology has to be in place for flexibility to be enabled. This involves monitoring of the power flows on the network and the communications to get the data to the right place to be processed. To enable the markets within the project we are developing two IT systems, one for coordinating the power system and forecasting constraints, and the other for advertising constraints and recruiting flexibility providers to turn up generation or turn down demand. To improve the capabilities of the network, project LEO seeks to diversify the renewable technologies that are used. This has included using roof-top solar photovoltaic (PV) arrays, small hydro stations on the river Thames, behind-the-meter battery capability, vehicle-to-grid infrastructure (V2G) and demand response from large buildings. Another large part of this approach has been GIS mapping, which has been used to create an 'Integrated Land Use Map'.
- **Local Markets:** Another part of Project LEO is to test the new markets and flexibility models. The market is managed through information flows between our distribution networks, flexibility exchanges, aggregators and suppliers. Economic and technical modelling are used to determine the flexibility of the electricity system. We are exploring how to enable assets to take part in these markets, for example we have developed stimulation packages with a guaranteed number of events to recoup enablement costs. The prices are split into availability and utilisation payments and encourage energy consumption and generation at times that help the network. The services are grouped into two different areas DSO services which help the network, and Peer to Peer services which enable more renewable generation to flow through the network. We are testing different market models for the co-ordination of services with the ESO and running workshops to identify conflicts of interest.

Following the progress of the Whole Systems solutions adopted as part of Project LEO, the LEO partnership is now looking to develop a process that can be replicated by other counties looking to adopt a similar Whole Systems approach to decarbonisation

## How the Case Study reflects SSEN's long term vision for Whole Systems

Project LEO is a powerful example of where we have already displayed all elements of our long-term vision for Whole Systems for SSEN. Below we provide an overview of how Project Leo reflects our long-term vision:

- **Engage:** Project LEO has brought the right people and organisations to the table to start a 'Whole Systems' Approach
- **Co-create:** Understanding the language, aims and objectives of each partner has allowed extensive transfer of knowledge in all directions, leading to more robust and embedded solutions to enable flexibility
- **Design:** Using co-creation a trial plan has been developed to satisfy the needs of all partners from market modelling at the Bulk Supply Point (BSP), to technical modelling at the Primary substations, to people engagement at the grid edge and greater understanding of the LV network.
- **Fund:** LEO is the first project to be funded by both Ofgem and BEIS enabling collaboration

- **Deliver:** LEO is set to deliver 18 months of learning output from trailing flexibility, but the project is also delivering intangible benefits through the relationships that have been built and the knowledge that has been transferred already between organisations.

## Key lessons for our RIIO-ED2 and long-term approach

There have been a number of key learnings gained from working with the various stakeholders on Project LEO.

**Community** - Through working together with different organisations that we wouldn't normally, we have improved our communication with various stakeholders. Different organisations bring different perspectives and ways of working, and we have been able to learn from this diversity of thought. Through Project LEO, we have improved our understanding of the importance of leading through people. This is particularly important when aiming to influence different parties and stakeholders. Further details on our approach to stakeholder engagement in Project LEO is outlined in the Communication Strategy. The Project Stakeholder Advisory Board is drawn from Ofgem, BEIS, Citizen's advice, Community Energy England, Grosvenor Homes, Oxfordshire Council and ELEXON.

**Technology** - We have learnt that the systems required are going to have to be much more granular and able to react in close to real time in a more liquid market for flexibility. In addition to this, we use complex forecasting to predict constraints to be able to use low carbon technology, batteries and building management systems. This approach and lessons learned can be carried into ED2 and our long-term Whole Systems vision and broader work as part of our Digital Strategy. Furthermore, Project LEO has allowed a platform for effective data sharing between us and the different partners and through this we have learnt the importance of data being well organised and understood across the system.

**Markets** - Testing new markets through Project LEO has allowed us to test routes to market for some smaller assets that have not previously been tested. Through these rollouts, we are acquiring some key learnings that can be applied to future asset delivery in ED2. Project LEO has also provided us with the IT systems needed to deliver market-based offerings, and test potential market models for the future energy system. Furthermore, through our engagement with new markets on Project LEO, we have learned about contracting and pricing and how different markets are likely to work. Through our workshops on ESO interaction, peak management services and peer to peer we have worked with a wide variety of stakeholders to flush out the issues around conflicts of interest, market rules and potential gaming behaviours.



# CASE STUDY 5: REGIONAL ENERGY SYSTEM OPTIMISATION PLANNING (RESOP)

## Background

The Regional Energy System Optimisation Planning (RESOP) project is an ongoing Network Innovation Allowance funded initiative between SSEN, Scotland Gas Network (SGN) and Dundee City Council focused on developing a tool to support Dundee's net zero ambitions. Dundee has been recognised as one of Europe's leading cities for electric vehicles and the City Council has set an objective to become a net zero city by 2045. This makes Dundee a suitable trial location for RESOP, and there are plans to roll it out more widely to other local authorities.

When fully developed, RESOP will model the impact of local strategies on the energy system to ensure communities' ambitions can be accommodated and economic growth delivered in a sustainable manner. In the long term SSEN will work with local authorities and other stakeholders to identify the impact of their plans on the energy networks and the role of low carbon technologies in managing this impact. The aim is to support delivery of local objectives and to identify the need for network investment or flexibility to optimise the existing network.

To fully decarbonise heat and transport, better information is needed to ensure network operators can act to accommodate new demand. Equally, low carbon technologies have a valuable role in helping to balance the network by providing flexibility at key times. RESOP will allow the best Whole Systems framework to be developed, considering a wide range of assets and infrastructure, to meet the needs of the city whilst delivering best value for communities.

## Proposed Whole Systems solution

The RESOP project is developing a Whole Systems planning tool that can incorporate the low carbon technology objectives and drivers for local authorities and businesses, allowing SSEN and others to assess the impact of those plans on local electricity and gas networks. Whole Systems planning brings together planning and scenario assessment across electricity, gas, transport and heat to understand the impact of transition to net zero on the wider system. The tool will be able to model likely outcomes of future scenarios, thereby supporting better informed local decision making.

The RESOP tool will be instrumental in giving local communities a greater say in their energy future and helping to accelerate the decarbonisation of heat and transport. At the same time, outputs from the tool will provide evidence for the DNO to invest in the network in advance to facilitate these changes.

The RESOP trial project in Dundee is due to be completed towards the end of 2021 and we have proposed to scale up the tool to enable application in other Whole System Projects as part of our Whole system support CVP

## How the Case Study reflects SSEN's long term vision for Whole Systems

The RESOP Case Study demonstrates that SSEN are already delivering elements of our long-term Whole Systems vision, including:

- **Engage:** We are working with local authorities and other stakeholders to identify the impact of their plans on the energy networks and the role of low carbon technologies in managing this impact. The aim is to support delivery of local objectives and to identify the need for network investment and flexibility to optimise the existing network and invest where needed at the appropriate time. We have also engaged and developed the requirements up with Dundee City council, Transport Scotland, SGN and Scottish Government through a series of workshops.
- **Design:** Through the RESOP project we have co-created with Dundee Council and SGN, a tool to support local authorities analyse the future energy needs of their areas
- **Fund:** Funding for SSEN's participation in RESOP has been provided through £343,000 from Ofgem's Network Innovation Allowance (NIA). When SGN formally join the project in 2021 this NIA funding will increase.
- **Deliver:** To support the delivery of RESOP we are trying to use data that councils have to produce as part of the Local Heat and Energy Efficiency Strategies (LHEES). LHEES are becoming mandatory for all councils to complete in 2023, so we are trying to reduce the amount of extra work that the already limited councils have to produce better value. We have also asked as part of a heat strategy about resources and capacity for local authorities to help deliver these.

## Benefits of a Whole Systems approach

By adopting a Whole Systems approach in the RESOP project, we have:

- Identified opportunities for data sharing across local authorities and the energy sector
- Optimised our existing network through flexibility. Understanding our network plans means that we can assess if flexibility or reinforcement is most suitable.
- Applied scenario modelling, which means we can investigate the best value solution for customers.

## Key lessons for our RIIO-ED2 and long-term approach

There are a number of key learnings gained from working with SGN and Dundee council on RESOP which we are applying in ED2 including:

- Recognising the value of partnership working and how a Whole Systems approach is required to deliver a coordinated approach, particularly when developing a shared tool / platform that will need to be used by multiple parties.
- Understanding the needs of local authorities, and how we can best support them going forward. This has helped to inform our Whole Systems CVP to provide additional information and support to local authorities over ED2.
- Appreciating the value that can be had from pilots and trials to test ideas, build a culture and ways of working and developing methodologies that can then be rolled out more widely.
- The limited resource and capacity for councils to have useful output from the LHEES. Energy is still separate from the local authorities, so they perhaps don't understand the impact of heat and transport together.

# CASE STUDY 6: AMENDING OUR INVESTMENT DECISION PROCESS TO INCLUDE WHOLE SYSTEMS CONSIDERATIONS

## Background

We have a standardised investment decision process which we use to assess the necessary reinforcements, replacements and other investments for our network, so it continues to operate safely and reliably in compliance with all regulatory requirements. This process incorporates the requirements for a full quantitative assessment using the Ofgem “standard” CBA methodology for all investments over £2m and consideration of flexibility options that could defer or provide an alternative to an engineering solution.

In preparation for submitting our ED2 business plan we have augmented this process to help us identify circumstances where there may be Whole Systems options and to prompt us to also undertake a wider assessment of the external costs and benefits of such options as potential alternatives to SSEN-only action, whether engineering or flexibility.

The ENA has developed an industry-wide best practice approach, which complies with Ofgem’s requirements, to assess these costs and benefits. We have adopted the ENA’s Whole Systems CBA methodology as the tool SSEN will use for such assessments. The purpose of the Whole Systems CBA is to:

- Evaluate options to help achieve net zero.
- Keep consumer impacts at the heart of decision making, and.
- Help deliver a secure network at optimal value for money to consumers.

A key differentiator between a Whole Systems and other CBAs is that a key requirement for the Whole Systems CBA is that data will be required from external stakeholders so that costs and benefits attributable to them can be adequately captured.

## Adjustment to the process to include Whole Systems considerations

In preparing our ED2 business plan, CBAs are undertaken as part of our broader decision-making process for ED2 investments. In Figure 6 we outline the 5 stage IDP development process for load and non-load related investment decisions, as found in our Engineering Justification Papers (EJPs).



Figure 5 - Our investment decision framework

We have amended stage 3 of the Investment Decision Process (IDP) to include an additional assessment to ensure Whole Systems options are considered for every proposal and to determine whether a Whole Systems CBA would be a useful and proportionate addition to the IDP decision pack. The Whole Systems CBA assessment includes 5 tests, 3 of which are based on the ENA’s 3 tests for a Whole Systems CBA, and 2 additional tests we introduced to reflect Ofgem’s guidance on investment thresholds for a CBA (£2m), and the option to use the flexibility CBA instead of the full Whole Systems CBA. Figure 7 provides an overview of the decision tree framework we have introduced.

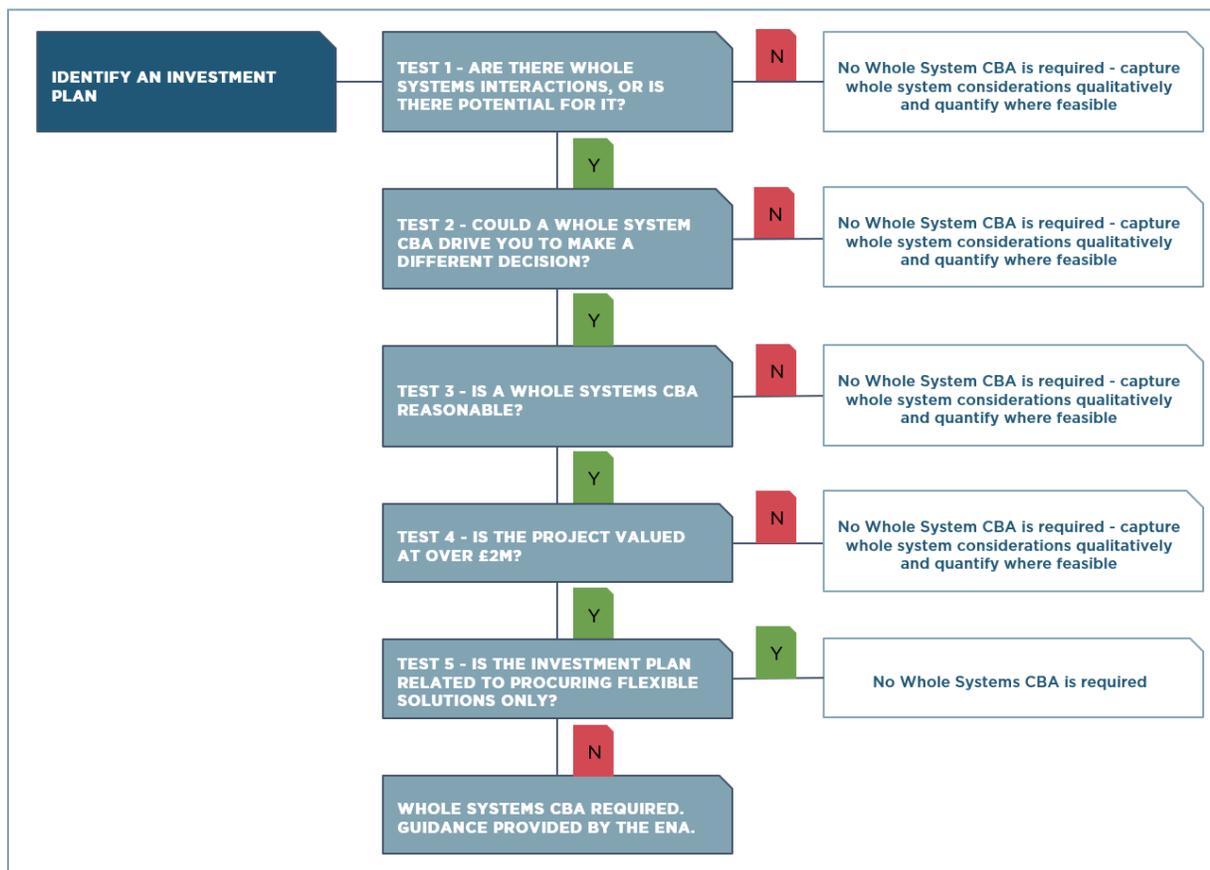


Figure 6 - Whole Systems CBA decision tree

We have introduced an assessment of the five tests noted above in each EJP to determine whether a Whole Systems CBA is required. In Table 7 we provide further detail on the tests we have applied and the guidance we have prepared for our teams to use on an ongoing basis. We have also developed a worked example of a historic investment decision (for the Shetland shared Transmission/Distribution link).

Table 7 - Guidance on application of Whole Systems CBA tests

Test name	Test description
<p><b>Test 1:</b> Are there Whole Systems interactions, or is there potential for it?</p>	<p>A Whole Systems or solution includes interactions with a wide range of stakeholders, including potential co-delivery of a solution. Therefore, a Whole Systems CBA may be required if the proposed investment contains interactions (or if there are potential interactions) with third parties.</p> <p>Examples of Whole Systems interactions within a project may be:</p> <ul style="list-style-type: none"> <li>● working towards meeting a net zero target (e.g. EV Strategic Partnership with Scottish Government and SPEN)</li> <li>● working across or with gas and electricity networks (e.g. Shetland Project, Grid Supply Point (GSP) projects at the interface of transmission and distribution with NG and/or SSEN Transmission),</li> <li>● working with local councils and other stakeholders, including to prepare Local Area Energy Plans, (e.g. Project LEO), or</li> <li>● expanding current services to incorporate hydrogen or decarbonisation (e.g. Heat Electrification Partnership with Scottish Government and SPEN).</li> </ul> <p>If the only realistic options for inclusion in the CBA are within an individual network and have no impact on other parties, a Whole Systems CBA is not required and Ofgem’s standard CBA and/or the Flexibility CBA should be used.</p>
<p><b>Test 2:</b> Could a whole system CBA drive you to make a different decision?</p>	<p>A Whole Systems CBA needs to be carried out with the genuine aim of considering and accepting a range of plausible options. In undertaking a Whole Systems CBA, a number of plausible (e.g. have stakeholder support) Whole Systems solution options should be compared against a “do nothing” scenario.</p> <p>In many cases there may be multiple Whole Systems options to solve a problem, and all Whole Systems options considered in the CBA need to be deliverable and supported by stakeholders. In a situation where there are a variety of potential options with stakeholder support, a Whole Systems CBA would be a valuable tool to support identification of the preferred Whole Systems solution.</p> <p>If completing a full analysis is unlikely to result in a different decision, the Whole Systems options and considerations should be captured on a qualitative basis and if costs are available included.</p>

Test name	Test description
<p><b>Test 3:</b> Is a whole system CBA reasonable?</p>	<p>Performing a CBA is a complex task as it can be difficult to estimate costs and benefits. There are limits on the number of factors that can reasonably be considered within the parameters of a CBA model. Undertaking a Whole Systems CBA needs to be a feasible and practical exercise, where stakeholders are already agreed with the options and the necessary data is made available. In some cases, a Whole Systems CBA may not be possible due to lack of stakeholder buy-in to secure data necessary for the CBA.</p> <p>Under this test the ENA also advises a Whole Systems CBA should be “proportionate”. In line with Ofgem’s guidance this implies it should only be applied for “larger or more complex” projects. Test 4 below introduces a materiality threshold for Whole Systems CBAs in line with Ofgem’s Feb 2021 EJP guidance for CBAs</p> <p>If completing a full analysis does not appear reasonable given the complexities of the CBA model, the Whole Systems options and considerations should be captured on a qualitative basis and if costs are available included.</p>
<p><b>Test 4:</b> Is the project valued at over £2m?</p>	<p>EJPs (including CBAs) are required for high value load related and non-load related investment programs, where the forecast cost of the investment proposal exceeds £2m. This includes discrete projects and programmes of projects with common drivers. Programmes of projects could include activities to address common reliability or obsolescence issues, where an individual intervention is unlikely to meet the criteria or threshold. Therefore, where a Whole Systems project or programme of projects is valued over £2m, a CBA is required as part of the EJP.</p> <p><u>Note:</u> there may be some cases where the Whole Systems solution is valued at less than £2m (and therefore does not require an EJP / CBA), however a Whole Systems CBA may be beneficial to strengthen the evidence base for the solution.</p>
<p><b>Test 5:</b> Is the investment plan related to procuring flexible solutions only?</p>	<p>The ENA has developed methodologies and guidance for both Whole Systems and Flexibility CBAs. In some cases, an initiative may pass all four tests mentioned above but if it relates only to working with stakeholders to procure flexible solutions, only a flexibility CBA should be completed.</p>

In general, very few investments proposed in our ED2 plan meet the requirements for a Whole Systems CBA. We have indicated the Subsea Cables CVP and programme of work are potential candidates for Whole Systems CBA, and work is ongoing with the ENA, Ofgem and other Whole Systems Energy Charter signatories to understand how we can use and apply the Whole Systems CBA on an ongoing basis. Despite this we feel it is important for us to introduce our teams to the Whole Systems CBA tool now as part of augmenting our processes and ways of working, as in the future as the interdependencies between energy vectors increases, such CBAs will become increasingly commonplace.

## CASE STUDY 7: WHOLE SYSTEM SOLUTION FOR SKYE GENERATION CONNECTIONS

In ED1 there have been a number of generation connection acceptances to the 33kV SHEPD Distribution network at Dunvegan 132/33kV GSP on the Isle of Skye. These applications have driven the need for SHE Transmission to offer SHEPD a new 120 MVA transformer along with additional GSP works. This was the best solution at the time of each offer, but this caused an issue with distribution circuit routing conflicting with the proposed 132kV transmission circuit. Given the complexities of the project, the need to reduce costs and time impacts to connecting customers SHE Transmission and SHEPD have developed a Whole System proposal for this region

For this Whole System Approach discussions were initiated with SHEPD early on to determine the feasibility of the project. After positive initial discussions, regular progress update meetings were arranged, and individual actions assigned at each meeting to drive the project forward.

At the regular progress meetings between SHE Transmission and SHEPD the different approaches that could be taken and the cost implications for all parties including the customer were discussed. The original design of a new, second 120MVA transformer at Dunvegan was compared to the potential to have a new GSP with 1 or 2 x 120 MVA transformers at the proposed Edinbane Collector substation, however as one new transformer is sufficient for the currently contracted generation and provides some headroom this option was confirmed, with Edinbane being identified as the optimum site.

### Network Impacts

The main impact on the network will be that SHEPD will have another GSP to operate which is acceptable if the associated benefits and efficiencies for customer connections can be leveraged, this approach also gives an additional demand point which could be utilised in the future.

There were two options considered within the Whole System discussions:

Diagram 1 – the original option was to Install a second 120 MVA transformer at Dunvegan GSP to facilitate the new embedded generation connections.

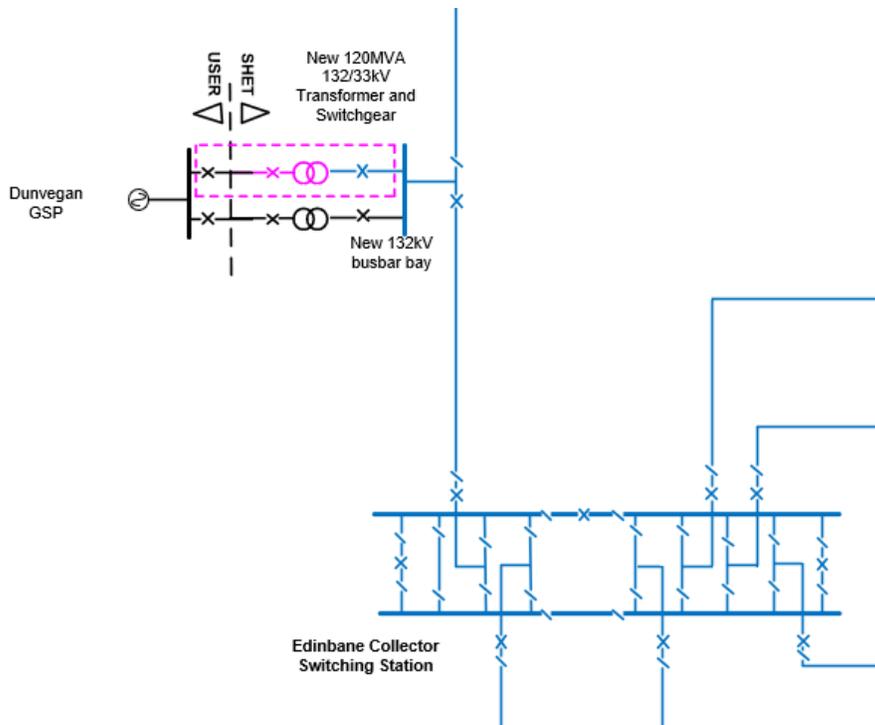
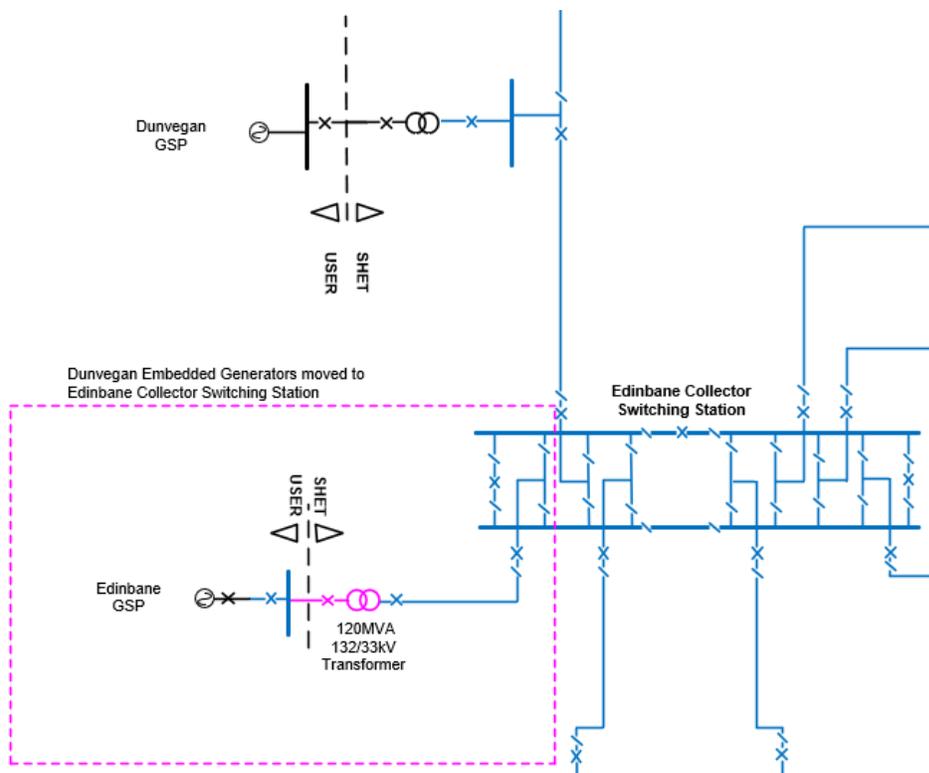


Diagram 2 - Instead install the 120 MVA transformer at the proposed Edinbane collector substation to facilitate the new embedded generation connections.



The relocation of the new transformer from Dunvegan to Edinbane will result in lower customer distribution works and less impact on Dunvegan GSP. For both options the cost to SSEN-Transmission and SHEPD should be comparable as the works for each option should be the same. The biggest difference will be the cost to the customer from the different routing options.

Comparisons of costs are shown in the below table

Table 1 – Cost comparison for Dunvegan-Edinbane

Generator	Capacity (MW)	Dunvegan Route Length (km)	Edinbane Route Length (km)	Number of Circuits	Dunvegan Cost	Edinbane Cost
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	£2,025,000	£1,037,500
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	£1,600,000	£450,000
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	£1,325,000	£1,325,000
				<b>Total Cost</b>	<b>£4,950,000</b>	<b>£2,812,500</b>

**Stakeholder Benefits of Edinbane Option**

**Landowners**

The Edinbane option will minimise the disruption to landowners with cabling and overhead line works reduced significantly, and while some existing agreements will need to be changed to reflect the new cabling arrangements all other impacts in terms of works, costs and inconvenience are reduced.

**Developers**

The Edinbane option provides the preferable option for all developers involved as it will result in much lower costs for their enabling works, as all circuit routes will be much shorter.

**SSEN**

For SHEPD the main impact is that we will gain another GSP at Edinbane which then gives extra options for any future connections. The possibility of a second transformer at an Edinbane GSP has been discussed and any future connections would be able to utilise this as an option.

**SHE Transmission**

The main positive impact to SSEN-Transmission with the Edinbane option is to do achieving consents for the Skye project. With the Dunvegan option, SHEPD would have at least 3 circuits going in one direction which would be in the same corridor as the circuit for the Skye project.

This could raise issues down the line with statutory authorities asking for justifications as to why this is the case and why we didn't consider any other options. The Edinbane option thus has a much higher likelihood of achieving consent and reducing the chance of delays to the customers.

### Summary

By working between both Transmission and Distribution options, engaging stakeholders and exploring their priorities – in this case cost and speed of connection, a Whole System solution was identified that presented a cost-effective alternative for both network operators/owners and our stakeholders. While SSEN has had to issue connection offer variations to three stakeholders as part of this solution, the apparent benefits, increased security of supply and over £2m reduction in cost has meant all connecting customers and landowners have accepted the changes.

## CASE STUDY 8: ENGAGING WITH STAKEHOLDERS TO DEVELOP LOCAL NETWORK PLANS

In November 2020 (during the co-creation Stakeholder Engagement phase) we conducted an exercise to gather stakeholder input and evidence for our ED2 Investment Baseline Scenario, which is based on the Distribution Future Energy Scenarios (DFES). The purpose of this engagement was to seek stakeholder feedback on our approach to developing our Local Network Plans (LNPs) for ED2 to facilitate the transition to net zero. We plan to continue updating and developing our LNPs through ED2 and beyond. By enabling stakeholders to input into the development of LNPs we are able to develop adjusted baseline positions that reflect local circumstances and better inform future investment needs.

We outlined our proposed process for developing LNPs and asked Local Governments, Industry and community stakeholders how they'd like to be involved in the network planning. Stakeholders were asked questions ranging from "Should SSEN, as a network provider, adjust network plans and investment to align with Local Authority Plans?" to "How should local evidence be collected by SSEN to inform investment plans?" to best understand stakeholders' views on feeding into SSENs network planning process.

In Figure 8 we illustrate how SSEN's proposed methodology for Local Network Plans is 'DFES adjusted'

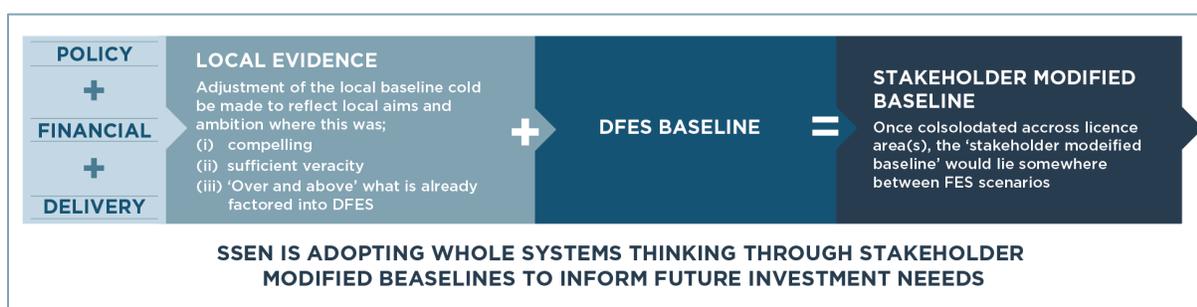


Figure 7 – Approach to developing stakeholder modified DFES baseline scenarios

## Other ED1 Whole Systems initiatives

As we develop our Whole Systems approach for ED2, learnings and feedback from the Whole Systems projects we've been involved with in ED1 have been important in developing our long-term vision and ED2 transition plan. Case Studies 1-5 in this strategy provide detail on key learnings from our ED1 Whole Systems work. Table 8 summarises other Whole Systems projects we have been involved in ED1.

Table 8 - Summary of SSEN's Whole Systems initiatives for ED1 (and selected initiatives continuing into ED2)

Initiative name	Initiative description	External stakeholder involvement	Status
Heat Electrification Partnership	A Scottish Government-led initiative that brings together SSEN and SPEN behind a common goal. The purpose of the initiative is to undertake and coordinate projects that help answer some of the challenges that Scotland faces in decarbonising its heat. This partnership is running concurrently with the Strategic EV Partnership, in recognition of the significant and at times distinct challenge the net zero transition poses for both areas.	Scottish Government SP Energy Networks	Live - continuing into ED2
4D Heat	On this project, we worked alongside stakeholders to analyse an off-gas grid area in Skye. We extrapolated findings to off-gas grid Scotland, to explore the ability of flexible demand from heat to absorb wind power that would otherwise have been curtailed due to transmission constraints. Constraint management is required where the electricity transmission system is unable to transmit power to the location of demand, due to congestion at one or more parts of the transmission network and currently costs around £500m per year. On this project, we identified that up to 540GWh of energy generated by wind could be absorbed by domestic heating across off-gas grid Scotland in 2030, saving £24m per year in wind constraint payments and delivering a further £2m per year in environmental and social benefits. Potential follow on projects include Mass Market Flex and another on smart storage heating.	National Grid ESO SSEN Transmission Delta EE Everoze PassiySystems	Closed

Initiative name	Initiative description	External stakeholder involvement	Status
Green City Vision	<p>The objective of this project was to assess a city (Swindon), combining all the energy demands (excluding any very large industry that will have a bespoke plan) now and in the future and matching that against low or zero carbon sources. The aim will be to design a 2050 optimised energy solution for the city that minimises the cost to the consumer. The design/designs will be costed at a feasibility level to assess solutions for this goal.</p> <p>The outcomes of the project centred on the system implications and pathway barriers to achieve an 80% reduction in carbon emissions within the Swindon area by 2050. The outcomes spanned compliance through the following decarbonisation philosophies; Electrification; Green Gas; Electrification-Green Gas Hybrid; Consumer Led; Business Led; Consumer-Business Hybrid; Multi-Vector.</p>	<p>Wales and West Utilities</p> <p>UK Power Networks</p>	Closed
EV Strategic Partnership	A Scottish Government-led initiative that brings together SSEN and SP Energy Networks which is driving forward coordinated investment in charging infrastructure and the wider network, and the benefits of this approach show it is a concept we should be replicating with other organisations across our areas to ensure timely and appropriate investment lays the foundation for EV adoption.	<p>Scottish Government</p> <p>Transport Scotland</p> <p>Scottish Futures Trust</p> <p>SP Energy Networks</p>	Live - continuing into ED2
London Underground Asset Register (LUAR) / National Underground Asset Register (NUAR)	London Underground Asset Register (LUAR) is a pilot scheme between utilities, transport providers, telecommunications companies and boroughs with a focus on sharing data around underground pipes and cables in London. There are twelve local London authorities who are currently partners of LUAR and 35 different organisations are partnering on the project. There are plans to expand the pilot on a national scale (NUAR).	<p>Twelve local London authorities are currently partners of LUAR. 35 other organisations partnering local authorities including: Affinity Water, BT/Openreach,</p> <p>Cadent, Canal &amp; River Trust,</p>	Live - continuing into ED2

Initiative name	Initiative description	External stakeholder involvement	Status
		<p>community Fibre, Energy Assets Network, Energy Assets Pipelines,</p> <p>Environment Agency, Essex &amp; Suffolk Water, GTC, Historic England, HS2, NG, Network Rail, SES Water, SGN,</p> <p>TfL, Thames Water, Tideway, UKPN, Vattenfall, Virgin Media</p>	
Riding Sunbeams	<p>Riding Sunbeams is a project exploring the opportunity to install Solar PV and potentially storage to locations on Rail Networks where current distribution connection points are located. This would reduce the loading of rail networks on the distribution system and enable carbon reductions to transport networks.</p>	<p>Energy Hubs, Community Energy South, Network Rail, Horizon Energy, Leapfrog, Universities of Birmingham and Bristol, Innovate UK, Ricardo</p>	Live – continuing into ED2
South West Active Networks (SWAN) transmission Active Network Management (ANM) scheme	<p>The SWAN project is an example of a Transmission constraint flexible connections project, where we installed ANM systems for embedded generators to resolve constraints at the Transmission level, collaborating with National Grid ESO on the data and control requirements of the scheme.</p> <p>For the SWAN scheme, we deployed a Distributed Energy Resource Management System to manage N-3 constraints at transmission level, avoiding approximately £500m of reinforcement and enabling over 1.2GW of new energy resources to connect to the Distribution network. The project also installed a new ICCP link between the control rooms of SSEN and NGESO, enabling both SWAN specific data exchanges as well as future proofing against new Whole System requirements, conflict management and operational exchanges in ED2.</p>	National Grid ESO and TO	Live – completing in 2022.

Initiative name	Initiative description	External stakeholder involvement	Status
Resilience as a Service (RaaS)	RaaS is a project supporting low-carbon solutions for maintaining network resilience. The project aims to reduce carbon intensive generation by using stand-by generators to deal with customer electricity faults.	E.ON Costain	Live - Ending in 2022
Solent Achieving Value from Efficiency (SAVE)	SAVE is a £10.3m project aimed at assessing the usage of energy efficiency measures. The project tested the value of energy efficiency at a community levels ability to reduce constraints and defer or avoid network investment. It also tested the cost of and effectiveness of a range of energy efficiency intervention techniques.	University of Southampton (UoS), DNV GL and Neighbourhood Economics (NEL)	Live - continuing into ED2
Aberdeen Hydrogen project (AHP)	This was a circa £2m NIA project delivered in conjunction with SGN, which was part of a much larger EU Horizon 2020 project which saw the deployment of a fleet of ten hydrogen powered buses in Aberdeen. The wider project included involvement from local and regional government, transport operators First Group and Stagecoach as well as the OEMs providing the hydrogen production and re-fuelling installations.	Aberdeen City Council Vanhool BOT SGN	Closed
A9 Electrification	The A9 is the longest road in Scotland at 439km. This project is to make the A9 Scotland's largest EV-ready route by providing EV charge hubs across the entirety of the route. As part of this project SSEN system planners were seconded into Transport Scotland offices.	Transport Scotland	Live - continuing into ED2
E-Tourism project	The E-tourism project is an NIA funded initiative that investigates how EV charging demand from visitors to tourist travel sites in Northern Scotland (such as the Fairy Pools and Urquhart Castle) will increase.	Transport Scotland	Live - continuing into ED2
Locally Contracted		Flexible Power (WPD, Northern Powergrid, and SPEN)	

Initiative name	Initiative description	External stakeholder involvement	Status
renewable Generation			
Flexible Power Initiative	<p>We collaborate together on Flexible Power with four other DNOs to offer a single point of information in respect of our flexibility service requirements. Flexibility providers are able to view flexibility locations, requirement data, procurement notices and documentation published by all four DNOs on the joint website. Once contracted, providers are given access to the joint Flexible Power Portal where they can declare their assets availability, receive dispatch signals and view performance and settlement reports. Flexibility Providers that contract through Flexible Power have the benefit of:</p> <ul style="list-style-type: none"> <li>▪ Generating new income from their power assets</li> <li>▪ Efficient participation through Flexible Powers electronic dispatch portal</li> <li>▪ Supporting their local energy network</li> <li>▪ Saving power and contributing to a low carbon future.</li> </ul>	<p>Western Power Distribution</p> <p>Northern Powergrid</p> <p>SP Energy Networks</p> <p>Electricity North West</p>	Live - continuing into ED2
OZEV Engagement	<p>worked with OZEV and DfT to secure data sharing agreements for DNOs to get locational data on registered keepers of EVs and locations of customers who took advantage of the EVHS and WCS grant schemes for EV chargers, which helped inform the analytics used to target various investment initiatives. Also, we worked with OZEV to inform the creation of the Automated and Electric Vehicles (AEV) Act 2018 which was the legislation mandating the smart requirements in UK for all EV chargers sold, helping to ensure grid stability for DNOs moving forwards. We have continued to support updates to the AEV Act through meetings, responses to consultations and by supporting the EV and Energy Taskforce (EVET) and Energy Data Taskforce, largely through evidence from our customer engagement and innovation projects.</p>	Department for Transport, OZEV, UK DNOs	Live – continuing into ED2

Initiative name	Initiative description	External stakeholder involvement	Status
Power Networks Demonstration Centre (PNDC)	<p>Established in 2013, the PNDC is a platform to accelerate the deployment and integration of energy networks and technologies through our advanced capabilities in system integration and collaborative industrial research. Government, industrial and academic partners founded the PNDC to connect key stakeholders through every stage of the deployment process and enable innovation through collaboration. The PNDC performs accelerated technology testing in a controlled, real-world environment alongside a portfolio of research programs across all aspects of the energy system. There are three primary research focus areas:</p> <ul style="list-style-type: none"> <li>▪ Digital substation</li> <li>▪ Control room of the future</li> <li>▪ Integrated energy systems.</li> </ul>	<p>SP Energy Networks            UK Power Networks            Belcan            Trilliant            Fundamentals            Arqiva            Bellrock technology            Powerline technologies            Siccar            Virtual Access</p>	<p>Live - standalone organisation that SSEN is a member of</p>
ENA initiatives	<p>We are part of a range of initiatives with the ENA including:</p> <ul style="list-style-type: none"> <li>▪ Open Networks Project: bringing together the nine electricity grid operators in the UK (and Ireland) to “work together to standardise customer experiences and align processes to make connecting to the networks as easy as possible and bring record amounts of renewable distributed energy resources, like wind and solar panels, to the local electricity grid”<sup>11</sup>.</li> <li>▪ Data and Digitalisation Steering Group: made up from representatives of all ENA members with the focus to coordinate and collaborate data and digitalisation initiatives. This is supported by Ofgem, BEIS and Innovate UK who have regular update agenda item in the meetings. Currently it has four subgroups focusing on coordination of activity, the development of the national energy map, development of a standard data triage process and focus external engagement.</li> </ul>	<p>Cadent, Electricity North West, ESB networks, GTC, NG, NG ESO, NGN, Northern Ireland Electricity Networks Limited, Northern Powergrid, SGN, SPEN, UKPN, WWU, WPD</p>	<p>Live - ongoing initiatives SSEN is part of.</p>

<sup>11</sup> <https://www.energynetworks.org/creating-tomorrows-networks/open-networks>

Initiative name	Initiative description	External stakeholder involvement	Status
	<ul style="list-style-type: none"><li data-bbox="422 305 1396 553">▪ Green Recovery Investment project: The Green Recovery Programme is a joint initiative of all UK DNO's, working with ENA and Ofgem to identify projects which can be delivered in the next 2-3 years that support the adoption of low carbon technology and provide an economic stimulus following the Covid pandemic. The programme was initiated with a Call for Evidence from stakeholder which resulted in the submission of 160 questionnaires detailing over 350 schemes within the two SSEN Regions. Overall SSEN have £41m of projects which create 122MW of capacity onto the network to support the delivery of LCT projects.</li></ul>		



# APPENDIX C: ENHANCED ENGAGEMENT

- Overview: A Whole Systems approach and thinking refers to, "Coordination or cooperation between energy sectors and other vectors with the aim of an overall enhancement in quantifiable consumer benefits and/or societal outcome".
- Total cost: £2.4m in baseline plan
- Contribution to annual customer bills: SEPD £0.06 and SHEPD £0.09

## RIIO-1 context

During ED1 we adopted Whole Systems thinking in a wide range of discrete areas the business. For example, we developed a Whole Systems approach to make investment decisions to meet Shetland’s future energy needs, resulting in an integrated solution at a lower cost for customers.

During ED2 we will focus on implementing a formal Whole Systems approach in all areas of the business and on making changes to our processes to help us achieve our long-term vision for Whole Systems. As part of this, we are applying Whole Systems principles and processes including identifying, valuing and comparing all viable options to meet energy needs at the lowest cost to customers.

## ENGAGEMENT SYNTHESIS

### Stakeholder engagement

#### Engagement details

#### Community Energy Schemes, Charities, Local Authorities

We engaged expert stakeholders to co-create our flexibility, whole systems and energy efficiency CVPs via a round table

#### Insights derived

- In terms of support, stakeholders would like to see from us:
  - One local authority stakeholder felt there is often a lot of data missing at individual substation level. They said that as smart metering is present in all our buildings, in recognition of 'this shared whole systems enterprise', we need to look at how it can get its own house in order to provide us greater visibility of the network. Therefore, sharing data at a local level would be great, but we can go further e.g. by developing a general data management infrastructure/superstructure for sharing information or looking into our stakeholder management process. [E175]
  - Another local authority stakeholder asked what opportunity is there to connect and share information through energy suppliers. They felt as a customer, they rarely have any engagement with a DNO and the only time that it really happens is with emergencies like floods, where there has been damage to lines coming to properties. They felt it is time to be more collaborative to reach communities and find more joined-up solutions to reach communities to drive towards net zero. [E175]

- A local authority stakeholder noted that given the limitation of available funding, we should build a bank of resources for local authorities and customers to use to inform a whole system approach rather than engagement. They added that coupling this with continued work to simplify new ways of working to feed back into business as usual would make us far more effective and an enabler than project-by-project engagement, thus better empowering our customers. [E175]
- When asked how we should prioritise engagement increase one local authority stakeholder felt there is the potential need for a lot more engagement with local authorities and for developing more formal partnership working as we all serve the same customers, and we all have a role to play in achieving net zero. They added we should recognise that an approach that works in West Sussex will not necessarily work in the Highlands and therefore treat these partnerships as meaningful. [E175]
- One Local authority stakeholder said they support local authorities proposing areas of review, but felt we need to think about how the engagement will work in a complicated local-authority landscape, as there are lots of different models and lots of different local authorities that might engage. We should consider who would be taking on responsibilities/funding. In addition, some programmes may be in place in some areas, where, in others, they need to be created from scratch; easy and efficient engagement with local authorities would be a great step to achieving this. [E175]
- When asked whether they felt the CVP goes above our normal obligations one local authority stakeholder felt there is no way that can be achieved as business as usual due to its complexity. In addition, they felt it is part of a bigger next step which involves thinking about how we keep the key benefits and simplify them so that they can be rolled out into business as usual. They felt that there are ways that are starting to crystallise to allow this to happen. [E175]
- When asking stakeholders whether they thought the service should be reactive or proactive, one local authority stakeholder felt it would be helpful to have different choices on what action to take when engaging with the DNO in an organic way, rather than a 'bolt-on' consultation. They added, most of all, simple and targeted engagement with local authorities is needed to ensure that they receive the right kind of support". [E175]
- When asked if they would support the Whole System Support CVP, one local authority stakeholder felt it would be difficult for benefit to reach the community as a whole using a special-purpose vehicle with a zone that delivers a flexibility benefit. Instead, they suggested creating an entity that could recoup the benefits if the flexibility was evident within the zone as a whole and reinvest that through shares or another channel. They felt this would take the decision making and complexity out of our hands and would instead reside with a separate vehicle that could be community-owned and used as a distribution mechanism. [E175]

## Non-consumer stakeholders

We tested our Whole Systems strategy, outputs and costs with a broad range of non-consumer stakeholders to understand their views on the acceptability and bill impacts of our Draft Business Plan via an online consultation event and surveys

- Broadly speaking, stakeholders were positive about the package of outputs around whole systems, particularly around active network solutions and flexibility. [E151]
- A national government representative thought that the Shetlands is a good example of whole systems and the outcome for the Shetlands was unique, perhaps driven by need rather than being whole systems from the outset. They thought it would be helpful to understand how that's been incorporated into what we are doing and what is meant by whole systems as part of that strategy. [E155]
- One emergency response stakeholder felt the whole systems concept is good, but it doesn't obviously link back to resilience. They felt this is a key area and links to the Government priority of whole-of-society resilience in the Integrated Review and National Resilience Strategy Call for Evidence. [E155]
- One local authority stakeholder welcomed the inclusion of enhanced support to deliver net zero initiatives, which will help drive these schemes, however, they commented that was marked as 'in development' and that there doesn't seem to be a timescale for the start of this work. They also felt the inclusion of only 72 local authorities runs the risk of smaller Councils being overlooked. [E155]
- One local authority stakeholder welcomed the specific objectives to work with local authorities and to provide support concerning net zero objectives. [E155]
- A storage and renewables representative welcomed our commitment to collaboration with customers and stakeholders to build a 'sustainable and inclusive' network for the future, especially the whole system approach, collaborating with industry bodies within the energy sector. [E167]
- One storage and renewables stakeholder felt that considering the way we use our network, to take broadband out to some of the islands, it's a really great idea. [E151]
- Community interest groups thought that engaging with local groups was good and very important to work together to progress LCT installations. It was noted that we would need the input of various stakeholders both from generation and resident to create a better local energy system. Proactive engagement is necessary, not just speaking with the local authority once a year. This was seen as a part they strongly supported from the plan. [E151]
- One local authority stakeholder suggested thinking outside the grid and that microgrids teaming up with community generation might be another option rather than reinforcing the existing grid. [E151]
- One storage and renewables stakeholder felt looking at communications and the data from the LV network in particular should be a priority as this will improve network analysis and understanding of where the network is working hardest. [E151]
- Community energy groups wanted to see clearer commitments and investment into community energy projects, stating that while greater engagement with local authorities was positive to see in the plan, they shouldn't be the sole focus in a whole systems approach. [E151]
- One Community energy groups stakeholder said: "whole systems is a huge, amorphous thing. By definition, it's everything, so how much of the investment will end up with community energy? We are seeing some of the other DNOs giving large sums to community energy. I

notice there are a lot of commitment around engaging with local authorities, which I think is great, but local authorities aren't the only citizen-focused element in a whole systems approach". [E151]

- Contrasting this, delegates from storage and renewables segment stated that a focus on community energy groups must not preclude support for small- to medium-sized installers, as it was felt that these businesses were the ones that experience the bulk of the communication problems and delays. [E151]
- One contractor felt unsure if our plan was value for money. "There's talk about increasing funding for the communication and interaction with councillor groups and community groups, but the renewable energy community in the UK is primarily made up of small- to medium-sized installers, and we're the ones that have the bulk of the communication problems and delays. Is that deliberately excluded or is that dealt with somewhere else in the proposals? You're not going to get to your targets just by talking to community groups." [E151]
- One local authority stakeholder welcomed the commitment to meet with local authorities annually, to discuss energy planning. They added more frequent contact would be better, such as 6- monthly to ensure we continue to understand future requirements. [E155]
- A storage and renewables stakeholder felt there was a lot of engagement with Local Authorities but suggested additional weight and focus should be placed on engaging with generators. [E155]
- One emergency response stakeholder felt the CVP for local authorities and communities is a starting point but doesn't go far enough and partly could be focussed on Local Resilience Forum which brings together all resilience partners. [E155]

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### Consumer Groups

Citizens Advice provided their views on all DNOs draft Business plans via a published report

- CA felt this it was not clear why the DNO is the most appropriate body to deliver this CVP. [E176]

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### Domestic customers, customers in vulnerable situations, future bill payers

We gathered consumers' views on our Draft Whole Systems strategy outputs and costs via a survey

- 52% of customers considered 'Enabling communities to access and benefit from fibres where they are installed in our assets', to be a medium priority, with 31% classifying it as a high priority. In the south, 45% said it was a medium, and 25% a high priority. [E170]

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### National Government

We engaged MPs and MSPs about our Draft Business Plan outputs via bilaterals

- MP for North East Scotland was interested in the whole systems support for local authorities CVP citing "zero policy-making capacity" within local authorities who are stripped to the bone and that anything we can do in this area is positive. [E166]
- MP for Maidenhead was strongly supportive of our whole systems approach and keen to provide a link between ourselves and their local councillors to push forward with this. [E166]

- MP for Dundee West said unlocking the renewable potential of the Scottish Islands was essential to meet net zero, supportive of whole system solutions. [E166]
- MSP for Orkney Islands was highly interested in the broadband CVP following s discussion on the R100 rollout in Orkney. [E166]
- MSP for Highlands and Islands was very supportive and keen to explore opportunities in gaining access to core fibres on our subsea cables to enhance broadband cables across her constituency (related to Broadband CVP). [E166]
- MP for Witney & West Oxfordshire supports our focus on energy efficiency and felt more should be done in this area. [E166]

**Local authorities,  
Transmission, DNOs,  
Community Interest  
bodies, Academic  
institutions, Consultants,  
Other supply chain**

We engaged with stakeholders via a workshop to co-create our Whole Systems strategy including a long-term vision and transition plan, and to gain feedback on data sharing that would enable a whole systems approach

- 92% of stakeholders agreed with our interpretation of Whole Systems. 91% agreed that our vision for whole systems reflected their views on how everyone should work together and 89% agreed that we are taking the right actions to support Whole Systems [E104].
- ‘Open data’ and ‘collaboration’ are seen as the most important enablers to whole systems success. Working with local authorities to best site renewable generation and understanding where upgrades are required was a further stakeholder view [E104].
- Stakeholder provided the following insights when asked about challenges when working with us:
  - Lack of ability to access end customer data and lack of widespread fine-grained network monitoring data
  - Insufficient visibility of system state at LV level – developers often do not know where new connections will create issues
  - We have historically been narrowly-focused and internal – and should drive greater collaboration, especially in rural areas
  - Stakeholders felt that the contacts are unclear for testing new ideas and projects with DNOs, who tend to be focused on new generation assets within the wider LV system and don’t look at redesigning alternatives
  - Too many parts to SSEN which results in no single point of contact
  - We tend to focus on point connections to a network rather than on an area-wide scale [E104].
- Stakeholder called for a common approach that isn’t too onerous, undertaking evaluation across multiple networks, infrastructure or energy vector to achieve the right solutions
- When asked which datasets and services are useful to facilitate whole system collaboration, stakeholders most commonly chose ‘network data’ and ‘interactive network impact assessment’ [E104]
- When asked to rank how we should prioritise our proposed collaboration activities, stakeholders placed ‘infrastructure planning’ highest, followed by ‘regional development’, ‘flexibility’, and ‘EV and LCT growth’ [E104]
- When asked about the benefits to having a collaboration system/open data, stakeholders identified: [E104]
  - Community empowerment
  - More efficient processes
  - Visualisation

- Unanticipated innovation
- Simpler access to data
- Real-time
- 'No one person is smarter than everyone'.
- The three initiatives which stakeholders felt provided the greatest value to for local authorities and communities were 'DNO representation in local whole system initiatives', 'regional network constraint/curtailment studies', and 'dedicated regional whole system liaison officers' [E104]
- In order to co-ordinate whole system collaboration, 60% stakeholders thought we should prioritise 'graphical/geospatial systems'. [E104]
- Stakeholders listed some of the benefits of our providing a whole systems service: [E104]
  - Use RACI more where initiatives can be informed and provide guidance
  - Enable local communities and local authorities to plan activity driving towards net zero
  - Speaking with one voice and getting solutions quickly across the industry
  - Visibility of all the initiatives so stakeholders can leverage each initiative's efforts and avoid reinventing the wheel
  - Critical resource for 'route to net zero' options modelling to support transition at least cost [E104].
- When asked if there were any other services which we should provide at scale to support stakeholders with whole systems, stakeholders provided the following suggestions: [E104]
  - Access to low level network monitoring data to underpin future demand modelling
  - Bring energy vectors and infrastructure together to do whole systems on a large scale in the future
  - System models.
- When asked what factors might affect whether or not, and how much stakeholders would use a whole systems service, stakeholders said: [E104]
  - Appropriate granularity
  - No wheels being reinvented
  - Need for more players at the table for success – we can lead but other need to follow for enough to allow true whole systems
  - Information needs to be hyperlocal
  - Cost of service over increased value of data
  - Put local priority into whole system context
  - Accurate and up to date
  - Whether payment is required to use the service
  - Stakeholders wanted to feel listened to and for there to be open communication about priorities so stakeholders can understand why they aren't being actioned
  - Ease of use and quick results for enquiries
  - Simple, quick and need to deliver benefits
  - User friendly interface

- Ability to openly publish results for others to learn and use
- Maximise value of public investment.
- When asked if having to pay to use our services would influence uptake, stakeholders responded with the following: [\[E104\]](#)
  - Would restrict unexpected innovation where free data and knowledge leads to more innovation
  - Would depend on how much it would cost
  - It might inhibit an open enquiry
  - As long as there was transparency and an element of ‘shared pain for shared gain’, then likely no impact.

### Scottish Hydro Electric Transmission (SHET) Whole Systems team

We engaged to review SHET’s Whole Systems approach and to discuss progress made on Whole Systems since their business plan was submitted and Ofgem had issued its Final Determination, to help to inform the ED2 Whole Systems approach.

(Record of this event is not available therefore feedback cannot be verified)

- SHET Whole Systems team helped to inform the development of a SSEN Whole Systems unit
- Distribution and Transmission businesses have collaborated on Whole Systems (e.g. Shetland) to ensure strategies are aligned
- Insight shared on how SHET team are augmenting processes to include Whole Systems considerations
- SHET Whole Systems lead to attend future stakeholder workshops.

### National Grid

We engaged with National Grid’s Whole Systems Manager to review their long-term approach and whole systems plans.

(Record of this event is not available therefore feedback cannot be verified)

- Relationship built with Whole Systems Manager at National Grid
- Understanding of National Grid’s long-term Whole Systems vision, useful in informing our long-term vision; plans are very high level and further development is required to understand how they plan to achieve their long-term vision
- National Grid contact invited to Whole Systems Workshop
- Whole Systems Manager keen to work with us going forward.

### Local authorities

We held a bilateral following on from the Powering Scottish Islands to further discuss maintaining security of supply to remote islands

We also held targeted workshop with Local Authorities and Community Groups to validate

- Local Network Plans, as influenced by stakeholders, have fed into our investment baseline scenario [\[E086\]](#).
- Stakeholder advised they were waiting for section 37 consent to begin repairs to cables and are now lobbying their needs case at a ministerial level. This consent is likely to be for like for like replacement of cables rather than upgraded cables, which stakeholders voiced was a short-sighted view, and replacement should be on a T or D connection and a at a whole systems level approach [\[E086\]](#).
- It was suggested that there would be value in focusing on stakeholder engagement during the 'identify strategic options' stage as it would

<p>and gather additional feedback on our Asset Management Strategy focused on maintaining security of supply to remote islands</p>	<p>help us spend consumers' money more efficiently and create opportunities that feed into whole system solutions <a href="#">[E095]</a></p>
<p><b>Developer/connections representatives</b></p> <p>During annual stakeholder workshops we discussed ED2 topics from our Scottish Licence Area.</p>	<ul style="list-style-type: none"> <li>One developer/connections representative in Scotland highlighted the changes in spatial distribution of people as a result of COVID, particularly away from cities. We should therefore look to focus investments on providing resilience through local energy networks. <a href="#">[E072]</a></li> </ul>

## Engagement statistics



## Stakeholder segments engaged

<b>CONSUMERS</b>	Domestic customers	Customers in vulnerable situations	Transient customers	Next generation bill payers	SMEs	Major energy users		
<b>CUSTOMERS</b>	Distributed generation customers	Builders and developers	Community energy schemes	Landowners/ farmers				
<b>POLICY MAKERS AND INFLUENCERS</b>	Government	Research bodies, policy forums and think tanks	Media	Consumer groups	Regulators			
<b>COMMUNITIES AND LOCAL DECISION MAKERS</b>	Local authorities	Charities	Academic institutions	Housing associations				
	Vulnerable customer representatives	LEPs	Emergency response	Healthcare	Community interest bodies			
<b>WIDER INDUSTRY AND VALUE CHAIN</b>	DNOs	Transmission	GDNs	Water	Telecoms	IDNOs		
	ICPs	Consultants	Energy suppliers	EV charging	Other supply chain	Storage and renewable providers/ installers	Transport and highways agencies	
<b>PARTNERS AND ENABLERS</b>	Current and future employees	Contractors	Service partners	Shareholders	Investors	Business advisers	Trade unions	

## EVIDENCE ASSESSMENT

### Engagement scoring key

Feedback weighting accounting for the robustness of the engagement event and relevance of feedback

Score	Description
1-1.66	Limited evidence of good event planning, methodology or data collection. Feedback provided is high level with tangential relevance to the topic.
1.67-2.33	Good evidence of engagement planning and discussion of data collection methods, but limited depth of feedback and range of opinions. Feedback not necessarily fully aligned to the topic and only provides a limited insight and thus moderately useful.
2.34-3	Well conducted, trustworthy event with highly relevant feedback. Specific, clear and relevant information with clear link to the topic discussed and high value added.

Phase	Date	Event ID	Event name	Key stakeholder groups	Number of stakeholders engaged	Engagement score
Phase 4: Testing and Acceptability	Oct-21	E153	Employee Consultation Document Engagement on Draft Plan	Current and future employees	3	1.8
	Oct-21	E155	Stakeholder Consultation Document Engagement on Draft Plan	Community interest groups, storage and renewables suppliers, emergency response, healthcare and highways agencies	19	2.8
	Sep-21	E151	Consolidated Outputs and Costings Event	Contractors, Consultants, Local Authorities, National Government, Storage and Renewables suppliers, Supply Chain	106	3.0
	Sep-21	E170	Microsite survey on Costed outputs	Domestic Customers, Vulnerable Customers and Future Customers	1,298	2.2
	Sep-21	E175	Flexibility CVP Expert Event	Community Energy Schemes, Charities, Local Authorities,	31	3.0

Phase 2: Co-creation	Sep-21	E176	Citizens Advice report on DNO Draft ED2 Business Plans	Consumer groups	1	2.5
	Aug-21	E166	Corporate Affairs General Bilateral	Government, Storage and renewables providers	25	2.5
	Jul-21	E167	Sustainability Strategy consultation	Vulnerable customer representative, A storage and renewables representative and Community Interest Group	4	2.0
	Mar-21	E086	Powering Scotland's Isles Bilaterals	Local authorities	7	1.5
	Mar-21	E104	Whole Systems Workshop	Other supply chain, transmission, energy suppliers, current and future employees	24	2.5
	Feb-21	E095	Remote Island Communities workshop - Orkney	Local authorities, distributed generation customers, community energy schemes	18	2.0
	Jan-21	E020	Connections ICE Engagement - BAU & ED2 Survey	Distributed generation customers, builders and developers, local authorities, ICPs and IDNOs	16	1.3
	Oct-20	E035	Connections ICE Engagement - BAU CCSP - Housing Developers	Builders and developers	8	1.5
	Sep-20	E071	Annual Stakeholder Workshops - South	Local authorities, housing associations, water, vulnerable customer representatives	109	2.0
Sep-20	E072	Annual Stakeholder Workshops - North	Local authorities, vulnerable customer representatives, housing associations	84	2.0	
Sep-20	E081	Citizens Advice Scotland report: Consumer Insights on the Future of the Gas and Electricity Distribution Networks in Scotland	Domestic customers, customers in vulnerable situations, SMEs	1,507	2.0	
Phase 1: Open Discovery	Mar-20	E016	SSEN Distribution ED2 Online Workshop - Central Southern England	Wider industry & value chain, Consultants, ICPs, IDNOs	49	2.0
BAU Insight	Dec-18	E018	DSO Consultation - Supporting a smarter electricity system	Charities, Local government	5	2.3
	n/a	-	Scottish Hydro Electric Transmission (SHET) systems team	Transmission	n/a	n/a *
	n/a	-	National Grid's Whole Systems Manager	System Operator	n/a	n/a *

\*Record of this event is not available therefore feedback cannot be scored.

## MEASUREMENT OF SUCCESS

The table below sets out the benefits that the Whole Systems output will deliver:

Output	Northern Target	Southern Target	Comparison to RIIO-1	Cost in baseline plan	Consumer benefits
Track key stakeholder feedback annually through a qualitative and quantitative survey	Survey conducted and outputs reported annually	Survey conducted and outputs reported annually	New for ED2	Incremental	Effective Whole Systems solutions delivered aligned with stakeholder needs
Support Local Authorities' energy and heat strategy development through provision of relevant data sets and annual engagement on our DFES scenarios	All LAs contacted annually to inform LAEP and LHEES strategies, log of data provision/ access reported annually	All LAs contacted annually to inform LAEP and LHEES strategies, log of data provision/ access reported annually	New for ED2	£2.4m	Local authorities are aware of our services and how we can support them in their decarbonisation plans
Provide enhanced support to 72 Local Authorities and up to 200 community groups using people within our business and apply our capabilities to assist communities develop and deliver viable effective whole system and net zero initiatives that have an interaction with our network.	Stakeholder-informed metrics will be agreed and implemented, annual report on outputs and metric performance	Stakeholder-informed metrics will be agreed and implemented, annual report on outputs and metric performance	New for ED2	£12.3m (CVP)	Net customer benefits of £11.2m by helping to lower long-term costs for customers and local net zero and whole system initiatives through more efficient siting and use of infrastructure
Go beyond our traditional activities as a DNO, enabling communities to access and benefit from fibre where we they are installed in our assets.	Annual report on implementation	Annual report on implementation	New for ED2	£8.0m (CVP)	Our proposal will deliver net customer benefits of £27m by enabling a range of benefits across island communities including sustainable economic development, education, healthcare and addressing depopulation through access to good quality digital infrastructure