SSEN DISTRIBUTION RIIO-ED2

COST EFFICIENCY PAPER

RIIO-ED2 Business Plan Annex 15.1

Scottish & Southern Electricity Networks

CONTENTS

EXECUTIVE SUMMARY

Our ambition is to deliver the change and investment in power networks that our customers require to benefit from a reliable net zero energy future. We believe expenditure of £3,994m is required to achieve those outcomes. Our commitment is to deliver this network growth efficiently and our plan sets out the measures we have already identified to reduce costs to customers by £410m.

TOTEX by plan section and Ofgem categories	Valued Service	Safe & Resilient	Accelerated progress to net zero	Our RIIO ED2 Plan
Load Related	0	0	510	510
Non-Load Capex	0	1,096	211	1,308
Non-Op Capex	0	42	42	83
IT/OT	199	0	53	252
Network Op Costs	0	735	0	735
Capitalised Overheads	160	339	206	705
Innovation	0	0	18	18
Subtotal	**359**	**2,212**	**1,039**	**3,611**
			+ General running costs	525
			- less ongoing efficiency	-141
			RIIO-ED2 Totex	**3,994**

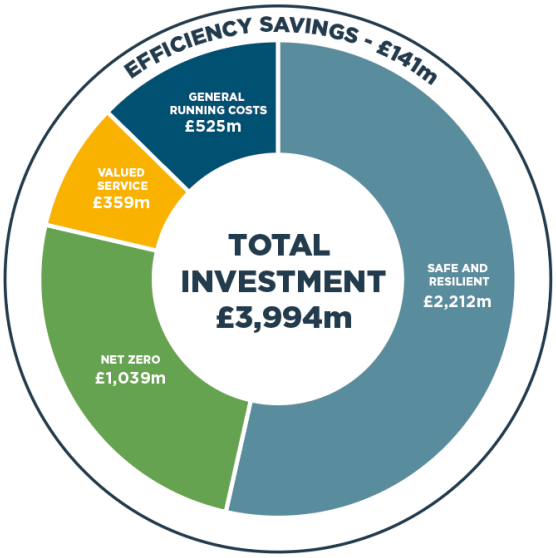


Figure 1: Breakdown of our RIIO-ED2 investment plans (£m, 20/21 price base)

Risk to consumers around our future workload is managed using both ex-ante and ex-post regulatory mechanisms. In this annex, we focus on the required ex-ante allowances that provide a baseline for the necessary activities we need to undertake during the RIIO-ED2 period. Where there is significant and material uncertainty in future workloads, we have proposed that these activities are addressed using ex-post mechanisms – in Chapter 17 we discuss where we plan to adopt such uncertainty mechanisms.

In **Chapter 2** of our Plan we clearly explain how costs in key RIIO-ED2 categories compare to RIIO-ED1 on a comparable price control period basis using both the five and eight-year RIIO-ED1 average expenditure. When comparing individual areas of cost, we use the last five years of RIIO-ED1 as these are more reflective of the cost drivers we will experience during RIIO-ED2.

Delivering the step change in net zero outcomes in RIIO-ED2 necessitates increased investment of £961m. In the same five-year period, using Ofgem's financial parameters, average bills would fall by £3.30 and £9.70 for SEPD and SHEPD respectively. Using our justified financial parameters, average bills will be broadly flat. Our ***Finance and Financeability Chapter, (Chapter 19)***, highlights our concerns with Ofgem's own parameters and the robust evidence underlying our proposed approach. The combination of factors within our control – increased efficiency and innovation – coupled with Ofgem's underlying financial framework assumptions (e.g., asset lives and cost of capital) leads to this reduction in the average domestic bill in RIIO-ED2 compared to RIIO-ED1.

In this annex we set out the evidence for the efficiency of our baseline investment proposals. We detail below: the efficiency of our current costs; the steps we to close the gap (in full or in part); an overview of our RIIO-ED2 efficiency plan; our ambitious forward-looking cost efficiency assumptions; and the high confidence we have in our proposals.

Efficiency of our current costs

We have benchmarked our current performance across all GB networks using the first six years of RIIO-ED1. Industry experts, Oxera, ***(Annex 15.4 & 15.7)*** assessed the relative efficiency of our cost base against the other DNOs using actual costs to 2021. They relied on industry standard cost drivers and replicated the cost assessment approach adopted for the RIIO-ED1 price control. This includes both top down and disaggregated bottom-up analysis of Totex.

Oxera examined the suitability of recent proposed changes to the regulatory cost assessment models. It suggested limited justified revisions which more closely reflect real life operational and network characteristics. For example, it challenged whether affording increased weighting to customer numbers within assessment models (24%) can be justified given by the proportion of network activity and costs directly attributable to customer populations (8% for our DNOs). Placing such a weight on customer numbers could lead to allowances becoming unreflective of actual costs. Other recommendations can be found in the Oxera report which has been published with our Plan.

Oxera combine the results from the Totex (top down) and disaggregated cost (bottom up) modelling, an approach which has been common to all recent price control cost assessment processes. The results of their combined benchmarking are summarised in the following figure.

Summary results of Oxera RIIO ED1 five-year cost efficiency modelling

		TOTEX model	Disaggregated model	Results
Efficiency score	SHEPD	86.2	91.8	**88.6**
	SEPD	93.2	98.4	**95.4**
Upper quartile (UQ)		92.4	93.5	**93.5**
Gap to UQ	SHEPD	**-6.7**	**-1.8**	**-5.2**
	SEPD	**0.9**	**5.2**	**2.0**

This assessment ranks SHEPD and SEPD as first and sixth respectively of the 14 DNOs, with relative efficiency gaps to the industry upper quartile level of -5.2% and 2.0% respectively. In these results the top (most efficient) 25% of DNOs, when ranked by efficiency score, will lie below the upper quartile level and the remaining networks above. Upper quartile has been the threshold for setting previous energy price controls.

Oxera conclude that based on these results, SHEPD is an efficient company and is above upper quartile, while SEPD has an estimated inefficiency gap of 2.0%, or approximately £7m p.a. in totex terms.

Our RIIO-ED2 efficiency plan

RIIO-ED2 provides us with a wide range of different challenges as we seek to meet our customer needs and deliver what our stakeholders require. We must be able to balance net zero carbon targets, increased requirements for network flexibility and capacity, rapid development of our DSO capabilities in a digital world while all the time maintaining the reliability of our networks for all our customers.

We are already planning for this rapidly changing future and how we deliver on our commitments while managing costs, and bills, down. Our approach to managing our workforce, assets, supply chain, as well as utilising innovation, digitalisation and competition provide the foundation to delivering efficiency.

Our workforce strategy

Our people are at the centre of everything we do. The step change required in the electrification of heat and transport facing industry and society in RIIO-ED2 will challenge our business and our workforce as never before. In RIIO-ED2 we will be proposing a workforce increase of 20% to support our business plan.

Our workforce will be delivering more work on average each year compared to RIIO-ED1. They will be supporting an increase in capital delivery (Load/Non-Load and High Values Programmes), in both SHEPD and SEPD compared to the last 5 years spend in RIIO-ED1, of 65% and 79% respectively in the same time periods. Our people play a key role in working with our customers and the communities we serve to deliver our net zero ambitions efficiently.

Our Workforce Resilience strategy outlines how we will keep our people safe and well, highly skilled and productive in order to meet our stakeholders' expectations and provide value for our customers and communities. We are blending our sourcing strategies to ensure we can meet the need for workforce growth. Our insourcing/outsourcing model is based on keeping our core competencies in house and where required, efficiently, supported by outsourcing.

Further Details are included in our ***Workforce Resilience Strategy (Annex 16.3)***.

Our risk and asset management strategy

Asset management is an integral part of everything we do at SSEN. We recognise the importance of our networks' infrastructure in the context of the wellbeing of all who use it. A defined and integrated risk-based asset management system incorporating strategic targeted improvements in asset data, leads to efficient, cost-effective network solutions which ensure that we meet our Asset Management objectives. Good stewardship of the whole lifecycle of our asset base delivers long term value for our customers.

Our Supply Chain Strategy

Our Supply Chain Strategy has been designed to ensure we have the ability to optimise and find synergies across our work bank and deliver our programme efficiently. We will continue to build on the key RIIO-ED1 Improvements such as category management, batching of requirements and optimising commercial management.

Our Supply Chain strategy will drive benefits and efficiency through:

- A range of contracting strategies to support a flexible, effective and optimized approach to 'touch the network efficiently' principle.
- Refinement of procurement strategy models and delivery of further efficiencies through long-term commitments and earlier contractor involvement
- More collaborative longer-term strategic relationships with supply chain
- Regional and local supply chain strategies
- Providing the supply chain with greater visibility, certainty and continuity of work to support skills development and increase efficiency

You can find further detail in our ***Supply Chain Strategy (Annex 16.2***).

Our Deliverability Strategy

Assessing deliverability has been a core activity of our business planning process for RIIO-ED2, ensuring that our ambition can be translated into a deliverable programme of work that will be a true enabler for net zero.

Effective work allocation models which enable early contractor involvement and visibility of work banks are critical to drive value for money for our customers and develop a pipeline of the necessary skills. Further details are included in our ***Deliverability Str*ategy (Annex 16.1).**

Harnessing innovation

As detailed in the ***Innovation Strategy (Annex 14.1)***, we have demonstrated genuine leadership in the innovation space and delivered significant benefits for customers. We will expand our innovation roll out with new deployments from our existing portfolio of innovation projects or from innovation activities undertaken in RIIO-ED1 by other energy networks. As part of our RIIO-ED2preparations we have undertaken a systematic three stage assessment methodology of the available innovations from our own portfolio and those of other licensees to ensure that we identify those innovations with the greatest potential to bring benefits in RIIO-ED2. Further information is provided in our ***Innovation Strategy (Annex 14.1)*** and a full justification for each project can be found in the relevant Chapters and Annexes. We have not sought totex allowance for ongoing innovation roll out but will fund this through the totex incentive properties which underpin the RIIO model.

Digitalising our Business and engagement

We have invested in digital infrastructure during RIIO-ED1 to provide us with the solid foundational IT systems and data sets necessary to meet the challenges of the net zero transition. To meet our RIIO-ED2 strategic outcomes and continue to drive efficiency we will continue to invest in the digitalisation of our business.
This will become even more critical under the future energy scenarios as connections volumes and network interactions rapidly increase. Our IT Investment Decision Packs demonstrate the benefit of avoiding material increases in the cost of administrative overheads which would otherwise be required to meet our targets. Further details are included in our ***Digitalisation Investment Plan*** **(Annex 5.1)**

Optimising native competition

We have developed our competition strategy to ensure that we are able to utilise native competition where there is opportunity. Throughout RIIO-ED1 we have introduced new mechanisms that will further enable supplier innovation, flexibility and cost efficiency across our business plan throughout RIIO-ED2. Full details of how we will use native competition to drive positive outcomes are included in our ***Supply Chain Strategy (Annex 16.2) and our Competition Chapter (18)***.

Embedding efficiency into our plan

We have included this targeted efficiency improvement in our RIIO-ED2 plan and creates a robust foundation on which to forecast our RIIO-ED2 investment programme and outputs. In addition to the top-down Ongoing Efficiency assumptions which we have applied to our overall totex, worth **£141m,** we have identified **£269m** of additional bottom-up efficiency savings embedded in our plan. We summarise embedded savings

A. We have included stretching reductions in unit costs that we expect to achieve during the remainder of RIIO-ED1. These will deliver **£38m** cost reductions are planned across the activities of Load, Asset Replacement and tree-cutting.

B. Totex benefits associated with our RIIO-ED2 investment decisions. Through these decisions we achieved direct reductions in totex of **£47m** during RIIO-ED2. These savings include:
   - directly cashable savings of £44m against our historic actual costs through IT investment; and
   - cost savings of £3m arising from the adoption of flexibility to improve our deliverability, therefore not requiring the use of premium unit rates in Load.

   In addition, our decisions have resulted in £80m of avoided costs that would otherwise be incurred. We do not illustrate these benefits in the waterfall above, as these benefits materialise beyond the RIIO-ED2 timeframe. These avoided costs relate to:

   • investment in IT systems to avoid otherwise required spend increases of £64m; and
   • deferment of Load investment that our scenario modelling would expect us to need of £16m due to the use of flexibility schemes

C. Stretching reduction in unit costs which we are targeting during RIIO-ED2.We have identified unit cost savings of **£184m** to target more stretching rates to reduce our overall totex, embedding greater efficiency within our base costs. We summarise these below:

- Asset Replacement efficiency as part of the targeted cost improvement that brings SEPD to upper quartile we have targeted a 5.0% efficiency improvement in RIIO-ED1 delivered unit rates. To ensure we continue to challenge ourselves we have also targeted improvement in SHEPD, which is already at the efficient frontier, through a 2.5%-unit cost improvement. This flows directly into a reduction in RIIO-ED2 forecast totex of £25m.
- Load replacement - We also apply these same asset replacement unit rates to our load projects, reducing our load expenditure by £11m.
- Network Diversions. We are experiencing continued increase in injurious affection claims across our networks. Each individual claim value is determined by the individual circumstances. However, as the volume of workload increases materially, we are able to realise economies of scale in legal and land agents' costs. We have reduced the forecast costs of our claims in RIIO-ED2 by £14m to reflect this.
- Network Operating Costs economies of scale. We are proposing reduced unit rates within our Tree-cutting activity in SEPD compared to our six-year average, causing an efficiency improvement of £24m compared to RIIO-ED1 actual performance. Furthermore, with an increase in Repairs & Maintenance activity aligned to forming a safe & resilient network, we are predicting efficiencies of £17m across both regions.
- PCB unit cost targeted stretch. We have additionally identified £14m in efficiency savings on unit rates which we apply for the transformer replacement and refurbishment due to PCBs. We have embedded lower unit cost into our proposals through reductions in forecast unit rates.
- Productivity and economies of scale - across the rest of our plan we have identified an additional £79m of savings arising from unit cost reductions due to increased productivity across our people, processes, and systems, as well as benefits from increased economies of scale as our activity volumes rise.

D. Ongoing Efficiencies through RIIO-ED2

We expect to identify ways of improving our productivity and efficiency on an ongoing basis. Our ongoing efficiency expectations reflect the degree to which we, as an efficient firm, can reduce costs through technological and process change over time. We have built in additional efficiency savings to our plan that are based on the level of efficiency frontier movement we believe is justified by market evidence.

We have reduced our proposed totex allowances by **a 0.7% per annum** ongoing efficiency multiplier. This reflects the benefits we expect from our IT investments, embedding innovation into BAU, continuous improvement and our supply chain strategy. **Over the five years of modelled efficiency improvement (2023 to 2028), customers will benefit by over £141m through reduced totex allowances**

RIIO-ED2 Cost drivers

RIIO-ED2 represents a step change in the level of network workload, complexity and outputs. This means that direct cost comparisons are often no longer valid. RIIO-ED2 will see new drivers of network costs and witness the expansion of many others. The incremental components of our cost base have a range of cost drivers. These are individually explained, evidenced and justified within our Investment Decision Packs and accompanying Plan annex documents. We have summarised some of the material cost drivers in this section.

High confidence in our costs

Ofgem will assess our Business Plan using its range of cost assessment tools. In that process it is seeking assurance that the cost information being used is robust, reliable, and independent from our cost forecast.

Our cost forecasts have been derived using evidence from a combination of sources and the information included within accompanying cost books and cost confidence tables. This evidence includes:

- RIIO-ED1 actual costs;
- Cost information sourced from competitive tendering process;
- Market cost data, where this better reflect the future costs for carrying out the work; and
- Where Ofgem is able to determine a unit cost allowance that can be applied with an appropriate volume driver or uncertainty mechanism.

We are clear where and when we have overlaid further efficiency stretches or specific rate improvement and the justification for doing so. This allows Ofgem to trace our cost forecast back to reported or independent data. It enables Ofgem to independently assess and verify where any adjustments have been made to actual outturn costs.

This costing methodology provides confidence in the accuracy, consistency and integrity of our costs. In our ***Cost Confidence Assessment (Annex 15.3),*** we have provided detail on the classification of cost confidence with a detailed cost book and other supporting documents to provide transparency around our costing methodologies.

Our assessment is that 95% of our totex forecast costs can be attributed to Ofgem's criteria for high-cost confidence, with 5% of our forecast costs for which we have yet to secure the relevant independent data source. **This would produce a blended sharing factor of 48.3%.**

Structure of this document

Driving value for money, by efficiently delivering for customers, is at the heart of our plans. We will be showing throughout this document, and through our business plan, that SSEN will be building on its ethos of delivering value for customers.

This annex should be read in conjunction with the wider business plan. Further details underpinning our cost proposals are provided in our Investment Decision Packs (Engineering Justification Papers (EJPs) and Cost Benefit Analysis (CBAs)), Business Plan Data Table (BPDT) commentary ***(Annex 15.9)***, and Operating Business Costs ***(Annex 15.6).***

In this paper, we will set out the detail of our totex proposals for RIIO-ED2 and explain the approach we have taken to satisfy ourselves that these cost proposals are efficient.

The structure of the document is as follows:

- In section 1 we describe the steps we have taken to evaluate our current efficiency and the efficiency challenge we have incorporated into our plan
- In section 2, we set out our plans to achieve our efficiency ambition
- In section 3, we discuss how we have developed our cost proposals taking account of the embedded efficiencies and cost drivers in our plan
- In section 4, we summarise our cost proposals across the business plan data table categories, highlighting where further information can be found to support our plans.

Links to other parts of the plan

Cost efficiency (Annex 15.1)
ENA Ongoing Efficiency Report (Annex 15.2)
Cost Confidence Assessment (Annex 15.3)
Establishing an appropriate efficiency challenge (Annex 15.4)
Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5)
Operating Business Costs (Annex 15.6)
Company-specific and regional factors for RIIO-ED2 (Annex 15.7)
Cost Benefit Analysis Process (Annex 15.8)
BPDT Commentary (Annex 15.9)

1. AN EFFICIENT COST BASE FOR RIIO-ED2

In this section we provide a description of how we consider the starting point for evaluating the efficiency of our plan. First, we discuss the specific issue that make our DNOs different, which need to be considered before efficiency is evaluated on a comparable basis with other DNOs. Second, we discuss the efficiency of our current cost base based on Ofgem's models. Third, we discuss the appropriate challenge for ongoing efficiency throughout the RIIO-ED2 period. Lastly, we discuss our considerations on issues that Ofgem will need to evaluate in determining an appropriate approach to cost assessment.

IDENTIFYING COST CHALLENGES SPECIFIC TO SSEN

Our Communities, (Chapter 1), describes some of the factors which differentiate our north and south networks from each other and our peers. These differences can, in some circumstances, contribute to material differences in the costs a network faces in meeting the needs of its customers. It is important to identify and adjust for any material cost variations in order that subsequent cost comparisons across regions is fair and representative of costs which the network can control. These costs variations are often referred to as company-specific or regional factors.

The impact of regional or company-specific factors will be captured by the final design of Ofgem's cost assessment models, the final design of which will become apparent in the coming months as the industry working groups progress and Ofgem decides on its cost assessment process. Some factors may become more relevant in RIIO-ED2 compared to previous price controls and therefore forecast data is needed to assess whether these are sufficiently captured in the modelling or need additional adjustments.

We commissioned Oxera to undertake an assessment of the ***company specific and regional factors (Annex 15.7)*** which it could identify within our business. Oxera have followed Ofgem's guidelines in identifying and then quantifying relevant factors. We summarise these factors below which Ofgem will need to factor into its cost assessment approach, by excluding them from comparative models with other DNOs that do not have the same network features. Ofgem should evaluate these costs separately and incorporate into our RIIO-ED2 allowance.

- **Submarine cables –** we serve 59 inhabited islands in our SHEPD region, and the Isle of Wight in SEPD, using over 110 subsea cables, stretching more than 500km, all of which causes additional costs. The most significant expense associated with these relates to installing, inspecting, maintaining and repairing submarine cables, accounting for **£184.5m** during RIIO-ED2. We consider that submarine cable costs should be excluded from the regression models. The efficiency of these costs should instead be examined on an engineering and needs basis. This materially affects the SHEPD network which has almost all the GB subsea assets and, to a lesser extent, SEPD where we own and operate multiple subsea cables to the Isle of Wight.
- **Subsea Programme Team –** the cost associated with the team that manage and deliver subsea cables activity. These costs amount to **£7.5m** during RIIO-ED2. Like the submarine cables direct costs, these should be treated separately outside of Ofgem's cost assessment models.

- **Serving islands** – SHEPD also incurs materially higher costs as it provides a full range of network operational activities to the multiple islands communities it serves. No other DNO has similar islanded and remote networks or the cost pressures this creates. These costs include capital and operating costs of Island Diesel stations, additional staff, and vehicle costs, as well as specific travel costs for helicopters and ferries. We explain our remote island generation within ***Chapter 8, Supporting the Scottish Islands***, and ***Annex 8.1***. These costs amount to **£37.6m** (excluding subsea cable costs) within its report and recommends they are removed prior to the price control cost assessment modelling.
- **Sparsity/density/topography –** SHEPD is geographically the largest of the 14 GB license areas, but with the smallest population it incurs materially higher costs. Operating in particularly sparse or dense areas causes additional costs compared to a network with average sparsity / density. The effect on costs of maintaining performance and service within an extremely sparse network area has been considered by Oxera in its report. It quantifies this impact at **£74.6m** over RIIO-ED2, as an additional atypical costs that is imposed on SHEPD due to the nature of our network. We consider the evidence to be conclusive that Ofgem should be either remove these from the cost assessment models.
- **Regional wage differences -** Updating Ofgem's RIIO-ED1 index with the most recent data shows that wages in Scotland are very similar to those in the Southeast so these areas could be grouped together, with little differences shown across the remaining UK regions. Oxera's analysis indicates that the required adjustment to account for regional labour costs should provide funding of **£40m** to support SSEN's workforce costs.
- **Shetland –** To maintain security of supply on Shetland, SHEPD is funded to operate Lerwick Power Station (fuel costs and O&M) and act as system operator, balancing the system in lieu of NG ESO. SHEPD is also funded to secure the islands' longer-term arrangements (Integrated Plan) as it transitions away from an islanded network. The costs of **£99.8m** which we will incur during the RIIO-ED2 period are specific and unique to our business and as such, Ofgem should treat separately through its cost adjustment process.

The graphic below summarises our proposals how these costs should be treated by Ofgem through its cost assessment approach.

FACTOR	QUANTIFICATION (5Y RIIO-ED2)	PROPOSED TREATMENT
Submarine cables	£184.5m	Exclude from models
Subsea Programme Team	£7.5m	Exclude from models
Serving islands	£37.6m	Exclude from models
Sparsity/density/topography	£74.6m	Pre-regression adjustment
Regional wage differences	£40m	Pre-regression adjustment
Shetland	£99.8m	Exclude from models

We have then used the identified company specific or regional factor results in analysing our current levels of efficiency at the start of RIIO-ED2.

OUR CURRENT EFFICIENCY

Assessing the efficiency of our current performance and the required future efficiency improvements have been key foundations for developing our RIIO-ED2 business plan. To achieve our ambition of being the frontier company we have undertaken several studies to ensure that we are building the appropriate level of stretch into our plan.

We commissioned Oxera, to evaluate the relative efficiency of SEPD and SHEPD compared to other DNOs, and against the efficient benchmark, based on performance and cost drivers to date during the RIIO-ED1 period, using Ofgem's cost assessment approach at RIIO-ED1.
See ***Establishing an appropriate efficiency challenge (Annex 15.4)***. It used the latest available data, covering the period until 2020, and therefore excludes forecast data over RIIO-ED2 in updating Ofgem's aggregated (totex) models and disaggregated cost models.

The approach involved assessing SEPD's and SHEPD's relative efficiency based on Ofgem's cost assessment approach at RIIO-ED1. It used the latest available data (covering the period until 2020), and therefore excludes forecast data over RIIO-ED2 in updating Ofgem's aggregated (totex) models and disaggregated cost models.

Oxera identified several areas of concern in updating Ofgem's aggregated modelling with the latest data. In particular:

- There is no accounting for the atypical nature of subsea cables, the assets and costs of which are not comparable to those of other DNOs. This issue has become more significant since RIIO-ED1.
- The weighting of scale drivers in the top-down model places a 24% weight on customers, which appears excessive when compared to the proportion of activity directly associated with customers.
- The regional wage adjustments systematically underestimate the efficient cost of labour by DNOs operating in Scotland.

To address these issues, Oxera normalised the data by:

- excluding subsea assets and costs from the data in the econometric modelling for all DNOs;
- weighting scale drivers in the top-down model based on operational insights from SSE;
- grouping Scotland's cost of labour with the South East, which, according to ONS data, it is aligned more closely to, instead of the rest of the UK.

Under the totex model, SHEPD and SEPD are ranked first and fifth respectively of the 14 DNOs, with UQ gaps of -8.2% and 0.9% respectively. Under the disaggregated modelling, SHEPD and SEPD are ranked second and 11th respectively of the 14 DNOs, with UQ gaps of -1.8% and 5.2% respectively.

The analysis concluded that, the combined results from the totex model and the disaggregated modelling rank SHEPD and SEPD as first and sixth respectively of the 14 DNOs, with UQ gaps of -5.2% and 2.0% respectively as shown in the table below.

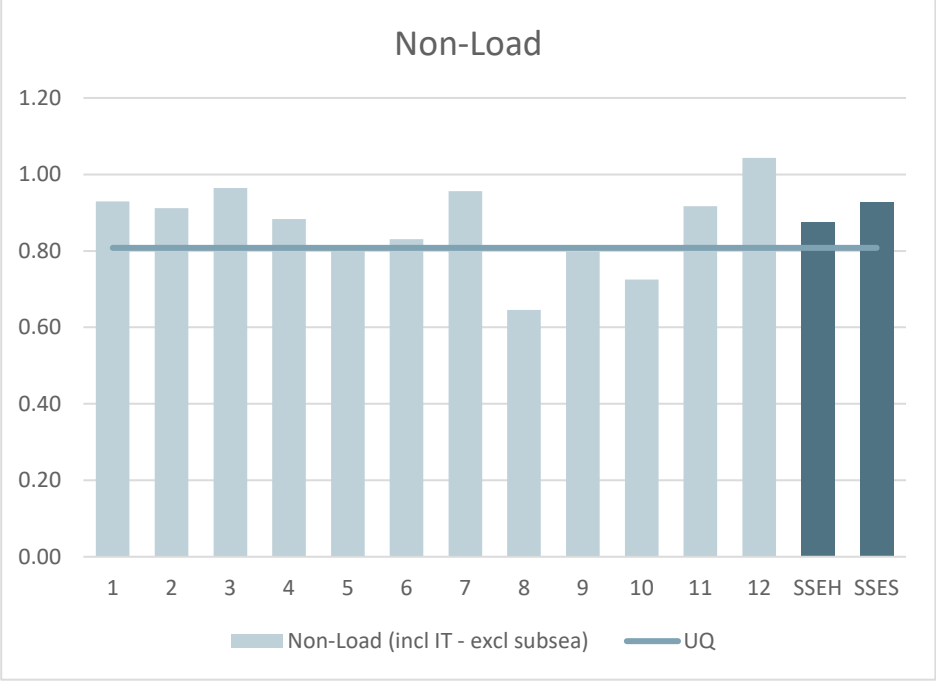
SHEPD's and SEPD's relative efficiency position (%)

		TOTEX model	Disaggregated model	Results
Efficiency score	SHEPD	86.2	91.8	88.6
	SEPD	93.2	98.4	95.4
Upper quartile (UQ)		92.4	93.5	93.5
Gap to UQ	SHEPD	-6.7	-1.8	-5.2
	SEPD	0.9	5.2	2.0

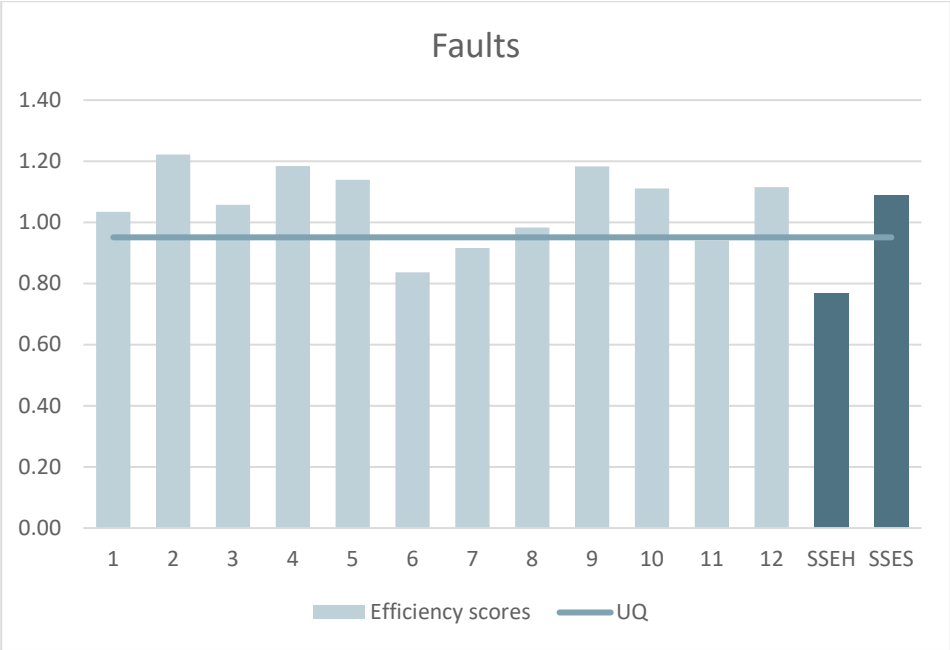
In developing our plans, we have taken account of the catch-up efficiency by evaluating our unit cost against other DNOs – we have reduced unit costs for asset replacement by 5% in SEPD and 2.5% in SHEPD where we are not currently at the upper quartile based on our benchmarking. We also identify variety of other bottom-up efficiency savings, which in combination deliver benefits of £270m in our plan. We detail our approach to embedding efficiencies into the plan in section 2.

We have also undertaken some benchmarking using industry data provided by Ofgem, showing the comparative performance of our regions against other DNOs and the upper quartile benchmark below. We set out more comprehensive benchmarking analysis in our ***Operating Business Costs (Annex 15.6).***

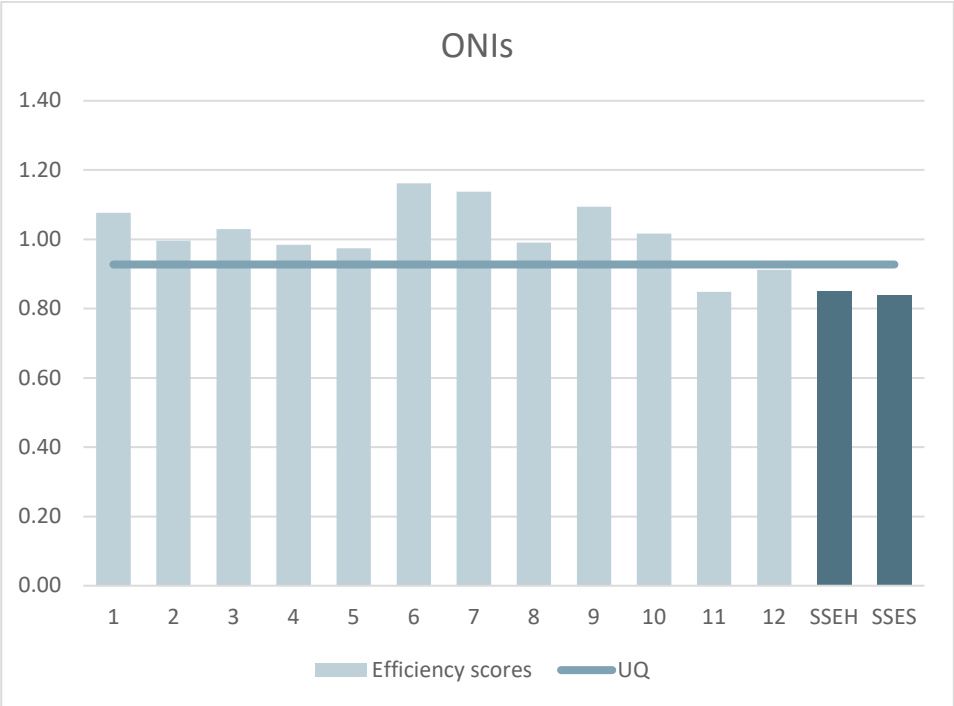
Disaggregated Modelling



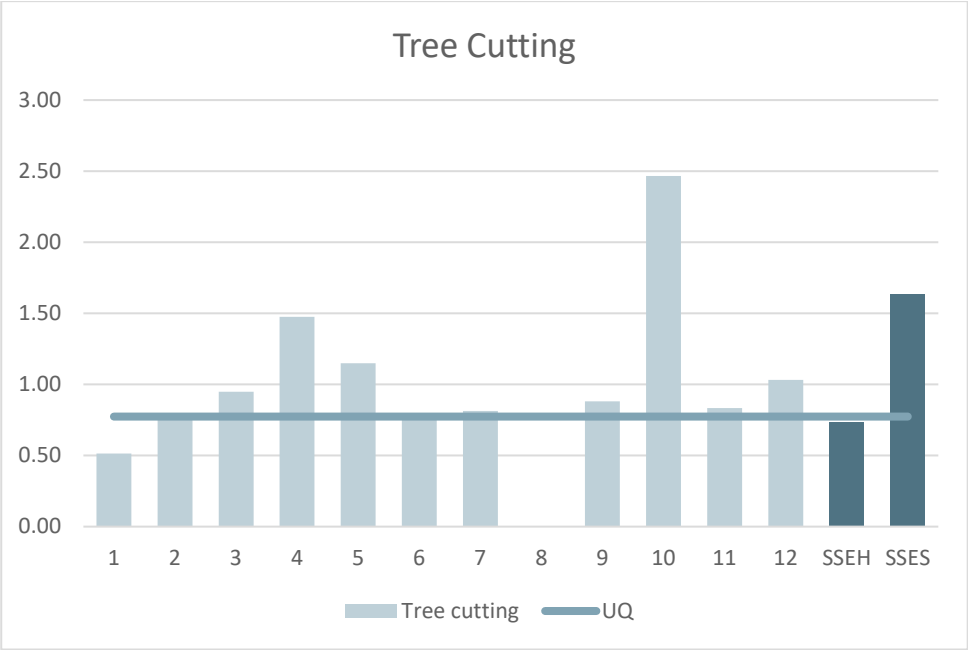
The graph above shows that SSEH's Non-Load spend is below the average DNO (6th) and SSES's spend is above the average DNO spend (10th). We have built in efficiencies in this spend area for both SSES and SSEH as we have targeted the efficiency frontier across a number of key asset categories.



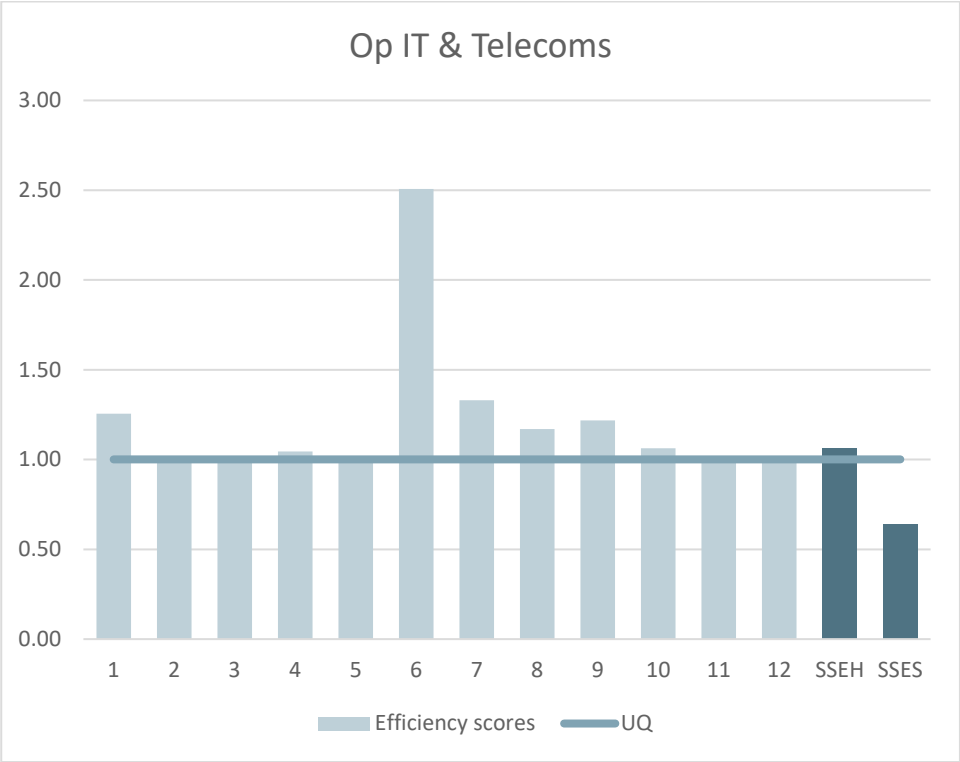
Faults is an area of spend where SSEH outperforms every other DNO (1st) and SSES is ranking just below an average DNO (8th). RIIO-ED2 spend has based on RIIO-ED1 delivered unit rates and we project to continue doing well in this area. Underground Cable faults, which are expensive to repair, are the main driver for SSES's higher expenditure ion this area, hence we are proposing targeted investment in RIIO-ED2 to improve position.



This is an area of spend where both DNOs are more efficient that Upper Quartile, what Ofgem would consider efficient spend. SSES is the most efficient DNO for ONIs (1st) and SSEH is 3rd. We are looking to maintain this performance through RIIO-ED2.



From the graph above it can be seen that SSEH is an efficient DNO, as its efficiency score is better than UQ. Tree cutting is a focus area for SSES, with regional differentiation in tree growth, landowner issues and outages causing increased unit rates, and a unit rate comparable with other similar sized companies in the sector.



SSES is the most efficient DNO for Op IT & Telecoms (1st) and SSEH spend in is slightly higher than the average DNO spend (8th) given the specific DNO specific issues of SSEH.

ONGOING EFFICIENCY

The ongoing efficiency (OE) target captures the degree to which an efficient firm can reduce costs due to technological change. OE is part of the change in efficient costs (or frontier shift) over time before considering input price changes.

To inform our RIIO-ED2 efficiency plans, we have received third party expert views on the pace of future productivity improvements. This section has been developed based on two third party reports:

- First, a report prepared by NERA for the ENA "Ongoing Efficiency Report" – See ENA Ongoing Efficiency Report ***(Annex 15.2)***.
- Secondly, a report prepared by Oxera on "Establishing an appropriate efficiency challenge" – See ***Annex 15.4***.

Both the NERA and Oxera study reviewed various benchmarks of productivity improvements, relying on the assumption that the past rate of technological progress is a good indicator of the potential future rate.

Oxera's assessment found that the scope of likely ongoing efficiency improvements over RIIO-ED2 to be a maximum of 0.6% p.a., which it considered to be robust to all the sensitivities considered. It calculated based on total factor productivity in industries that correspond to DNO activities over full business cycles.

- for CAPEX activities it identifies the following as comparator sectors: construction, repair and installation of machinery and equipment, transport and storage, and manufacturing of electrical equipment; and
- for OPEX activities it identifies the following as comparator sectors, transport and storage, professional, scientific, technical, administrative and support service activities, telecoms and IT and other information services.

In calculating this, Oxera used EU KLEMS data where it identified that there was one complete business cycle through 2007–16.

NERA followed a similar approach and concluded that 0.3% was the appropriate ongoing efficiency assumption for the sector.

We have separately considered historical DNO productivity and the relationship between totex productivity and MEAV. We identified that over DPCR5 and RIIO-ED1 and the maximum ongoing efficiency improvement over the course of a 10-year period is 5%. This equates to approximately 0.5% per annum.

Having taken account of the evidence on relevant benchmarks from our external advisors and our own analysis, we have decided to adopt an even more stretching ongoing efficiency assumption at 0.7%. This reflects our efficiency ambition and the benefits we expect from our IT investments, embedding innovation into BAU, continuous improvement and our supply chain strategy. This is applied to our overall totex forecast on an annual compound basis, resulting in an overall reduction in ongoing efficiency of £141m over RIIO-ED2, representing over 3.5% of our proposed expenditure when excluding the costs of Shetland Islands. This ambitious drive for efficiency across the RIIO-ED2 period is ahead of the industry wide view of 0.3 - 0.5%.

EVALUATING EFFICIENCY AT RIIO-ED2

RIIO-ED2 will be a different type of price control to that the Electricity Distribution sector has previously seen. Pre RIIO, cost reduction was paramount, with an increasing focus on both network performance and customer service levels. RIIO-ED1 changed focus with outputs valued equally with cost efficiency, and companies were incentivised in both areas. With net zero as a recognised destination, RIIO-ED2 will be a price control for growth, increased network flexibility, the deployment of our role as Distribution System Operator while securing continued reliability.

RIIO-ED2 represents a step change in the level of workload, complexity and outputs. This means that direct cost comparisons previously used are often no longer valid. RIIO-ED2 will see new drivers of network costs and witness the expansion of many others.

Ofgem's approach for assessing cost efficiency will need to adapt as a result. The past is no longer a good prediction of the future and the development of benchmarks to evaluate future comparative efficiency will be challenging as different companies face different future cost drivers.

We anticipate that Ofgem's approach to benchmarking costs will need to take account of the various additional complexities. We highlight below some considerations around the issues Ofgem will need to address through its development of a cost assessment methodology:

- **Recognition that SHEPD is unique:** There are mechanisms in Ofgem's toolkit to create level playing field- such as Regional and Company-specific factors, however there are still indirect costs which can't be quantified with the data currently available that are sustained by SHEPD only.
- **RIIO-ED1 fast-track decision**; WPD was the only company fast-tracked at RIIO-ED1. At Ofgem's subsequent slow-track assessment, Ofgem estimated a gap of 12% between its updated view of efficient costs and fast-track allowance, amounting to an additional £738m[1]. This will impact RIIO-ED2 performance targets, potentially distort RIIO-ED2 benchmarking if not corrected for, as well as flattening RIIO-ED1 into RIIO-ED2 totex increases, and we will work with Ofgem on potential solutions.
- **Different DFES assumptions**: DNOs have adopted different DFES scenarios and assumptions, and as such there is a risk that data and cost assumptions across companies are not comparable. As such, we anticipate there will be challenges for Ofgem in developing robust models with new novel approaches required to account for differences in underpinning DFES assumptions.
- **Net zero cost drivers**: The cost assessment model should recognise that the drivers of future costs differ to the historical drivers of cost. Specifically load capacity and future network requirements will be key determinants of future costs required to support the UK's transition to net zero. As such cost models will need to adopt the appropriate drivers to support the funding requirements.
- **Unique drivers:** DNOs will have different drivers of costs within their geographies. As an example, distributed generation will, in our view, be a key driver of expenditure in SHEPD as our network carries significantly more distributed generation per customer than other geographies.

1 See Annex 15.4: Establishing an appropriate Efficiency Challenge

This is due to greater levels of renewable generation assets that benefit UK's effort to achieve net zero – not just customers in our region.

- **Triangulation and model weighting**: Ofgem is likely to need to develop a suite of models which it uses to triangulate its view on totex allowances for each DNO. The application of a one-size-fits-all approach to weighting may be inappropriate as the relevance of different models may differ by DNO.

We have identified just some of the challenges that Ofgem will face in developing its cost assessment methodology. We look forward to working constructively with Ofgem on the appropriate approaches to assessing efficiency for RIIO-ED2.

2. ACHIEVING OUR RIIO-ED2 EFFICIENCY AMBITION

In this section we set out the principles that underpin our approach to developing our cost proposals for RIIO-ED2. In doing so we describe:

- Our efficiency ambitions across RIIO-ED1 and through RIIO-ED2;
- Important specific features about our business which provide context for efficiency.
- How our operating model plans will enable us to deliver efficiently; and
- Key assumptions for ongoing efficiencies which we have embedded into our proposals.

OUR AMBITION FOR RIIO-ED2

Our ambition for RIIO-ED2 has been developed following engagement with our customers and other stakeholders. We have listened carefully and have driven our plan based on this engagement. Our customers and other stakeholders expect us to deliver on the required load investments for net zero, materially improve performance and maintain affordability, striking the right balance between bills today and tomorrow.

Our aspiration is for both SEPD and SHEPD to be recognised as the most efficient, or upper quartile efficient, DNOs in key cost areas, delivering value for money to our customers whilst delivering the outcomes they expect. Throughout this business plan we have detailed the approaches we are taking to deliver against our customer expectations through 2023-28. Our plan enables us to:

- Facilitate the drive to net zero for our local communities, recognising the increasing reliance on electricity for transport and heating;
- Meet our legal obligations on eliminating safety and health risks to the public and our employees from our assets;
- Improve the reliability of our network in the longer-term and reducing the environmental impact of our own activities.

Our business plan is underpinned by a series of clearly defined outputs that have been co-created through our stakeholder engagement process, and further prioritised and refined through willingness to pay studies.

This plan represents a step change in terms of delivering more for our customers. Our efficiency ambition will enable us to ensure that we deliver value for money for our customers whilst developing and maintaining the network as required.

SEPD AND SHEPD FACE VERY DIFFERENT CHALLENGES

Our two networks, SHEPD in the north and SEPD in the south, supply power to 3.8 million homes and businesses and differ significantly in terms of geography and other characteristics.

Our SEPD network in central southern England serves over 3.1 million homes and businesses spanning a diverse mix of communities across a variety of locations including cities, coastal towns and villages. SEPD is one of the most densely populated networks, covering West London, Slough, Reading and the M4 corridor, requiring the need for substantial populations of underground cables, which are expensive to repair and replace. We also have a high level of tree coverage in our areas, and the move towards longer, hotter summers, interspersed with intense periods of rainfall has made our underground cables more susceptible to faulting than we had seen in previous price controls, as well as high tree growth across our network. To reflect this, compared to RIIO-ED1 levels of spend we have included an additional £44m in our plan for replacing underground cables, and £53m for Tree cutting, including surveys for Ash Dieback.

Our SHEPD network is unique. Covering a quarter of the UK landmass, the vast region includes major towns and cities of Aberdeen, Dundee, Inverness and Perth. However, SHEPD also connects customers in remote rural areas and Scottish Islands, often via radial networks with no alternative supply and a higher risk of interruptions. The remote and rural nature of the geographies in SHEPD sees our teams working in some of the most challenging terrains in the UK to serve our customers. SHEPD also has high levels of renewable penetration, and we are the only network in Great Britain to own and operate over 100 subsea cable links. Not only are these links an essential service to local communities, providing a safe and reliable supply of electricity to homes and businesses, they also now increasingly facilitate renewable generation exports to the GB mainland and are a vital foundation in our journey to net zero. This means we face very different risks and opportunities in SHEPD when compared to any other DNO.

EFFICIENCY OF OUR OPERATING MODEL

Our over-riding business ethos drives us to reduce costs through innovation, digitalisation, efficient procurement, and whole system solutions. We already seek to deliver all distribution investment as efficiently as possible, sharing the benefits with customers.

Our approach to managing our workforce, assets, supply chain, as well as utilising innovation, digitalisation and competition provide the foundation to delivering efficiency.

Our workforce strategy

Our people are at the centre of everything we do. We take pride in the work they carry out and our priority is ensuring they get home safely each day. The step change required in the electrification of heat and transport facing industry and society in RIIO-ED2 will challenge our business and our workforce as never before. We will be increasing investment and delivering greater volumes of work on average each year in RIIO-ED2 compared to RIIO-ED1. By the end of RIIO-ED1, our workforce will number 3,974. In RIIO-ED2 we are proposing to increase our workforce to 4,839 to support our business plan and ensure not only that we can continue to deliver our commitments safely, efficiently and to our customers' expectations, but also enable the transition to net zero. This increase in workload, coupled with the requirement for us to develop new skills as we develop DSO capabilities and further digitalise our activities, will result in us needing to increase not only the size but also the skills of our workforce. Extending our pipeline, we'll help to grow the recruitment base for our industry and contribute to wider social inclusion and mobility.

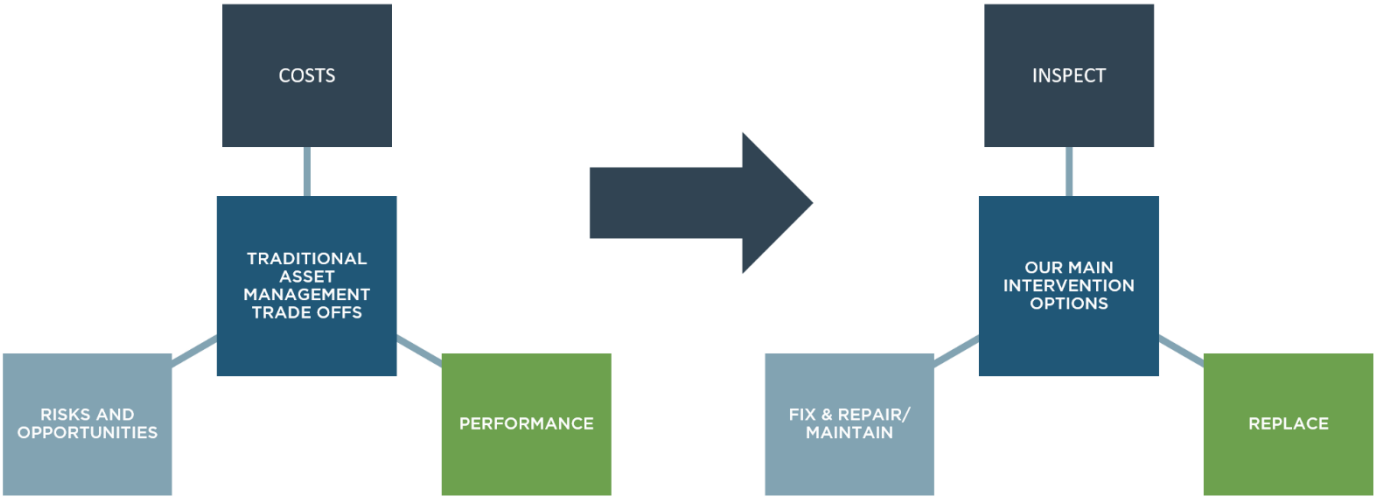
Our ***Workforce Resilience Strategy (Annex 16.3)*** outlines how we'll keep our people safe and well, highly skilled and productive, in order to meet our stakeholders' expectations, and provide value for our customers and communities. We'll keep doing all the good things we did in RIIO-ED1; continued focus on driving efficiency to keep costs as low as possible, improving customer service, enhancing customer experience, and identifying innovative new solutions to keep the network safe, reliable and resilient.

We're blending our sourcing strategies to ensure we can meet the need for workforce growth. Our insourcing/outsourcing model is based on where we want to keep our core competencies in house and where we will get best customer value by outsourcing work. Whilst we intend to insource more work, there's no doubt that we'll still need to work in partnership with our resource suppliers to deliver work programmes in the most cost-efficient way.

We have several people initiatives already underway, all with a shared ambition to provide a safe, motivated, productive and efficient workforce. These are, Pay Progression, Fatigue Management, Fit for Future Contracts, Training Strategy, Workforce Capability and Business Change and more detail can be found in ***Workforce Resilience Strategy (Annex 16.3)***.

Our risk and asset management strategy

Asset management for long-term resilience of the network requires navigating a trade-off between accepting increased risks, incurring costs on activities to reduce risks, and maintaining the capability to respond when risks manifest. In the risk mitigation space, there are then different levels of mitigation and cost to select from to achieve an aggregated impact that gives consumers the network performance they seek at the right cost. This trade off and our potential responses to it are characterized in the figure below:



Asset management is an integral part of everything we do at SSEN. An effective Asset Management System (AMS) will ensure that our network continues to provide a safe and reliable supply to all customers. We are certificated to BS ISO 55001:2014 Asset Management. Implementing this standard enables us to achieve our objectives through effective control and governance of our network assets enabling us to realise value through managing risk and opportunity in order to achieve the desired balance of cost, risk and performance.

We recognise the importance of our networks' infrastructure in the context of the wellbeing of all who use it. A defined and integrated risk-based asset management system provides an efficient, cost-effective solution which will ensure that we meet our Asset Management objectives. The application of an AMS provides assurance that those objectives can be achieved consistently and sustainably over time. Our AMS enables us to translate the company's objectives into asset-related decisions, plans and activities, using a risk-based approach. Good stewardship of the whole lifecycle of our asset base delivers long term value for our customers. For more detail, please see ***Safe and Resilient Strategy (Annex 7.1***).

Our Deliverability strategy

We have set out the following Deliverability Strategy principles which will continue to enable us to understand how to balance requirements for increased labour (due to rising work volumes across multiple investment drivers) with cost efficiencies realised through optimised Capital Delivery:

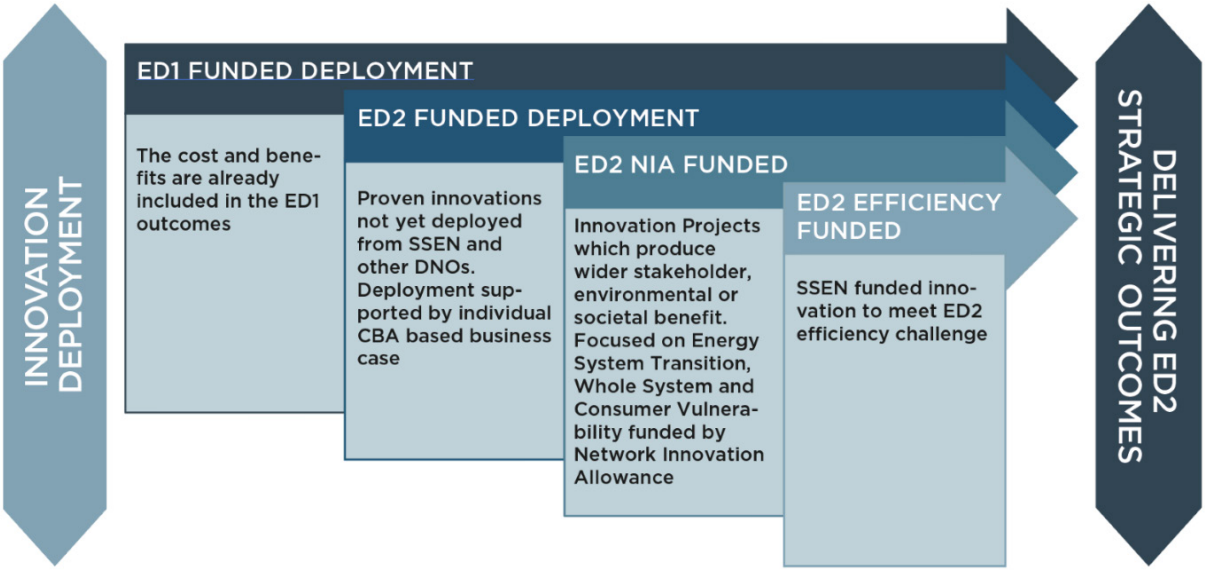
Alongside specific deliverability impacts within our plan, our deliverability testing ensures that the collective package of our RIIO-ED2 business plan is deliverable. We have refined our workforce modelling to ensure we identify the impacts of different sourcing models and work volumes mixes on Closely Associated Indirect (CAI) and Business Support Costs (BSC). Expected efficiency and deliverability impacts on our RIIO-ED2 Business Plan have been established through ongoing engagement with our supply chain, as detailed in ***Supply chain strategy (Annex 16.2***). Further details can also be found in ***Deliverability Strategy (Annex 16.1)***

Harnessing innovation

As detailed in the ***Innovation Strategy (Annex 14.1)***, we have demonstrated genuine leadership in the innovation space and delivered significant benefits for customers. We have rolled out successful innovations such as LV Automation, LiDAR[2] and our Constraint Management Zones (CMZ's), sharing the knowledge and learning with other DNOs.

We have led the industry with ground-breaking projects like Local Energy Oxfordshire (LEO)[3], one of the most ambitious, wide-ranging, innovative, and holistic smart grid trials ever conducted in the UK. We effectively deployed around £16.0m of Network Innovation Allowance (NIA) to date, delivering 53 innovation projects and over £80m of benefits for our customers, which will increase to over £89m by the end of RIIO-ED1. We anticipate that the ongoing utilisation of these RIIO-ED1 deployed innovations will produce a further £19m[4] of benefits from their continued use in RIIO-ED2.

In RIIO-ED2, we propose to expand and develop our innovation roll out by bringing through new deployments from our existing portfolio of innovation projects or from innovation activities undertaken in RIIO-ED1 by other DNOs, as well as those delivered by Transmission and Gas licensees. As part of our RIIO-ED2 preparations we have undertaken a systematic three stage assessment methodology of the available innovations from our own portfolio and those of other licensees to ensure that we identify those innovations with the greatest potential to bring benefits in RIIO-ED2.



[2] LiDAR stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges between objects and is conducted through use of aerial inspection of our overhead assets.
[3] https://project-leo.co.uk/about/the-leo-project/
[4] The cost and benefits from these deployments have already been included within business plan submission

Through this process (described further in our ***Innovation Strategy (Annex 14.1)***) we are proposing to invest over £120m on the deployment of proven innovations, to leverage long term benefits for customers. These innovations include deployment of monitoring equipment to prepare for widespread LCT adoption, new sensor equipment for our subsea cables and new secondary transformers to reduce consumers energy costs and losses on the network.

The breadth of our proposed activity identifies opportunities for innovation across all areas of our business, helping to deliver our strategic outcomes and have a positive impact across society. Our balanced and fair approach to funding innovation in RIIO-ED2 appropriately shares the costs to reflect the risks and benefits from its successful delivery. It facilitates the transition to net zero, supports our stakeholders' ambitions, and retains our focus on delivering efficiency within our business.

We intend to request a Network Innovation Allowance of £17.6m, plus our own 10% contribution to create a total fund of £19.25m for the RIIO-ED2 period (at least £14m of it will be allocated to third parties), to fund innovation activities related to the Energy System Transition and Consumer Vulnerability. Where appropriate we would look to actively participate in the new Strategic Innovation Fund during RIIO-ED2.

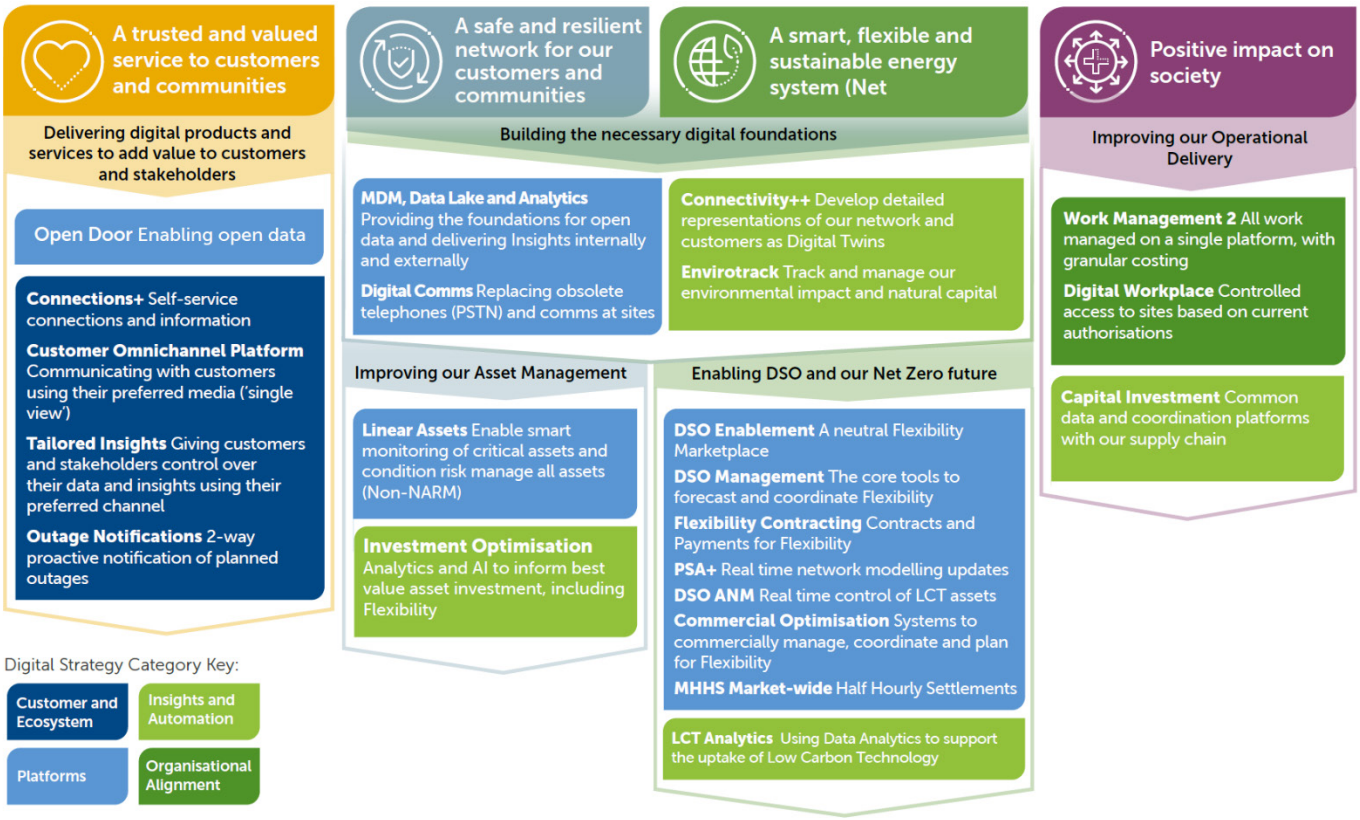
To meet our RIIO-ED2 strategic outcomes we will continue to invest in innovation to drive efficiency and improve the performance of our operations (we will deliver at least £10m of BAU funded innovation activities). We have not sought a specific business plan allowance for this but will use the incentive properties of the RIIO framework to make decisions on additional spending to secure future benefits and savings, we currently believe that the focus of our activity will be in areas such as network resilience, asset management, inspection and supply restoration.

Digitalising our Business and engagement

We have invested heavily in the digital infrastructure and the capabilities necessary to allow us to generate efficiencies and to provide us with the solid foundational IT systems and data sets necessary to meet the challenges of the net zero transition.

In RIIO-ED2 the role of digitalisation is growing with Open Data and new DSO related capabilities and data exchange being critical to the successful transition to net zero. In RIIO-ED2 £43m of additional IT investment, excluding overheads, will be required to deliver these capabilities and ensure alignment with the industry agreed DSO implementation plan.

Laying the foundations is the start of this process and in RIIO-ED2 we are focussed on leveraging the full value from this investment, completing the key steps necessary to digitalise most of our business functions in RIIO-ED2 bringing efficiency and scalability. The diagram below extracted from our ***Digitalisation Investment Plan (Annex 5.1)*** provides an overview of the areas that we need to invest in during RIIO-ED2.



To meet our RIIO-ED2 strategic outcomes and continue to drive efficiency we are continuing to invest in the digitalisation of our business, in RIIO-ED2 this will become even more critical and provide a larger benefit as the volumes of transactions and workload increase to match the FES scenarios. Many processes that would have required a doubling of tripling of workforce will be automated and streamlined allowing us to improve the productivity of our workforce in parallel with the expansion of that workforce in those fields not suitable for automation.

The detail of this investment is set out in our ***Digitalisation Investment Plan (Annex 5.1)***. In preparing out IT investment plan we have included assurance with Gartner undertaking an assessment of our project costs and this has shown our portfolio to benchmark well. In addition, we have undertaken a benefit assessment with each of our directorates ensuring that the stated benefits are deliverable and will allow us to meet our stated efficiency targets.

Utilising competition

We have developed our competition strategy to ensure that we are able to utilise competition where there is opportunity. Throughout RIIO-ED1 we have embedded and enhanced competition within our regulated activities and have introduced new mechanisms that will further enable innovation, flexibility and cost efficiency across our business plan throughout RIIO-ED2. This native competition occurs within the price control framework operating under the totex incentive mechanism and is one of strongest levers we use to drive efficiencies within our operations. Full details of our use of native competition in RIIO-ED1 and RIIO-ED2 and how we will use native competition to drive positive outcomes are included in our ***Supply Chain Strategy (Annex 16.2)*** *and* ***Competition Chapter (18)***.

Our strategic approach and plans to develop DSO capabilities are central to our RIIO-ED2 ambitions. Full arrangements and plans for how we plan to run competitive processes to procure flexibility are set out in detail in our ***DSO Strategy (Annex 11.1 Appendix H)***.

Unlocking flexibility opportunities across our distribution network is a central pillar to the development of our DSO capability. As a DSO, we will be empowered to optimise the use of infrastructure and services in a way that encourages competition and maintains network reliability at least cost. To fully realise the value of our DSO capabilities we will utilise competition within flexibility markets to optimise our use of infrastructure and services. The outcome for consumers will be increased network reliability and improved network access at a lower cost when compared to traditional infrastructure only solutions.

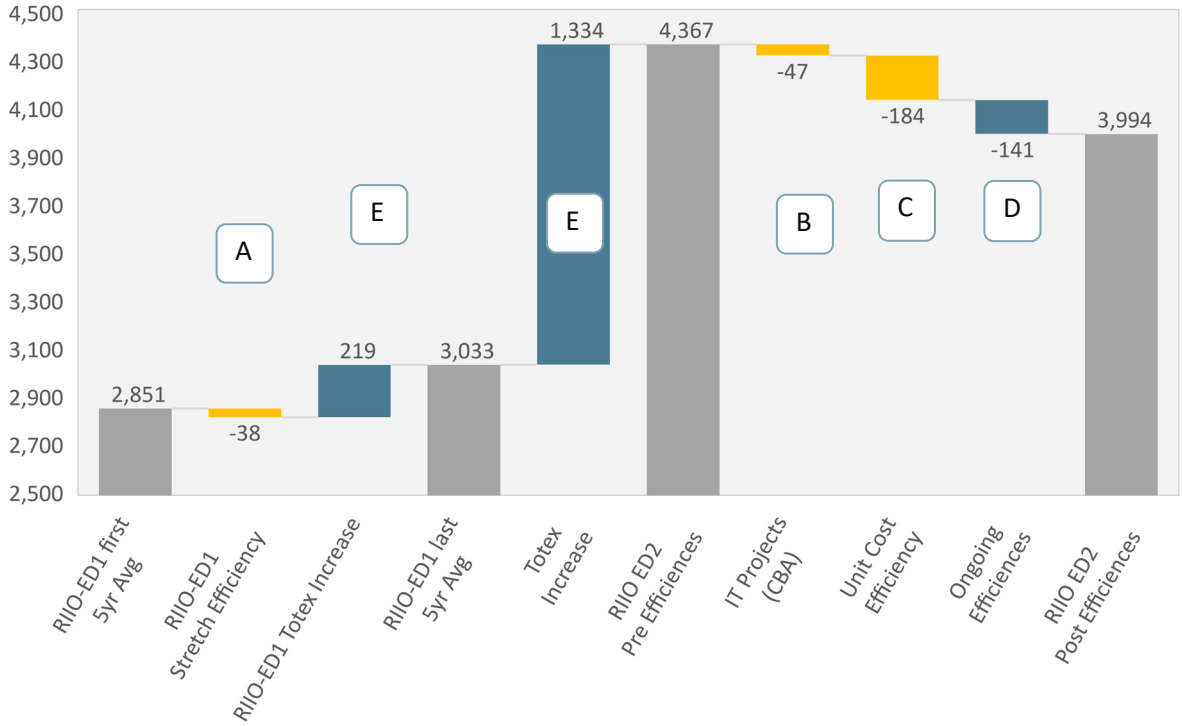
We intend to further develop existing, and form new, types of partnerships to help us deliver our DSO and Open Data commitments efficiently. Specific areas of focus include further developing our relationship with other DNOs as we utilise the Flexible Power Platform. We will continue to work with providers of LV monitoring equipment and services to accelerate the rollout of LV monitoring, maximising the value derived from the resulting data as well as analytics of broader network data sources. Our existing partnerships that were established in projects LEO and TRANSITION will continue and will be refined to provide the blueprint for similar partnership as the scale of our DSO activity increases.

We have already implemented measures to promote native competition, transparency and market access for flexibility providers and the ESO. Live activity and initiatives already delivered or underway including:

- The UK's first implementation of Constraint Managed Zones that have resulted in the significant carbon reductions;
- £162m of investment to improving visibility of flexibility opportunities through comprehensive IT systems and core communication networks upgrades;
- 238MW of live contracts with savings to date of £251k in operational costs on Islay and the Western Isles; and
- Dynamic purchasing system for procuring flexibility.

EMBEDDING EFFICIENCY INTO OUR PLANS

Understanding where we have opportunities to improve our efficiency as we approach the end of RIIO-ED1 allows us to target further improvement over the final years of this price control. We have included this targeted efficiency improvement in our RIIO-ED2 plan and creates a robust foundation on which to forecast our RIIO-ED2 investment programme and outputs. In addition to the top-down ongoing efficiency assumptions which we have applied to our overall totex, worth **£141m,** we have identified **£269m** of additional bottom-up efficiency savings embedded in our plan.



These embedded savings are made up of:

A. Stretching reductions in unit costs that we expect to achieve during the remainder of RIIO-ED1

During the remainder of RIIO-ED1, we are targeting stretching efficiencies arising from lower unit costs aligned with our increased activity. Through our commercial strategy, we will continue to drive value for money through the prices we negotiate with third partis. Savings of **£38m** are planned across the activities of Load, Asset Replacement and tree cutting.

B. Totex benefits associated with our RIIO-ED2 investment decisions

Across our investment plan we have taken decisions that seek to maximise the net benefits for our stakeholders. Our CBAs detail the associated costs and benefits of our plans.

Through these decisions we achieved direct reductions in totex of **£47m** during RIIO-ED2. These savings include:

- directly cashable savings of £44m against our historic actual costs through IT investment; and
- cost savings of £3m arising from the adoption of flexibility to improve our deliverability, therefore not requiring the use of premium unit rates in Load.

In addition, our decisions have resulted in £80m of avoided costs that would otherwise be incurred. We do not illustrate these benefits in the waterfall above, as these benefits materialise beyond RIIO-ED2 timeframe. These avoided costs relate to:

- investment in IT systems that is avoiding otherwise required spend increases of £64m; and
- deferment of Load investment that our scenario modelling would expect us to need of £16m due to the use of flexibility schemes.

C. Stretching reduction in unit costs which we are targeting during RIIO-ED2

We have identified unit cost savings of **£184m** to target more stretching rates to reduce our overall totex, embedding greater efficiency within our base costs. We summarise these below:

- **Asset Replacement efficiency** (unit costs). We know from standard peer to peer unit cost comparison, and the results of Oxera's cost efficiency report, **(Annex 15.4)**, that our performance in asset replacement costs could continue to improve. As part of the targeted cost improvement that brings SEPD to upper quartile we have targeted a 5.0% efficiency improvement in RIIO-ED1 delivered unit rates. To ensure we continue to challenge ourselves we have also targeted improvement in SHEPD, which is already at the efficient frontier, through a 2.5% unit cost improvement. This flows directly into a reduction in RIIO-ED2 forecast totex of £25m.
- **Load replacement -** We also apply these same asset replacement unit rates to our load projects, reducing our load expenditure by £11m.
- **Network Diversions**. We are experiencing continued increase in injurious affection claims across our networks. Each individual claim value is determined by the individual circumstances. However, as the volume of workload increases materially, we are able to realise economies of scale in legal and land agents' costs. We have reduced the forecast costs of our claims in RIIO-ED2 by £14m to reflect this.
- **Network Operating Costs economies of scale.** We are proposing reduced unit rates within our Tree-cutting activity in SEPD compared to our six-year average, causing an efficiency improvement of £24m compared to RIIO-ED1 actual performance. Furthermore, with an increase in Repairs & Maintenance activity aligned to forming a safe & resilient network, we are predicting efficiencies of £17m across both regions.
- **PCB unit cost targeted stretch.** We have additionally identified £14m in efficiency savings on unit rates which we apply for the transformer replacement and refurbishment due to PCBs. We have embedded lower unit cost into our proposals through reductions in forecast unit rates.
- **Productivity and economies of scale** - across the rest of our plan we have identified an additional £79m of savings arising from unit cost reductions due to increased productivity across our people, processes, and systems, as well as benefits from increased economies of scale as our activity volumes rise.

We summarise the efficiencies arising for these unit rate impacts in the table below.

£m Category	Totex Changes	SSEN Cost Efficiency	SEPD Cost Efficiency	SHEPD Cost Efficiency
Load	Asset replacement rates used	11	11	0
Non Load	Asset replacement unit rates	25	20	5
	HV Poles	15	15	0
	LV Cable	3	3	0
	Network Diversions	14	11	3
	Environmental (PCBs)	14	14	0
Non Op CAPEX	Property	5	3	3
NOCs	Tree Cutting	24	24	0
	Repairs & Maintenance	17	14	3
CAI	Core	38	25	13
BSC	Core	7	5	2
	IT	12	8	4
Total (excl OE)		**184**	**153**	**33**

D. Ongoing Efficiencies through RIIO-ED2

As we discuss in section 2, both NERA and Oxera have undertaken studies to identify the appropriate ongoing efficiency benchmarks for the industry. NERA conclude that 0.3% is the appropriate ongoing efficiency assumption whilst Oxera conclude it should be in the range of 0.1% to 0.6%.

Having taken account of the evidence on these benchmarks and our own analysis, we have decided to adopt an even more stretching ongoing efficiency assumption at 0.7% per annum, providing greater ambition compared to the industry-wide position.

Over the five years of RIIO-ED2 customers will benefit by over £141m through reduced totex allowances, delivering ambitious efficiency stretch throughout RIIO-ED2

E) Increased Activity in the latter part of RIIO-ED1, and continued through RIIO-ED2 period

The above items have driven efficiency underpinning our plans. We also highlight the increase in activity in RIIO-ED1 and RIIO-ED2 which drives an increase in our overall totex.

i) RIIO-ED1; increases in connections and associated reinforcement, diversion and asset replacement, IT and OT, Environmental, Tree-cutting over the latter part of RIIO-ED1 have also necessitated increased levels of engineering support & project management costs and provide a more realistic comparative position for RIIO-ED2. We summarise these impacts in the table below.

£m		SSEN		
Category	**Sub category**	**RIIO-ED1 first 5 years**	**RIIO-ED1 final 5 years**	**Increase / (decrease)**
Load	Connections	37	65	29
	Reinforcement	99	149	50
Non Load	Diversions / IA	61	79	18
	Asset Replacement & refurb	477	536	59
NOCs	Faults	271	282	11
	Treecutting	128	136	9
CAI		634	682	48
BSC	IT	147	192	45
Non Op Capex		65	42	(23)
High Value Projects		37	9	(28)
			TOTAL	**219**

ii) RIIO-ED2 continued activity; Section 4 below, '**RIIO-ED2 COST DRIVERS'** provides further detail into the continued increasing workload, including digitalisation, safety and security and support required on the path to net zero.

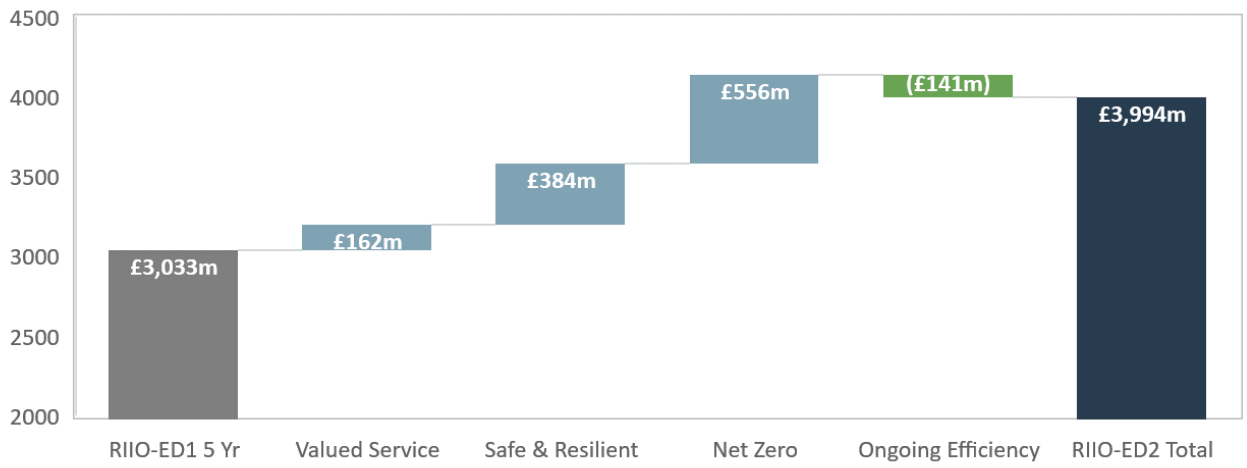
Having applied these adjustments, we are confident that our cost base is efficient as we enter RIIO-ED2. Our activity during RIIO-ED2 aims to continue that trend and improve further, adopting the operating model strategies, discussed above, that drive efficient management of the network. By driving efficient capital delivery, whole of life focus on touching the network; scale economies from increased activity; and better ways of working with our work force, we will achieve value for money for our consumers.

3. RIIO-ED2 COST DRIVERS

Throughout our plan we have detailed our proposals to deliver against the key strategic ambitions, namely: to deliver a valued and trusted service; to provide a safe, resilient, and responsive network and to facilitate the UK's transition to a net zero economy.

In this section, we summarise how our cost proposals map against these drivers in our plan. The incremental components of our cost base have a range of cost drivers which are individually explained, evidenced, and justified within our Investment Decision Packs and accompanying plan annex documents. We have summarised some of the material cost drivers in this section.

The chart below illustrates the incremental costs, split across those highlighted in Section B (A valued and Trusted Service), Section C (A safe, resiliant responsive network) and Section D (Net-zero). We then discuss some of the largest drivers of these incremental cost changes.



A VALUED AND TRUSTED SERVICE FOR OUR CUSTOMERS AND COMMUNITIES (SECTION B)

Improving our IT systems (excluding DSO related) – £137m: Many of our IT systems, and much of our IT architecture and Telecoms infrastructure are not fit for the challenges that RIIO-ED2 brings. Our RIIO-ED1 investment has created a solid platform on which we can build the DSO capabilities, open data, digitalisation, efficiencies and scalability needed for the future. In RIIO-ED2 we are now building those capabilities and aim to complete digitalisation of our IT systems during this price control. The scale and pace of change in RIIO-ED2 drives a commensurate increase in our IT investment. The individual justification for each component of our IT strategy is contained within our Investment Decision Packs. To ensure that our proposed RIIO-ED2 IT investments represent value, we appointed Gartner UK Limited to carry out a benchmarking exercise against its data base of similar deployments. Our investment proposals are within Gartner's benchmarked ranges. This includes associated license, workforce and cloud support costs.

Customer and Vulnerability – £25m: Our vulnerability strategy (£13m) for RIIO-ED2 provides Fuel Poverty and Partnership funding, award winning enabling fund, proactive educational programme and increases our workforce to provide industry standard support for our Priority Service Register customers in line with the baseline requirements set by Ofgem. Our customer strategy (£12m) is designed to meet changing customer needs and includes additional customer service advisors, and the required training and support costs to deliver our customer focused IT projects. This will enhance our online support, customer discovery and our complaints management platform.

A SAFE, RESILIENT AND RESPONSIVE NETWORK (SECTION C)

During RIIO-ED2 our underlying core safety and resilience programme expenditure remains broadly consistent with previous controls. We face incremental costs in a small number of areas through a combination of network and third-party drivers. Our expenditure increases between price controls by £384m (after efficiency) as a result of continued high levels of wayleave terminations and receipt of new data on overhead line clearances.

Overhead line clearances – £54m: Throughout RIIO-ED1 we have undertaken overhead line inspections that record the location code, associated risk and the height of the lowest point the conductor to ground/object across the network. More recently, to drive efficiencies and improve overall accuracy of the inspection data we have deployed airborne Light Detection and Ranging (LiDAR) systems to assess the entire overhead network. The LiDAR survey process has highlighted an increase in future clearance volume workloads and costs.[5] We are proposing to spend £61m across both our networks on addressing clearances. We set out our approach in more detail in our chapter and annex on ***Safe and Resilient (Annex 7.1)***.

Tree-cutting – £53m: We manage the tree population adjacent to our network to maximise benefit in terms of network safety, statutory compliance and quality of supply. The introduction of LiDAR surveys (innovation) is now providing us with materially improved quality and detail of overhead line data. To remain compliant with ESQCR we are required to resolve, where possible, all conductors below statutory limits. Our LiDAR assessment, which has been independently verified by Airbus for our Southern region, has confirmed a significant state of tree intrusion on our Southern region's LV to 132kV overhead lines. This represents a mandatory driver for a substantial programme of tree cutting to maintain public safety and the resilience and the reliability of our overhead line assets.

LiDAR has also identified significant vegetation growth around LV bare-wire conductor. To manage vegetation near our overhead electrical equipment, in addition to addressing an unprecedentedly high volume of tree-cutting activity (as indicated above) we are proposing to replace over 1,000km (equivalent to 25,000 spans) with ABC insulated conductor, tree-guards and another insulated conductor solution (Insuline). Our assessment indicates that the investment will remove the requirement to cut trees on a three-year cycle and instead revert to every 14 years when the tree-guard will itself require replacement. We set out our approach in more detail in our chapter and annex on ***Safe and Resilient (Annex 7.1)***. As we highlight in section 3, tree-cutting is an area where we have incorporated stretching unit rate ambitions with savings of £24m in total.

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5 Chapter 2 (Track Record) explains that over the eight year period we have also incurred considerably higher costs around overhead line clearances (around £40m) than envisaged in our RIIO-ED1 business plan in the first few years of RIIO-ED1. Our focus since then has been on deploying LiDAR to enable a more efficient approach to managing our overhead line network

SEPD/SHEPD Underground cables – £44m: Our ageing fleet of cables is increasingly impacting customers through the number of faults and interruptions to supply. To offset this progressive deterioration in the cable asset category we have identified the need to undertake a substantial programme of LV cable and associated service cable replacement as well as proportionate intervention in the HV cable fleet in RIIO-ED2. We expect this need to continue into RIIO ED3 reflecting the age profile of our cables. We set out our approach in more detail in our chapter and annex on ***Safe and Resilient (Annex 7.1)***.

SHEPD Subsea cables – £131m: We have identified the need for a more proactive, extensive and strategic subsea cable replacement programme. We are seeking to minimise costly reactive replacements by targeting assets at the end of their operational life and with material cost impacts should they fail while in service. The programme also recognises the strategic importance of our larger cables supporting demand and generation customers on Orkney and Uist. Further detail is contained in our ***Scottish Islands Strategy (Annex 8.1).***

Wayleaves and Diversions – £33m: When landowners no longer wish to host our assets and terminate a wayleave we need to reconfigure the network. These costs can vary greatly and lead to significant uncertainty. Throughout RIIO-ED1, we have found that the annual cost of wayleave terminations has fluctuated significantly, due to volatility in the volume and average cost of works: costs will vary significantly depending on the number of assets involved and nature of these assets (e.g. voltage levels). This makes it challenging for us to accurately forecast diversions costs for RIIO-ED2. The primary driver of the forecast higher costs in RIIO-ED2 relates to the outstanding Wayleave Terminations in SEPD from RIIO-ED1.

In RIIO-ED2 we are forecasting to spend £97m and £15m in our SEPD and SHEPD networks respectively compared to £66m and £13m respectively in RIIO-ED1. We have included savings through economies of scale arising from increased regular use of land agents and legal support. We set out our justification in our ***Safe and Resilient Annex (Annex 7.1***).

Other - £70m: these are increases across non-operational capex, property and tools (£21m); maintenance and inspections (£36m) and associated Indirects costs to facilitate increased activity in RIIO-ED2 (£28m), offset by Shetland reduction of £14m.

ACCELERATED PROGRESS TOWARDS A NET ZERO WORLD (SECTION D)

Our plan is fundamental to delivering our stakeholders' net zero ambitions which are aligned with legally binding government targets. Where we have confidence in the activities and costs underpinning our proposals, we have included these in our plans for base allowances. Where activities are less certain in terms of volume, location or costs, we propose that these are captured by uncertainty mechanisms. This will help ensure customers are protected.

The net zero investments in our base plan are driven by:

- load related investment required to support consumer uptake of low carbon technologies;
- investments required to enable our transition to DSO;
- investment in IT systems required to support net zero ambitions;
- investment in control rooms that will enable great operability of the network required under net zero; and
- investments required for us to achieve mandatory environment requirements driven by net-zero targets.

Load related investment – £309m: The primary driver for the increase in net-zero expenditure from RIIO-ED1 to RIIO-ED2 relates to load related totex (£287m), IT Connections+ project (£10m) and indirect costs (£12m) to support the increase deliverables. The drivers for this investment increase can be represented by the following metrics which emerge from the forecast energy scenarios.

- 1,660MW of EV chargers connect to our network at the end of RIIO-ED1, **rising to over 6,500MW** by the end of RIIO-ED2;
- 245k EVs in our network areas at the end of RIIO-ED1, **rising to 1.3m** by the end of the RIIO-ED2 period; and
- 208k heat pumps in our network areas at the end of RIIO-ED1, **rising to over 800k** by the end of RIIO-ED2.

We are adopting a flexibility first approach, but even with our ambition to expand network services we will face a material drive for increase load investment in the RIIO-ED2 period and beyond.

DSO related investment – £73m: Our role as a DSO is to enable the technologies, markets and solutions which are required for an efficient and effective transition to net zero. Expanding our DSO capabilities will enable this by facilitating the uptake of flexibility, low carbon technologies and market development as well as allowing us to deliver our flexibility first commitment when selecting appropriate interventions to meet network demands. The scale of the low carbon technology drivers noted above and the need to secure flexibility solutions as efficiently as possible demonstrate why the drive to implement DSO capabilities is also as strong. In RIIO-ED2 we plan to secure 5GW of flexibility services with the combined expenditure savings from deferring or avoiding reinforcement in RIIO-ED2 ranging from £18.3m to £46.3m (dependent on market liquidity) under our assumed Consumer Transformation LCT uptake scenario.

Environmental Requirements – £145m: As part of the legislative environment requirements aligned with net zero, we have included incremental expenditure of £122m across a number of activities in our core plan where we are clear on need, volume and timing. We anticipate needing to spend £42m on transformer replacement and refurbishment as a result of the PCB environmental requirements. We highlight in section 3 how we are adopting stretching unit rates achieve efficiency savings amounting to £14m for these transformer replacement and refurbishments. This also includes £10m of non-load capex is required to deliver storage solutions on our Battery Point (Stornoway) and Bowmore power stations. £5m in non-operational capex is for substation efficiencies and hybrid mobile generators with £8m indirect support costs to enable the business to deliver on these environmental requirements.

Control Room – £44m: Control rooms are the nerve centre of network and energy system operation. Rapid expansion of network operations associated with delivery of new connections and network capacity as well as the increased complexity of the system creates a significant pinch point in our RIIO-ED2 delivery plans to keep us, and our customers, on a pathway to net zero. The volume, complexity and interconnectedness of these changes will require new capabilities and greater capacity while remaining compliant with the security levels associated with Critical National Infrastructures and the SSEN Business Continuity Plan.

We have managed to avert any additional costs for customers in respect of our two control rooms (south/north) in recent price controls. The scale of change in RIIO-ED2 requires us now to make that step change in scale and security. See relevant IDPs:

- ***415_SEPD_DSO_Distribution_System_Control_Room_SEPD***
- ***416_SHEPD_DSO_Distribution_System_Control_Room_SHEPD***

NIC Funding reduction – (£15m); the increases above been offset by a reduction of NIC funding from RIIO-ED1. We have included NIA funding of £17.6m, and £10m self-funded innovation spend in our RIIO-ED2 plan.

DEALING WITH UNCERTAINTY

Our RIIO-ED2 business plan is based on need and evidence as we foresee it today. However further investment may be required during RIIO-ED2 and some of today's needs will change. Our plan includes a set of options for managing the known unknowns (uncertainties) we face in RIIO-ED2. Our balanced, yet agile approach to managing uncertainty has been woven throughout our plan. We are only proposing baseline investment with high certainty of need, aligned with Ofgem guidance and the need to protect customers from unjustified bill increases.

A key tool for managing uncertainties is **Uncertainty Mechanisms (UMs)**. UMs offer the opportunity to adjust investment to better reflect services needed by stakeholders over RIIO-ED2, recognising the external policy, economic and market evolution. This is especially important for the RIIO-ED2 period, given the pace of change required to deliver net zero. Typically, UMs are a right to request changes to allowances at the appropriate time, but not an obligation that this should be granted, with discretion remaining with Ofgem.

Our proposed UMs are targeted towards genuine, specific, and measurable areas where need has a high probability of changing and the impact of variance is significant, rather than being used as a 'catch-all' or an insurance policy. They are not designed to act as a disincentive to finding efficiencies through delivery or managing risks we should otherwise absorb in RIIO-ED2, a point we have tested carefully.

We are proposing nine UMs in addition to the Ofgem's common set, which we set out in ***Uncertainty Mechanisms (Chapter 17 and Annex 17.1)*** and summarise in the table below. Three of these build on Ofgem suggestions in the SSMD. The other seven have been developed based on extensive testing and iteration. It should be noted that some of our additional UMs (e.g. for Subsea cables) include several components incorporating multiple UM types.

		SEPD (£m)			SHEPD (£m)			SSEN (£m)		
		Base	Lower	Upper	Base	Lower	Upper	Base	Lower	Upper
SSEN proposed	Strategic investment	226.8	-2.8	+182.1	71.1	-9.5	+58.2	297.9	-30.3	+240.3
	Wayleaves & diversions	44.8	-8.9	+35.3	2.6	-1.3	+1.4	47.4	-10.2	+36.8
	Shetland	-	-	-	99.8	-12.7	+14.0	99.8	-12.7	+14.0
	Subsea cables	-	-	-	0	0	+75.7	0	0	+75.7
	Hebrides & Orkney	-	-	-	151.2	-151.2	+275.6	151.2	-151.2	+275.6
	OpEx adjustor	502.4	-9.0	+96.4	278.8	-3.3	+34.5	781.2	-12.3	+131.0
	Ash dieback removal	0	0	+38.0	0	0	+10.0	0	0	+48.0
	PCB replacement	28	0	+16.3	13.2	0	+20.2	41.6	0	+36.5
	DG Monitoring	0	0	+24.1	0	0	+16.7	0	0	+40.9
Ofgem proposed	Cyber resilience	8.2	-1.0	+5.3	8	-1.0	+5.3	16.4	-1.9	+10.6
	Black start	0	0	+14.0	0	0	+7.0	0	0	+21.0
	Environmental legislation	5.4	0	+83.9	0.2	0	+34.1	5.6	0	+117.9
	Total		-40	496		-179	553		-218	1,048

REAL PRICE EFFECTS

Ofgem sets allowances for DNOs in constant prices (i.e. in "real terms") at the beginning of each price control. Ofgem indexes allowances to changes in general inflation, measured by the Consumer Price Index including owner occupiers' housing costs (CPIH), that occur over the applicable period. The prices of DNO inputs typically grow at a different rate to CPIH. For instance, wages tend to rise faster than general inflation.

Differences between the growth rate of DNO input prices and general inflation are known as Real Price Effects (RPEs). Historically and at RIIO-2, Ofgem adjusts DNO allowances to take account of RPEs by relying on differences between the growth of benchmark indices intended to reflect the evolution of DNOs' underlying costs and general inflation. For RIIO-ED2, Ofgem Intends to set RPE allowances by indexing costs to benchmark indices.

The Energy Networks Association commissioned NERA Economic Consulting (NERA) to advise on Real Price Effects. See ***Real Price Effects (Annex 15.5)***.

NERA identify various issues with the benchmark indexation approach proposed by Ofgem. For example, it highlights it introduces inefficiencies as DNOs must manage uncertainty around year-on-year changes in allowances that do not track year-on-year changes in costs.

Working within the constraints of indexation required, NERA developed an indexing approach, showing that an RPE is necessary for each of seven DNO input cost categories, such as Specialist Labour, Materials (Capex), Materials (Opex), Plant and Equipment, etc, and identifies the set of benchmark indices that should be used to set the RPE for each cost category.

Its evaluation of DNO unit cost data also reveals that there are persistent differences between the long-run average growth of the selected benchmark indices and DNO unit costs. These differences are present even for the indices that perform best on our metrics of relevance to DNO unit costs.

To correct for these differences, NERA apply mean adjustments to the growth of the selected benchmark indices, to bring it in line with DNO unit cost growth and would amount to c.1.2% above CPIH across the various cost type categories.

Given that the macroeconomic outlook for the UK economy is currently highly uncertain, with significant pressures on input prices, supply chains and general inflation, we have considered RPEs as an uncertainty mechanism in our plan, with further careful consideration required by Ofgem prior to final allowance setting. We have forecast that RPEs will increase our RIIO-ED2 position by £235m over the five-year period.

4. SUMMARISING OUR COSTS PROPOSALS

In this section we provide an overview of the costs required for our core business plan. First, we set out the summaries of our investment proposals, highlighting the core area of investment across our geographies. We then discuss each of the lines in our cost tables, setting out context and nature of the cost and the rationale for our proposals. Further information on each of the cost categories is then sign-posted, so that the reader is able to identify the underlying rationale and justification in our plan: highlighting the chapters, annexes, Engineering Justification Papers (EJPs) and Cost Benefit Analyses (CBAs) that support the cost allowances which we have proposed.

SUMMARY OF OUR INVESTMENT PROPOSALS

SSEN core expenditure plans

Total SSEN Distribution (£m)	RIIO - ED1 Last 5 years	23/24	24/25	25/26	26/27	27/28	Total RIIO -ED2 Spend
Load	**224**	125	116	130	83	57	**510**
Non-Load	**757**	169	195	223	244	218	**1,050**
IT	**122**	36	59	54	55	48	**252**
Environmental	**35**	34	37	32	29	25	**158**
Non-Op Capex	**42**	13	14	18	19	19	**83**
NOCs	**629**	141	149	144	139	161	**735**
CAIs	**682**	150	155	159	159	159	**781**
BSC	**381**	84	87	91	92	94	**448**
Other (inc Shetland)	**162**	31	60	10	9	7	**117**
Totex (pre OE & RPE)	**3,033**	**784**	**874**	**861**	**829**	**788**	**4,135**
Ongoing Efficiency (OE)	**-**	-16	-24	-30	-34	-37	**-141**
Totex (pre RPE)	**3,033**	**768**	**849**	**831**	**795**	**750**	**3,994**
RPE	**-**	27	40	49	57	63	**235**
Totex	**3,033**	**795**	**889**	**880**	**852**	**813**	**4,229**

SEPD core expenditure plans

Total SEPD Distribution (£m)	RIIO -ED1 Last 5 years	23/24	24/25	25/26	26/27	27/28	Total RIIO -ED2 Spend
Load	138	88	94	106	61	36	**386**
Non-Load	495	107	125	131	141	129	**633**
IT	70	23	38	36	36	32	**164**
Environmental	26	25	27	22	22	21	**117**
Non-Op Capex	29	8	9	11	11	12	**51**
NOCs	430	102	108	100	101	112	**523**
CAIs	436	96	99	103	102	102	**502**
BSC	240	53	55	57	58	59	**281**
Other (inc Shetland)	29	2	2	2	2	2	**12**
Totex (pre OE & RPE)	**1,894**	**504**	**558**	**568**	**534**	**505**	**2,668**
Ongoing Efficiency (OE)	-	-11	-15	-19	-22	-24	**-91**
Totex (pre RPE)	**1,894**	**493**	**543**	**548**	**512**	**481**	**2,577**

SHEPD core expenditure plans

Total SHEPD Distribution (£m)	RIIO -ED1 Last 5 years	23/24	24/25	25/26	26/27	27/28	Total RIIO -ED2 Spend
Load	86	37	22	23	22	20	**124**
Non-Load	262	63	71	92	103	89	**417**
IT	52	13	21	19	19	16	**88**
Environmental	10	9	10	9	7	5	**40**
Non-Op Capex	13	5	5	7	8	7	**33**
NOCs	198	39	41	44	39	50	**212**
CAIs	246	54	56	57	56	56	**279**
BSC	140	31	33	34	35	35	**167**
Other (inc Shetland)	133	29	58	8	7	5	**106**
Totex (pre OE & RPE)	**1,139**	**280**	**316**	**293**	**295**	**283**	**1,467**
Ongoing Efficiency (OE)	-	-6	-9	-10	-12	-13	**-50**
Totex (pre RPE)	**1,139**	**274**	**307**	**283**	**283**	**270**	**1,417**

LOAD RELATED INVESTMENT

Load-related investment is expenditure we incur in developing additional capacity on the network to facilitate load growth and new connections, covering both demand and generation. Load-related reinforcement investment falls into the following categories:

- Connections within PC
- Primary reinforcement
- Secondary reinforcement
- Fault level reinforcement
- New Transmission Capacity Charges

In this section we discuss our baseline investment plans. However, the additional network capacity required could vary significantly relative to baseline proposals, necessitating a UM. The existing RIIO-ED1 load-related re-opener mechanism would not provide sufficient flexibility to manage the increased market uncertainties in RIIO-ED2. We discuss this in ***Uncertainty Mechanisms (Annex 17.1)***.

We summarise our baseline investment proposals for these in categories turn below:

Connections within Price Control

Our Connections business is responsible for providing more than 40,000 quotations to our customers every year. When new customers connect to our network or existing customers increase their import or export requirements there is sometimes a need to reinforce parts of our network. The costs in Connections cover all asset categories. Costs within price control are made up solely of the reinforcement costs associated with connections as any extension or sole use assets are paid for by the customer.

Using DFES Consumer Transformation, we are forecasting a significant increase in the number of both domestic and non-domestic heat pumps and electric vehicle charger applications, some of which will require upgrades to existing service connections, or the upstream/downstream networks, and includes large domestic generation projects and significant investment for data centre projects in SEPD. Proposed investment tails off end of at the period due to uncertainty in the large projects. These will be captured using our Strategic Investment UM.

To forecast the cost requirements of the high volume/low value projects we have used the historic costs associated with these types of projects and forecast any increases by technology types through the DFES. For medium volume/medium value projects we have used the Connections quotation values, which includes costings from our agreed frameworks and for large value/low volume projects where we have designed the solution. For the remainder of our large value projects, we have aligned our costing methodology to Load, as summarised in the next section.

C2 – Connections within PC

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	20.3	12.0	8.4	11.2	10.3	11.0	53.0
SEPD	45.0	34.6	54.9	39.6	15.0	15.1	159.3
SSEN	**65.3**	**46.6**	**63.3**	**50.8**	**25.4**	**26.2**	**212.3**

For more information see:

- Relevant Annex (***Connection Strategy Annex 10.2***)
- Relevant IDPs:
  350_SEPD_CONNS_BRIMBLEHILL
  367_SEPD_CONNS_DIGIPLEX
  369_SEPD_CONNS_KNIGHTSBRIDGE
  370_SEPD_CONNS_MIDDLETON
  371_SEPD_CONNS_MONKLEYLANE
  372_SEPD_CONNS_BANBURY
  374_SEPD_CONNS_LEIGH
  376_SEPD_CONNS_WINDWHISTLE

428_SEPD_CONNS_EJC976_Prince_Philip_Baracks_AldershotCC
429_SEPD_CONNS_ELN322_Network_Rail
432_SEPD_CONNS_EQE643_AH_Spring_Park
434_SEPD_CONNS_EQP844_AH_Welborne_Village
436_SEPD_CONNS_ERN991_Land_at_Westland_Farm
438_SEPD_CONNS_ESM896_Horton_Heath
439_SEPD_CONNS_ESP038_Cavalry_Barracks
440_SEPD_CONNS_EST747_Andover_Commercial_Park_OxfordCC
446_SEPD_CONNS_Barters_Farm
449_SEPD_CONNS_Faraday_Road

- Business Plan Data Tables (BPDT's) C2/V3/M30a/M30b

Primary reinforcement

Load-related investment is the expenditure required to create adequate network capacity for the changing demand and generation. DNOs are required to ensure their network is compliant with the Licence conditions and industry regulations and standards such as P2/7, G74, G99 and ESQCR. The CV1 table captures the Load-related costs and volumes for investment at 33 kV and 132 kV driven by thermal or P2 compliance requirements.

Our baseline plan has been derived on future energy scenarios assuming that the first two years will be in line with the Consumer Transformation (CT) scenario with the last three years in line with System Transformation (ST). Our rationale for this is that the CT scenario is best aligned to Government policy and stakeholder feedback, but we have opted for the lower scenario of ST for the last three years due to the inherent uncertainty that grows as forecasts move further into the future.

In assessing the solution options for all network constraints, we have considered the use of flexibility first to defer the investment as a means of reducing the net present cost. In some cases, even whilst the outcome of the CBA suggests construction of the capital solution, we plan to initially use flexibility to address the network constraint. This enables a balancing (smoothing) of the capital delivery profile for our major project portfolio across the RIIO-ED2 period which will realise efficiencies in the cost of delivery.

Our RIIO-ED2 Business Plan costs are derived from our outturn RIIO-ED1 expenditure. The Load schemes costs include Asset replacement costs, using reported unit rates, unique and site-specific costs for example civils, waterway, road or rail crossings; and local planning considerations, and the costs of flexibility to defer the need for investment.

The Flexibility First strategy is bolstered greatly in the Business Plan. All of CV1 schemes valued higher than £2m were assessed for deferral benefits using the Common Evaluation Methodology (CEM) CBA. The availability and utilisation unit costs were derived from our recent Flexibility contracts placed in RIIO-ED1 and aligned with other DNO's average costs.

In RIIO-ED1, there were several factors that resulted in a lower than expected spend, outlined below:

- Lower demand than anticipated prior to RIIO-ED1 impacting the beginning of the price control;
- Several schemes were cancelled or deferred to later in the price control; and
- Our continued drive for efficiency and using innovative solutions by employing the use of ANM schemes, reducing the need to reinforce our network.

The spend in the later years of RIIO-ED1 is expected to increase significantly as additional system reinforcements have been identified. This incorporates the £11m of embedded unit rate efficiency savings which we highlight in section 3.

CV1 – Primary reinforcement

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	48.2	17.4	6.1	7.2	6.3	4.1	41.1
SEPD	62.7	33.4	14.0	54.9	45.1	20.6	168.0*
SSEN	**110.9**	**50.8**	**20.1**	**62.1**	**51.4**	**24.7**	**209.1**

** Includes £54.2m for Fleet-Bramley scheme reported in CV25 high-value project BPDT*

For RIIO-ED2, there is a further step change in spend, in particularly for SEPD, due to our drive for Net Zero and expected high uptake of Electric Vehicles (EVs) and Low Carbon Technologies (LCTs) in the Consumer Transformation scenario. As described above, the use of Consumer Transformation in the first two years and System Transformation in the last three years was to reduce the uncertainty in our plan as the forecasted uptake of EVs and LCTs may prove to be too ambitious.

For more information see:

- Relevant Chapters ***(Chapter 9: Our Forecasting and Future Energy Scenarios & Chapter10: Our Network as a Net Zero Enabler)***
- Relevant Annex ***(Load Related Plan Build and Strategy Annex 10.1)***
- Relevant IDPs / CEMS (as detailed in the appendix of ***Load Related Plan Build and Strategy Annex 10.1***):

  44_SEPD_LRE_FleetandBramley_Substation_Group
  47_SEPD_LRE_Beaconsfield_Primary_Substation
  48_SEPD_LRE_AshlingRoad_Primary_Substation
  50_SEPD_LRE_HarvardLane_Primary_Substation
  51_SEPD_LRE_Stokenchurch_Primary_Substation
  53_SEPD_LRE_Egham_Primary_Transformers_And_Circuits_Reinforcement
  54_SEPD_LRE_AshtonPark_Circuits
  55_SEPD_LRE_Circuits_Around_Fulscot_Primary_Substation
  56_SEPD_LRE_NetleyCommon_Substation
  57_SEPD_LRE_Salisbury_Amesbury_Network_Reinforcement
  58_SEPD_LRE_FleetAlton_and_Fernhurst_Network_Reinforcement
  59_SEPD_LRE_Bramley_Thatcham_Andover_Reinforcements
  60_SEPD_LRE_Iver_Substation_Reinforcement
  61_SEPD_LRE_Reinforcements_at_Fawley_North_BSP
  62_SEPD_LRE_Replacement_Of_Mannington_Mill_Lane_Isolators
  65_SEPD_LRE_EastBedfont_A_Substation Reinforcement
  66_SEPD_LRE_Upton_System_Reinforcement
  72_SHEPD_LRE_Keith_Circuit_Reinforcements
  77_SHEPD_LRE_STMarys_Primary_Substation_P2_Compliance_Reinforcements
  78_SHEPD_LRE_Kilninver_Primary_Substation_P2_Compliance_Reinforcements
  79_SHEPD_LRE_Skulamus_Primary_Substation_P2_Compliance_Reinforcements
  82_SHEPD_LRE_PortAnn_Circuit_Reinforcements
  107_SEPD_LRE_Loudwater_BSP
  127_SEPD_LRE_CharlburyWoodstock_Ring_Network
  365_SEPD_LRE_Rutter_Pole_Circuit_Reinforcements
  423_SSEPD_LRE_New_Transmission_Capacity_Charges
  456_SEPD_LRE_Leamington Park

Secondary reinforcement

The CV2 table captures the Load-related costs and volumes for investment at LV and 11 kV driven by thermal or P2 compliance requirements.

Similar to Primary Reinforcement, the RIIO-ED2 forecast for CV2 is based on the approach outlined below.

In order to protect our customers against the costs of forecasting uncertainty, our ex-ante baseline funding only includes HV and LV load related investment required in the first two years in the RIIO-ED2 period. Unlike for EHV, even where HV and LV expenditure is identified as being required by all net zero compliant scenarios in the last three years of RIIO-ED2 (and whose volume is therefore highly certain), we have not included this in our ex-ante baseline funding request. Instead, we propose that HV and LV investment in the last three years of RIIO-ED2 will be funded via an appropriately designed, agreed, and implemented uncertainty mechanism (UM).

Flexibility at LV can significantly reduce the winter peak demand growth that is driven by the uptake of LCTs. SSEN has assessed the impact of five different sources of flexibility including Domestic SMART Charging; Domestic Vehicle to Grid; Flexible Heat from Domestic Heat Pumps; Time of Use Tariffs uptake arising from Ofgem's Access and Charging Significant Code Review; and a variety of Energy Efficiency interventions. Flexibility sources have been modelled by means of a reduction in the peak demand at each LV asset (i.e LV feeder or secondary transformer) with anticipated LCT uptake. However, the flexibility services to be procured in RIIO-ED2 is expected to include domestic vehicle to grid and flexible heat from domestic heat pumps. Our assumption for LV flexibility unit cost is £48 per kW per year. This is based on recently placed LV flexibility contracts. Recognising the LV flexibility market is still maturing we have carried out a sensitivity analysis with different flex costs in our Annex.

Our RIIO-ED2 Business Plan costs are derived from our outturn RIIO-ED1 expenditure. We have modified costs per activity, capturing and reporting those adjustments in our cost-book. By tying our costs back to reported, outturn, real life data this approach provides multiple data points on which both the Regulator and we can benchmark cost efficiency. It provides a high level of cost confidence in our Business Plan cost forecast for RIIO-ED2.

CV2 – Secondary reinforcement

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	3.4	4.9	3.5	0.0	0.0	0.0	8.4
SEPD	7.8	7.7	10.1	0.0	0.0	0.0	17.7
SSEN	**11.2**	**12.6**	**13.6**	**0.0**	**0.0**	**0.0**	**26.2**

In RIIO-ED1, there were several factors that resulted in a lower than expected spend, outlined below:

- Lower demand than anticipated prior to RIIO-ED1 impacting the beginning of the price control;
- Several schemes were cancelled or deferred to later in the price control; and
- Our continued drive for efficiency and using innovative solutions by employing the use of ANM schemes, reducing the need to reinforce our network.

The spend in the later years of RIIO-ED1 is expected to increase significantly as additional system reinforcements have been identified.

For RIIO-ED2, there is a further step change in spend, in particularly for SEPD, due to our drive for net zero and expected high uptake of Electric Vehicles (EVs) and Low Carbon Technologies (LCTs) in the Consumer Transformation scenario.

For more information see:

- Relevant Chapters (***Chapter 9: Our Forecasting and Future Energy Scenarios & Chapter 10: Our Network as a Net Zero Enabler***)
- Relevant Annex (***Load Related Plan Build and Strategy Annex 10.1***)
- Relevant IDPS:
  69_SHEPD_LRE_HV_Feeders
  70_SHEPD_LRE_LV_Feeders
  68_SEPD_LRE_Secondary_Distribution_Transformers

Fault level reinforcement

Load-related investment is the expenditure required to create adequate network capacity for the changing demand and generation. The CV3 table captures the Load-related costs and volumes for investment at all voltages driven by fault level requirements.

Fault level assessment is to identify any areas of the network where the fault level exceeds 95% of the rating of EHV system protection (or 100% of circuit rating) due to the increase in demand and/or generation. If a fault occurs and the fault level exceeds the interrupting current rating of the connected switchgear, this may cause severe damage to assets and more importantly risk the safety of anyone around these assets at the time of fault. This assessment has been run at worst case (maximum demand/maximum generation) and any fault levels identified to be more than the switchgear rating has been considered for reinforcement.

The solutions will be delivered through a mix of conventional and innovative solutions. Typical conventional solutions employed by SSEN include a mixture: replacing the switchgear; increasing the size of cables; replacing transformers with higher impedance units and reconfiguring the network to split busbars. Some of the innovative solutions employed by SSEN include fault current limiting devices, and real-time management of fault level. The exact solution is heavily dependent on-site specific factors which are discussed in the EJPs.

CV3 – Fault reinforcement

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	7.3	0.1	0.0	0.0	0.0	0.0	0.1
SEPD	12.0	12.6	15.2	11.7	0.0	0.0	39.5
SSEN	**19.3**	**12.7**	**15.2**	**11.7**	**0.0**	**0.0**	**39.6**

Similar to CV1, we expect to see a significant increase in spend in SSES, due largely to the expected uptake in EVs and LCTs proposed in the net zero scenarios

For more information see:

- Relevant Chapters (***Chapter 9: Our Forecasting and Future Energy Scenarios & Chapter 10: Our Network as a Net Zero Enabler***)
- Relevant Annex (***Load Related Plan Build and Strategy Annex 10.1***)
- Relevant IDPs (as detailed in the appendix of ***Load Related Plan Build and Strategy Annex 10.1***)
  60_SEPD_LRE_Iver_Substation_Reinforcement
  69_SHEPD_LRE_HV_Feeders

New transmission capacity charges

The NTCC apply to new connection assets installed after 1 April 2015 by either building a new GSP or increasing the capacity (MVA) at an existing GSP. In the latter case, the NTCC will be apportioned between PTPA and NTCC by the factor determined by dividing the old aggregate transformer capacity (MVA) by the new aggregate transformer capacity (MVA).

Reinforcement works at Iver is the only project forecast to complete during the RIIO-ED2 period for SEPD. This is driven by the high local demand increase with two new data centre connections (234MVA of total demand capacity) in the future. Six projects are due to complete during the RIIO-ED2 period for SHEPD, two of which involve new GSPs.

Projects to be completed and charged for the remainder of the RIIO-ED1 period were identified and annual Connection Charges calculated. These informed the Base Charges for NTCC and PTPA in RIIO-ED2.

Estimated additional charges for new connection projects forecast to complete in RIIO-ED2 were calculated using GAVs provided by NG ESO (SEPD) and TOCA documentation (SHEPD).

The proposed RIIO-ED2 expenditure is lower than what was asked for in RIIO-ED1 but higher than what is forecast to be delivered. There has not been the anticipated level of spend in this area; the volume of Distributed Generation connections has been less than expected. Further information is provided in the New Transmission Capacity Charges RIIO-ED2 Engineering Justification Paper.

C4 - NTCC

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	6.6	2.4	3.8	4.8	5.3	5.3	21.6
SEPD	1.3	0.2	0.2	0.2	0.4	0.6	1.6
SSEN	**7.9**	**2.6**	**4.0**	**5.0**	**5.7**	**5.9**	**23.2**

SSEN accept the proposals are more conservative than RIIO-ED1 and potentially more realistic given the current demand for distributed generation. We accept that any further uncertainty and associated risk will be mitigated through the Load Related Re-opener Mechanism that is being proposed by Ofgem.

For more information see:

- Relevant Chapters (***Chapter 9: Our Forecasting and Future Energy Scenarios & Chapter 10: Our Network as a Net Zero Enabler***)
- Relevant Annex (***Load Related Plan Build and Strategy Annex 10.1***)
- Relevant IDP: *423_SSEPD_LRE_New_Transmission_Capacity_Charges*

NON LOAD RELATED INVESTMENT

Diversions

Our approach to managing land rights related claims is designed to achieve the best outcome for consumers. The two primary forms of land access agreements used are wayleave agreements and easements (also known as deeds of servitude in Scotland).

In addition, landowners can claim compensation based on the reduction in the value of their land and property as a result of the presence of our network assets. These claims are known as injurious affections. We have experienced an increase in claims and payments during RIIO-ED1 and our forecast in RIIO-ED2. This increase is in part due to urban expansion which brings developments into contention with our assets, but also as a result of landowners and their representatives being more willing to test their rights and ours. We expect this trend will continue into RIIO-ED2 and be a significant limited factor for decarbonisation. Any significant activity increases relating to these often-complex injurious affections claims will require us to build internal capacity in RIIO-ED2. As a general rule, we do not automatically pay out compensation for injurious affections claims. While this may result in disputes being taken to court and taking longer to resolve, it protects customers from unnecessary payments.

In RIIO-ED2 we believe we will need to spend £162.8m and £27.8m in our SEPD and SHEPD regions respectively to address this area of Wayleaves and Compensation compared to £65.1m and £15.3m respectively in RIIO-ED1. The increase in RIIO-ED2 costs reflects our need to increase our processing of claims, and thus the associated costs of settling these Wayleaves and Compensation. However, given the scale of potential increase, we are proposing a baseline allowance for our current view of the costs combined with an uncertainty mechanism to allow for us either to recover any additional efficient costs or for the return of unspent allowances to consumers.

CV5 – Diversions

DNO	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	13.0	3.1	3.1	3.1	3.1	3.0	15.3
SEPD	65.9	17.2	18.7	20.3	20.3	20.3	96.7
SSEN	**78.8**	**20.3**	**21.8**	**23.3**	**23.3**	**23.3**	**112.0**

Given the significant uncertainty associated with wayleaves, injurious affections and diversions, we are proposing a baseline allowance for our current view of the costs combined with an uncertainty mechanism to allow for us either to recover any additional efficient costs or for the return of unspent allowances to consumers. As such, we have excluded £78.6m, due mainly to injurious affections costs being removed from our baseline costs. As described above, we believe there will be upward cost pressures, which we intend manage within our forecast where possible, however a RIIO-ED2 close out mechanism may be required if costs increase further than anticipated.

Our proposed mechanism has two components: (i) a re-opener for additional physical diversions spend; (ii) a close out mechanism for injurious affection spend. For further information, please see ***Uncertainty Mechanisms (Chapter 17)***.

For more information see:

- Relevant Chapter (***Chapter 06 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant Annex (***Annex 17.1 Uncertainty Mechanisms***)
- Relevant IDP*: 321_SSEPD_NLR_Distribution_Systems_Asset_Diversions*

Asset replacement

Asset replacement is the largest area of expenditure in non-load network investment, both in RIIO-ED1 and into RIIO-ED2. Our intervention strategy, which focuses on replacing or refurbishing assets which are mostly likely to fail and have the largest impact if they do fail, will remain unchanged, but the volumes of activity across the asset categories will be different. This will be influenced by the condition of the assets, network performance, historical activity levels and projected future requirements.

CV7 – Asset replacement

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	179.2	42.4	36.7	34.9	42.2	38.8	195.0
SEPD	305.4	58.4	68.2	68.7	71.4	69.6	336.3
SSEN	**484.5**	**100.8**	**104.8**	**103.5**	**113.6**	**108.4**	**531.2**

Efficiencies in our asset replacement programme incorporate the unit rate efficiency which we discuss in Section 3. The costs are based upon RIIO-ED1 6-year average unit costs and where these are above upper quartile benchmarking, an efficiency has been applied (SEPD -5% and SHEPD -2.5%) to the proposed unit costs, which is to be delivered in time for the start of RIIO-ED2 and is referred to as our RIIO-ED1 catch-up efficiency. In addition, we anticipate efficiencies arising from economies of scale for LV cables and HV poles. In total we're accounting for £43m of efficiency benefits embedded into our asset replacement programme.

We have included an uncertainty mechanism for asset replacement for Subsea Cables, which we discuss in ***Annex 17.1***. We are proposing baseline-funded proactive replacement and general repairs on its subsea cables, but there remains a risk of unforeseen cable faults, which we cannot fully control. These faults may require substantive remedial reactive works, including reactive cable replacement, the costs of which are not captured in the baseline plan.

Our volumes of activity relate to replacement of assets for:

- 61 different asset classifications covered under the NARMs reporting structure (CV7a)
- The 42 Non-NARMs asset classifications not included in the above (CV7b)
- And the Civil works associated with all the above (CV7c)

CV7a - NARMs Reporting Structure

We have identified volumes utilising the Ofgem approved common methodology for NARM related assets; identifying those for asset replacement under our Network Asset Intervention Methodology (NAIM). Unit costs have been driven using our 6-year average performance in RIIO-ED1 with a cost efficiency applied. Where possible low loss transformers are being utilised in Grid, EHV and HV Transformers with the planned introduction of on load tap changers for our HV transformers during RIIO-ED2 which have increased costs compared to RIIO-ED1.

DNO	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	148.2	31.4	23.7	21.0	27.4	24.3	127.8
SEPD	251.5	34.1	41.4	39.3	40.1	36.9	191.9
SSEN	**399.6**	**65.5**	**65.2**	**60.3**	**67.6**	**61.2**	**319.7**

SHEPD spend reduces by 14% in RIIO-ED2 due largely to the subsea replacement, both HV and EHV, seen in RIIO-ED1 (£88.1m), compared to the proactive subsea replacements in RIIO-ED2 (£63.5m). This was partly offset by more overall replacement volumes expected in RIIO-ED2.

For SEPD, we are forecasting a drop of 24% compared to last 5 years of RIIO-ED1. There are three key areas of replacements where RIIO-ED1 spend is higher than our RIIO-ED2 forecast: HV GM Circuit Breaker (£14m), EHV Underground Cable (Non-Pressurised) (£19m), and 132kV Underground Cable (Non-Pressurised) (£27m).

CV7b - Non-NARMs asset classifications

For Non-NARMs assets, we have a systematic approach based on industry best practice to strike that balance and to identify which assets we should replace before failure based on the consideration of the likelihood of failure (or Asset Health) and the Criticality of Failure (i.e. impact on our customers). Our approaches which differ by asset types, are detailed in in the annex and chapter. Our costs are primarily driven by the replacement son LV cables and HV cables.

We propose to spend £38.5m on replacement of 350km of LV cables in SEPD region; and £16.3m on replacement of 164km of LV cables in our SHEPD region. This compares to a combined replacement expenditure of £15.0m and expected refurbishment expenditure of £2.2m in RIIO-ED1.

We are proposing to replace 200km and 95km of HV cables in our SEPD and SHEPD regions respectively in RIIO-ED2 to deliver the safety and improved reliability we have committed and will deliver to our employees and customers. This will cost £34.7m and £10.3m respectively, reflecting the different operating environments between our two regions and compares to an expected comparative spend in RIIO-ED1 of £16.7m and £4.9m.

DNO	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	25.1	9.8	11.6	12.5	13.0	13.1	60.1
SEPD	40.9	22.2	24.4	26.5	27.8	30.1	130.9
SSEN	**66.0**	**32.0**	**36.0**	**38.9**	**40.8**	**43.2**	**191.0**

CV7c – Civils due to Asset Replacement

Civil works driven by asset replacement (CV7c) are carried out when an item of distribution equipment is replaced and requires a civil item to be altered, i.e. a new plinth may be required when installing a replacement ground mounted transformer. Forecast expenditure driven through asset replacement is £20.5m during RIIO-ED2. There is a slight increase to RIIO-ED1, due largely to the volume mix increasing the cost in RIIO-ED2.

DNO	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	5.9	1.2	1.3	1.4	1.7	1.4	7.0
SEPD	12.9	2.1	2.4	2.9	3.5	2.6	13.5
SSEN	**18.9**	**3.3**	**3.7**	**4.3**	**5.2**	**4.1**	**20.5**

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDPS:
  305_SSEPD_NLR_11kV_Primary_Switchgear
  306_SSEPD_NLR_EHV_Switchgear
  307_SSEPD_NLR_132kV_Switchgear
  308_SSEPD_NLR_6.6kV_&_11kV_Distribution_Ground_Mounted_Transformers
  309_SSEPD_NLR_EHV_Transformers_Ground_Mounted
  310_SSEPD_NLR_132kV_Transformers
  311_SSEPD_NLR_LV_Underground_Cable_and_Services
  312_SSEPD_NLR_HV_Underground_Cable
  313_SSEPD_NLR_EHV_and_132kV_Underground_Cable
  314_SSEPD_NLR_LV_Switchgear
  315_SSEPD_NLR_Link_Boxes
  316_SSEPD_NLR_LV_Overhead_Line
  317_SSEPD_NLR_HV_Poles
  318_SSEPD_NLR_EHV_Poles
  321_SSEPD_NLR_Distribution_Systems_Asset_Diversions
  *322_SSEPD_NLR_Rising_and_Lateral_Mains_*
  323_SSEPD_NLR_Civil_works_driven_by_Civils_Condition_&_Asset_Replacement
  324_SSEPD_NLR_Tree_Cutting
  325_SSEPD_NLR_Dismantlement
  327_SSEPD_NLR_Asbestoes_Management
  339_SEPD_NLR_WSC_SEPD
  424_SSEPD_OT_OTN ROLLOUT

Asset refurbishment Non-NARM

The works associated with Asset Refurbishment Non-NARM are focused on asset management and upkeep to reduce the potential for substantial investment to replace or fully refurbish an asset. This investment helps to keep our network operating safely and reliably; ensuring that our pressurised cables are maintained to avoid leaks is critical for a safe and reliable network, and for the environment.

Refurbishment sits across numerous asset types including: Poles (Replacement of insulator sets, stays and steelwork), Towers (Replacement of step bolts and Painting), LV UG Cables (Transferring services to new mains cable) and EHV UG Cable (Replacing pressurising equipment, gauges and pipework).

Other than LV Service transfers, the volumes in RIIO-ED1 for all other categories are relatively similar or reduced. LV Service transfers have increased due to our proposal to replace more LV Mains cable in RIIO-ED2 compared to RIIO-ED1 (a CV7b activity). Our increase in LV cable overlays also requires us to invest in moving existing service cables to the new mains cable; this has no health impact on the service but is a necessary investment to ensure end users have a reliable supply. This is primarily due to the investments described above: £25m increase due to the larger Protection programme of works and £18m increase to LV Service replacement spend in RIIO-ED1 vs RIIO-ED2.

CV8 – Refurbishment Non-NARM

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	4.6	2.2	3.1	3.3	4.7	5.2	18.6
SEPD	16.9	5.2	6.3	6.8	9.6	10.0	37.9
SSEN	**21.5**	**7.3**	**9.5**	**10.1**	**14.3**	**15.2**	**56.4**

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDPS:
  316_SSEPD_NLR_LV_POLE)
  317_SSEPD_NLR_HV_POLES
  318_SSEPD_NLR_EHV_POLES
  313_SSEPD_NLR_EHV_132kV_UG
  424_SSEPD_NLR_PROTECTION
  425_SSEPD_NLR_33kV_132kV_TOWERS

Asset refurbishment NARM

Asset refurbishment is relatively small area of expenditure in non- load network investment, both in RIIO-ED1 and into RIIO-ED2. Our intervention strategy, which focuses on replacing or refurbishing assets which are mostly likely to fail and have the largest impact if they do fail, will remain unchanged, but the volumes of activity across the asset categories will be different. This will be influenced by the condition of the assets, network performance, historical activity levels and projected future requirements.

Our volumes of activity relate to refurbishment of a number of asset classifications, mainly around HV, EHV and 132kV switchgear and transformers. The proposed volumes are broadly aligned to the similar period of replacement asset volumes in RIIO-ED1 but now driven by the CNAIM with specific asset refurbishment programme in SHEPD for EHV Switchgear. For both SEPD & SHEPD there is also a significant increase in the planned work on steel tower refurbishment throughout RIIO-ED2. Unit costs have been driven using our 6-year average performance in RIIO-ED1 with a cost efficiency applied.

Generally, assets will be replaced on a like-for-like basis using modern equivalents, although larger capacity assets may be used either to reduce network losses or to take account of anticipated load growth. The anticipated load growth from the increased uptake of low carbon technologies (such as electric vehicles and heat pumps) means that consideration will be given to installing greater capacity assets where there is a strong indication that load growth will take place.

This incremental reinforcement should negate the need for subsequent reinforcement as load increases, meaning that assets are only touched efficiently in the medium-term future.

CV9 – Refurbishment NARM

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	1.9	0.2	0.2	0.2	0.4	0.4	1.3
SEPD	28.9	3.8	4.0	3.0	3.1	3.1	17.0
SSEN	**30.8**	**4.0**	**4.1**	**3.2**	**3.5**	**3.5**	**18.3**

The small incremental increase in material costs will reduce long-term costs particularly for cable assets, where the majority of the costs arise from excavation and reinstatement.

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDPs are:
  305_SSEPD_NLR_11kV_SWGR
  306_SSEPD_NLR_33kV_SWGR
  307_SSEPD_NLR_132kV_SWGR
  308_SSEPD_NLR_HV_TRANSF
  309_SSEPD_NLR_EHV_TRANSF
  310_SSEPD_NLR_132kV_TRANSF
  311_SSEPD_NLR_LV_UG
  312_SSEPD_NLR_HV_UG
  313_SSEPD_NLR_EHV_132kV_UG
  314_SSEPD_NLR_LV_SWGR
  315_SSEPD_NLR_LINKBOXES
  316_SSEPD_NLR_LV_POLES
  317_SSEPD_NLR_HV_POLES
  318_SSEPD_NLR_EHV_POLES
  323_SSEPD_NLR_CIVILS
  425_SSEPD_NLR_33kV&132kV_TOWERS

Civil Works Condition Driven

Civil works driven by condition of civil items (CV10) includes the condition-based replacement of doors, roofs, enclosures, surrounds, as well as remedial works to building fabric and the upgrade of electrical installations on grid, primary and secondary sites.

A combination of condition-based assessments and trends in historic volumes has been used to forecast the volumes and expenditure of substation civil assets. The main risks in respect to these civils assets have been identified and considered and remain unchanged from RIIO-ED1. In addition, a mixture of survey reports and risk assessments have been used to forecast volumes and expenditures for specific programmes of work such as the RAAC roof replacements and substation venting requirements.

Our proposed forecast for the works associated with civils assets due to condition on HV, EHV and 132kV substations is £28.5m during RIIO-ED2.

CV10 – Civils due to the Condition of Civil Assets

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	4.0	1.2	1.2	1.2	1.2	1.2	6.2
SEPD	16.1	4.4	4.4	4.4	4.4	4.4	22.2
SSEN	**20.1**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**28.5**

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDP: *323_SSEPD_NLR_Civil_works_driven_by_Civils_Condition_&_Asset_Replacement*

Blackstart

The primary driver for RIIO-ED2 costs in this activity area is mobile voice communications required to improve our black start capability. No costs have been included for SCADA infrastructure.

In RIIO-ED1, we currently rely on a Public Switched Telephone Network (PSTN) service for over 800 PSTN lines to provide voice communications connectivity to substations. PSTN services are planned to be ceased by British Telecommunications (BT) in 2025 and no suitable blackstart alternative is being offered for a substation deployment by BT. The OTN rollout in RIIO-ED2 provides an opportunity to establish a resilient Voice over IP solution in many substations. Wherever possible, we will use this solution to mitigate the loss of the PSTN, but this will only cover a small number of sites by the end of 2025.

We already own and operate a Private Mobile Radio network which has been tested and proven in service. Where no other alternative exists, we will extend our Private Mobile Radio network to cover many of our substations and provide resilient voice communications.

CV12 – Blackstart

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	1.0	0.9	0.9	0.0	0.0	0.0	1.8
SEPD	0.8	1.9	1.9	0.0	0.0	0.0	3.8
SSEN	**1.8**	**2.8**	**2.8**	**0.0**	**0.0**	**0.0**	**5.6**

We have seen little spend in the category over the last 3 years and forecast minimal spend in the remaining 2 years of RIIO-ED1. This driven, as described above, by our need to include costs to extend the range of our existing Private Mobile Radio network, all of which we would expect work to be completed in the first two years of the new price control.

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 5.1 Digitalisation Investment Plan***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDP: *419_SSEPD_OT_Personnel Comms*

Legal and safety

Safety and statutory compliance are two of our main drivers for investment. Our decisions are driven by the HSE, ESQCR commitments and our safety culture. The key areas of the £14.5m investment for RIIO-ED2 Legal and Safety BPDT covers a variety of categories including site security, asbestos management, and operational restrictions. To ensure compliance with the Control of Asbestos Regulations (CAR) 2012 and the safety of SSEN assets, staff, and members of the public, we propose to spend £3.2m managing Asbestos Containing Material during RIIO-ED2. To adhere to the National ENA standard, we plan to spend £4.5m on security enhancements at our sites to ensure the continued safety of the public and deter unwanted access and potential theft. In line with PR-NET-ENG-028, the National Equipment Defect Reporting Scheme and Association with Operational Restrictions, we propose to invest £3.7m during RIIO-ED2 to manage Operational Restrictions across our network.

Our proposed expenditure is driven by the HSE, ESQCR commitments and our safety culture. The Legal & Safety EJPs provides justification for capital expenditure to ensure the continued safety of the public and our employees are met.

CV14 – Legal and Safety

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	5.6	0.8	0.8	0.8	0.8	0.8	4.0
SEPD	14.5	2.1	2.1	2.1	2.1	2.1	10.5
SSEN	**20.1**	**2.9**	**2.9**	**2.9**	**2.9**	**2.9**	**14.5**

Comparing to RIIO-ED1, we are reducing costs at similar levels for both SEPD and SHEPD. The reduction is costs can be attributed to RIIO-ED1 including a relatively large project (Handled Operated Airbrake replacement), partly offset by the Operational Restrictions work mentioned above.

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDPs:
  315_SSEPD_NLR_LINK BOXES
  320_SSEPD_NLR_LEGAL
  327_SSEPD_NLR_ASBESTOS

Quality of Service and North of Scotland Resilience

Quality of Service (QoS) table in the BPDTs covers expenditure covering Remote Location Capex and North of Scotland Resilience. For RIIO-ED2 this includes:

- £24.2m QoS costs to improve reliability and performance to meet our IIS Targets
- £16.5m remote location capex costs for our Distributed Embedded Generation (DEG) sites in Scotland in line with both our safe and resilient and environmental strategies
- £21.8m on North of Scotland Resilience (NoSR) to support our plans to reduce the average number of higher voltage interruptions experienced by WSC

Quality of Service

The QoS expenditure is associated with targeted investment in Automation and Lightning protection for the specific purpose of improving network performance. The circuits being targeted are those that have been impacted by unplanned outages over the course of the last 5 years.

Automating our HV circuits will enable us to restore electricity supplies quickly to more customers should an unplanned outage occur. Through automated switches determining the fault location and sectionalizing the circuit, we can restore supplies to the majority of customers on a circuit within 3 minutes; unlike previous restoration plans which would require manual intervention requiring greater times off supply.

When lightning strikes our network the significant surge in current can damage our assets and subsequently impact the supplies to customers by causing unplanned outages. We undertook an innovation trial on lightning protection in RIIO-ED1 and the trial was proven to be a success. As a result, we are proposing to target circuits in RIIO-ED2 that have a history of being impacted by lightning strikes.

North of Scotland Resilience

NoSR expenditure is used to address the Worst Served Customer (WSC) issues in the SHEPD licenced area. WSC is defined in RIIO-ED2 as any customer experiencing more than 12 interruptions over consecutive 3 years with minimum 2 interruption each year. The majority of the WSC sites are in the remotest part of the North of Scotland. The investment in these areas to improve the quality of supply and reduce customer vulnerability is the top priority of our strategy. The schemes have been carefully selected and passed through the Cost Benefit Analysis to make sure the optimum Net Present Value of the proposed investment.

SHEPD has 11,743 WSCs based on the data from reporting year 2019/20. Our strategy in RIIO-ED2 is to reduce this number by 75% by the end of the ED2 period. This is achieved through investment in the network to improve the resilience and reduce the number of customer interruptions. This forms an important part of the RIIO-ED2 activity as it improves the QoS and the resilience of the network in the remotest areas in SHEPD.

Remote Location Generation

SSEN have seven embedded island generation sites. These sites play a crucial role on the Scottish Islands often being the last resort to keep power flowing to homes and businesses during planned maintenance or faults on the network. They are used to provide security of supply for customers, and as backup and provide a security of supply to customers. Our embedded stations are one variable in the whole system solution we will be looking into in the early part of RIIO-ED2 for the Scottish Islands

The Primary Driver of cost is North of Scotland Resilience. Without these generators the security of supply for customers on the Western Isles is compromised. Replacing these will also improve environmental performance. Costs have been evaluated in line with similar works carried out in RIIO-ED1. As an example, the £9m of work proposed for Battery Point is similar to works carried out at Lerwick Power station in RIIO-ED1, therefore we have a high-cost confidence in this.

We include a re-opener in our plans for adjustment of baseline allowances, depending on required investment by SSEN regarding the Whole System solution, which is our longer-term approach. This will be triggered only within the first two years of RIIO-ED2 unless otherwise directed by Ofgem.

CV15 – Quality of Service and North of Scotland Resilience

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	50.4	8.7	10.1	7.8	9.3	9.1	44.9
SEPD	20.1	6.5	6.7	4.5	0.0	0.0	17.6
SSEN	**70.4**	**15.2**	**16.7**	**12.3**	**9.3**	**9.1**	**62.5**

For more information see:

- Chapter (***Chapter 7 Maintain a resilient network***)
- Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDPs:
  397_SSEPD_NLR_HV_AUTOMATION
  341_SHEPD_REGIONAL_WSC_ARISAIG
  342_SHEPD_REGIONAL_WSC_BARVAS

343_SHEPD_REGIONAL_WSC_LOCHINVER
344_SHEPD_REGIONAL_WSC_CLACHAN
348_SHEPD_REGIONAL_WSC_LAXAY
349_SHEPD_REGIONAL_WSC_DRIMORE
381_SHEPD_REGIONAL_WSC_UNST
382_SHEPD_REGIONAL_WSC_GUTCHER
383_SHEPD_REGIONAL_WSC_BRAE
384_SHEPD_REGIONAL_WSC_TARBET
385_SHEPD_REGIONAL_WSC_STROMNESS
398_SHEPD_REGIONAL_WSC_ACHILTIBUIE
345_SHEPD_REGIONAL_BATTERYPOINT
386_SHEPD_REGIONAL_Remote Generation_SSEPD

Physical security

Our Control Centres (CC) are a critical hub in our business operations. They provide the safety, monitoring, scheduling, and control of our system; all operational network activity flows through the CC. In addition, they are the primary source of operational and real time data and liaison for external stakeholders and Customers such as the ESO, adjacent DNOs and embedded generators. These centres are deemed as Critical National Infrastructure by the Centre for the Protection of National Infrastructure (CPNI). The criteria for meeting the security requirements of CPNI have increased significantly in recent years to reflect the international threat level and increased criticality of the electrical network.

Our CCs have historically been the focus of rationalisation and merging in the interest of maintaining an efficient fit for purpose facility, as a result our investments historically have been negligible. RIIO-ED2 fundamentally changes the scale, function and criticality of our CCs and as a result this expenditure is new with no equivalent in RIIO-ED1. Our investment during RIIO-ED2 is required as currently CCs:

- are not suitable for conversion to meet the CPNI requirements;
- do not have the physical capacity to support the delivery of the volumes of activity that RIIO-ED2 will bring; and
- do not have the physical capacity to support the new capabilities required of Open Data, Flexibility Services and the enhanced visibility necessary to support the transition to net zero.

In assessing the scale of investment necessary we have considered several options against the CPNI criteria and scaled the size of the CC operation to reflect our RIIO-ED2 Growth scenarios. We have subsequently independent Construction consultants to provide us with an options assessment and cost estimates against these requirements. For our SHEPD CC the optimal option is the re-purposing of an existing building to provide a new CC, our costs of £14.9m. For SEPD CC the selected option is the re-purposing of an existing site and creation of a new structure to provide a new CC with costs of £29.1m.

C3 – Physical Security

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	0.0	1.5	3.7	7.5	2.2	14.9
SEPD	0.0	0.0	2.9	7.3	14.6	4.4	29.1
SSEN	**0.0**	**0.0**	**4.4**	**11.0**	**22.0**	**6.6**	**44.0**

In evaluating these costs our external advisors to provide us with the costed design options in both in SEPD and SHEPD, they have extensive experience in the design and delivery of similar Critical Infrastructure, in particular Control Room facilities in multiple sectors.

For more information see:

- Chapter (***Chapter 6 Safety and Compliance***)
- Relevant IDPs: *320_SSEPD_NLR_Legal_&_Safety_Site_Security*

Rising and lateral mains

In response to the Grenfell tower block fire in London in 2017, the HSE are reviewing the arrangements for all utility services to manage such buildings. This is partly in response to the tower block fire in London in 2017 but ultimately to ensure that no buildings are at risk due to faulty or poor condition assets.

We are proposing to spend £29.3m to manage RLM during the RIIO-ED2 period. Due to a high population of RLM on the network, we have taken an efficient approach and recently inspected a statistically significant sample size of multi occupancy buildings across SEPD and SHEPD and extrapolated the condition data to help understand the condition of SSEN's asset base. The results from the recently completed inspection programme have been used to determine the final volumes and associated costs for RLMs in RIIO-ED2.

The final volumes for both RLMs related inspections and interventions reflect the increased focus on the safety of high-rise multi-occupancy dwellings. The large increase from RIIO-ED1 is due to a combination of the increased focus on safety related concerns in multi-storey buildings and the ageing RLM asset base and associated non-compliant RLM assets.

Our RIIO-ED2 Business Plan costs are derived from our outturn RIIO-ED1 expenditure. We have modified costs per activity, capturing and reporting those adjustments in our cost-book. By tying our costs back to reported, outturn, real life data this approach provides multiple data points on which both the Regulator and we can benchmark cost efficiency. (See EJP – costs have been derived via engagement with stakeholders in BAU who were involved in the recent phase one RLM inspection programme)

CV17 – Rising and Lateral Mains (RLMs)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.8	0.5	0.8	1.4	1.4	1.4	5.5
SEPD	0.9	2.4	3.6	6.0	6.0	6.0	23.9
SSEN	**1.7**	**2.9**	**4.4**	**7.3**	**7.3**	**7.3**	**29.3**

For more information see:

- Relevant Chapter (***Chapter 6 Safety and Compliance***)
- Relevant Annex (**A 7.1 Safe and Resilient**)
- Relevant IDP: *315_SSEPD_NLR_RISING & LATERAL MAINS*

Overhead line clearances

Investment in this category is required as it is driven by compliance with ESQCR and public safety. ESQCR 2002 was established to provide clear guidance on minimum OHL heights to the ground / objects / buildings and categorise the different levels of risk associated with the OHL network. Identifying and addressing the conductor clearances, in line with ESQCR, ensures that the public, industry, contractors and our operational staff remain safe when undertaking daily activities or work around our OHL assets. Managing our OHL conductor clearances ensures that we are operating and maintaining a safe and reliable network.

The deployment of Light Detection and Ranging (LiDAR) technology has highlighted that our OHL network, especially at low voltage, requires additional work to ensure safe clearance to ground and buildings. This is to ensure that we maintain the required levels of public safety. The introduction of LiDAR technology has been key to developing a more accurate and in-depth understanding of our assets. Acting on new and enriched data and information means we can keep the public and our colleagues safe. We are proposing to spend £60.5m across both our networks on OHL clearances.

CV18 – Overhead line clearances

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.8	2.6	4.2	5.8	6.8	6.8	26.2
SEPD	5.8	4.1	5.5	6.9	8.9	8.9	34.3
SSEN	**6.7**	**6.7**	**9.7**	**12.6**	**15.7**	**15.7**	**60.5**

LiDAR provides a view of the entire network in a single year, whereas we were only aware of clearance infringements as and when inspectors walked each OHL circuit. As a result, we have identified every clearance infringement in a single inspection; hence the increase in volumes and associated costs compared to RIIO-ED1. We therefore propose to spend £34.3m and £26.2m respectively in our SEPD and SHEPD regions.

For more information see:

- Relevant Chapter *(**Chapter 6 Safety and Compliance**)*
- Relevant Annex (***Annex 7.1 Safe and Resilient***)
- Relevant IDP: *418_SSEPD_NLR_OHL_CLEARANCES*

Worst served customers

Worst served customers (WSC) are identified as customers who experience a high number of interruptions over a number of subsequent years. The Primary Investment Driver is the number of high Voltage faults that the customers experience as recorded by SSEN Network Management Centre. Using our most recent performance figures (2019/20), we have calculated that SEPD have 5,436 customers that meet this WSC criteria. This is based on Ofgem's definition for RIIO-ED2.

We are committing to removing at least 75% of customers from this list in RIIO-ED2 which is supported by our Stakeholders. Following the entirety of optioneering and all detailed analysis, as set out in our EJP 339_REGIONAL_WSC_SEPD, the proposed scope of works is to target 32 circuits in SEPD to improve the quality of service to 4,122 of our WSC.

SEPD will spend £3.3m to deliver the preferred solution for each circuit within the RIIO-ED2 regulatory period. The costs are based on completed projects from RIIO-ED1 that are similar in content to the proposals.

CV19 – Worst Served Customers

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEPD	2.6	0.7	0.7	0.7	0.7	0.7	3.3
SSEN	**2.6**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**3.3**

For more information see:

- Relevant Chapter: *(**Chapter 7 Maintain a Resilient Network**)*
- Relevant Annex *(**Annex A 7.2 Reliability Strategy**)*
- Relevant IDPs:
  339_REGIONAL_WSC_SEPD

High value projects RIIO-ED2

For RIIO-ED2, we have included three new cable projects in SHEPD. These three cables are critical components of our proposed whole system approach during RIIO-ED2. The work will allow us to continue a whole system assessment in RIIO-ED2, including assessing relative export capacity needs from these major island groups. The proposal is to install 36km of cable between the mainland and Orkney, and to replace the existing cable between Skye and South Uist and in the process add an additional cable between Skye and North Uist. The total cost of these projects is £83.9m.

Additionally, the load related expenditure associated with Fleet and Bramley 400/132kV substation group amounts to £54.2m. We discuss this his further in our description of primary reinforcement costs above.

Both of these projects have been costed using RIIO-ED1 costs and the basis of the costs is detailed in the EJPs.

CV25 – RIIO-ED2 High Value Projects

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	0.0	8.0	30.4	25.9	19.6	83.9
SEPD	0.0	0.0	0.0	7.4	28.6	18.2	54.2
SSEN	**0.0**	**0.0**	**8.0**	**37.8**	**54.6**	**37.8**	**138.1**

For further information see:

- Relevant Chapter (***Chapter 18, Competition***)
- Relevant Chapter (***Chapter 8, Supporting the Scottish Islands***)
- Relevant Chapter (***Chapter 10, Our Network as a Net Zero Enabler***)
- Relevant Annex (***Annex 8.1, Supporting the Scottish Islands***)
- Relevant Annex (***Annex 10.1, Load Related Plan Build and Strategy***)
- Relevant IDPS:
  458/SHEPD/SUBSEA/SKYS_UIST_SOUTH,
  328/SHEPD/SUBSEA/SKYS_UIST_NORTH
  329/SHEPD/SUBSEA/PFW

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C4 – IT and Telecoms (Non-Op)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	33.0	8.9	12.0	10.0	9.8	7.5	48.2
SEPD	51.0	16.5	22.3	18.6	18.1	13.9	89.5
SSEN	**84.1**	**25.5**	**34.3**	**28.6**	**27.9**	**21.4**	**137.7**

For further information see:

- Relevant Chapter (***Chapter 5 IT, OT and Digital***)
- Relevant Annex (***Annex 5.1 Digitalisation Investment Plan***)
- Relevant IDPs:
  1_SSEPD_IT_DSO_Flexibility_Contracting
  21_SSEPD_IT_ASSET_Connectivity++
  22_SSEPD_IT_ASSET_Digital_Communications
  23_SSEPD_IT_Digital_Workplace
  25_SSEPD_IT_ASSET_Envirotrack

27_SSEPD_IT_Asset_Optimisation
29_SSEPD_IT_DSO_DSO_Management_Optimiser
30_SSEPD_IT_DSO_Low_Carbon_Technology_Analytics
32_SSEPD_IT_Linear_Assets
33_SSEPD_IT_ASSET_MDM_Datalake
34_SSEPD_IT_CONNS_Open_Door
35_SSEPD_IT_Tailored_Insights
36_SSEPD_IT_CONNS_Connections+
37_SSEPD_IT_CUST_Telephony_Modernisation
38_SSEPD_IT_CUST_Outage_Notifications
39_SSEPD_IT_DSO_Power_System_Analysis+
40_SSEPD_IT_DSO_Commerical_Optimisation
41_SSEPD_IT_DSO_DSO_Enablement_Orchestrator
42_SSEPD_IT_NRL_Work_Management2
417_SSEPD_IT_Smart_Meters+
426_SSEPD_IT_Marketwide_Half_Hourly_Settlements
444_SSEPD_IT_Capital_Investment

ENVIRONMENTAL

Flood mitigation

The primary driver for flood mitigation investment is to ensure measures are put in place to meet the recommended specifications of Engineering Technical Report 138 (ETR 138). The flood mitigation EJP sets out our plans to implement these flood mitigation measures highlighting the requirement to follow a systematic approach to ensure the resilience of grid and primary substations from flooding.

Following optioneering and detailed analysis, as set out in the EJP, the proposed scope of works is:

SEPD

- 47 sites identified for further flood risk assessment surveys and mitigation works.
- 4 sites for which detailed FRAs have taken place and the extent of the works required to mitigate the impact of potential flooding have been established.

SHEPD

- 30 site surveys identified for flood risk assessment surveys
- 14 sites estimated for flood mitigation work

The aggregate cost to deliver the preferred solution across both licence areas is £24.2m and the works are planned to be completed during RIIO-ED2. This amounts to an increased workload compared than seen in RIIO-ED1 due to the requirement to meet ETR138.

CV16 – Flood mitigation

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.5	0.1	0.2	0.2	0.1	0.1	0.5
SEPD	16.1	5.3	5.8	1.9	3.7	6.9	23.7
SSEN	**16.7**	**5.4**	**6.0**	**2.1**	**3.8**	**6.9**	**24.2**

For more information see

- Relevant Chapter (***13, Environmentally Sustainable Network***)
- Relevant Annex (***13.1 - Environmental Action Plan***)
- Relevant EJP - 7/SSEPD/ENV/FLOOD

Visual amenity

Visual Amenity schemes are requested by stakeholders; therefore, our key driver is improved customer satisfaction. We will continue to increase stakeholder engagement to increase awareness of this scheme and to deliver our proposed target. We have already gained support from our Stakeholders during our RIIO-ED2 Sustainability and Environment Engagement Webinar and more targeted engagement will take place to confirm routes.

We aim to underground 70 km of overhead lines in AONB and NSA across our Network. We are requesting £11m to complete this work. A total of £4m is being requested for SHEPD to underground 30 km, this equates

to £0.8m per year in RIIO-ED2. SEPD A total of £7m is being requested for SHEPD to underground 40 km, this equates to £1.4m per year. The proposed rates are based on local delivered unit rates in RIIO-ED1.

CV20 – Visual Amenity

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	2.3	0.8	0.8	0.8	0.8	0.8	4.0
SEPD	4.8	1.4	1.4	1.4	1.4	1.4	7.0
SSEN	**7.1**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**11.0**

For more information see:

- Relevant Chapter (**Chapter *13 Environmentally Sustainable Network***)
- Relevant Annex (***Annex 13.1 - Environmental Action Plan***)

Losses

In 2019, SSEN concluded the Low Energy Automated Networks (LEAN) project, which focused on reducing losses at 33/11kV primary substations. This Low Carbon Networks Fund (LCNF) innovation project successfully developed, implemented, and demonstrated TASS technology to reduce losses at 33/11kV primary substations. The key principle of TASS is to switch off one of a number of transformers in a primary substation at times of low demand to avoid the fixed iron losses associated with that transformer.

The Losses EJP (5/SSEPD/ENV/LOSSES) sets out our plans to implement Transformer Auto Stop Start (TASS) technology to substation transformers to reduce network losses from our primary substations for the RIIO-ED2 period. This is in response to increasingly ambitious environmental drivers and stakeholder expectations, which will significantly reduce Carbon (CO2) emissions in our SHEPD and SEPD network areas. The primary driver for this scheme is Environmental. The proposed scope of works is to implement TASS technology to 134 substations across our SHEPD and SEPD networks.

The cost to deliver the preferred solution is £2.2m and the works are planned to be completed in 2028.

CV21 – Losses

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	0.2	0.2	0.2	0.2	0.2	1.0
SEPD	0.0	0.2	0.2	0.2	0.3	0.3	1.2
SSEN	**0.0**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**	**2.2**

For more information see:

- Relevant Chapter – (**Chapter 13 - Environmentally Sustainable Network**)
- Relevant Annex – (**Annex 13.1 - Environmental Action Plan and Appendix relating to Losses Strategy**)
- Relevant IDP - *5/SSEPD/ENV/LOSSES*

Environmental Reporting

The Environmental Action Plan (EAP) has been formed as a result of the robust process developed using Ofgem Minimum Requirements, legislation changes, built on by stakeholders and other activity across the plan and also driven by our now required Science Based Targets. We went through a process to further understand our compliance areas, our track record and material impact areas, our stakeholder's preferences and what was causing the most harm. Our outputs table in section 6 of our EAP outlines the deliverables, outputs, and environmental benefits that we intend to deliver from implementing the EAP.

Our EAP is founded on global sustainability frameworks namely the UN's Sustainability Development Goals and the Science Based Target Initiative. Our targets within our EAP and CV22 are critical to the delivery of our 1.5-degree SBT. Solutions and costs have been evaluated through EJP's, CBA' s where appropriate, and work programmed on our assets has been overlayed onto other investment drivers (NLRE & LRE) to ensure no double counting has taken place. This is a significant step change in our approach to the environment and we have set ambitious targets to address the climate emergency and that is driving investment in new areas for RIIO-ED2.

Our EAP totals £172.3m – Environmental Reporting (CV22) makes up only a part of that at £120.3m and will deliver benefits from targeted output areas some of which will fall under the ODI-F Environmental Score Card, the rest are made up of Business Plan Commitments and Price Control Deliverables aimed at decarbonisation, pollution risk prevention, and nature-based solutions for carbon removal. All critical activity to achieve our business min requirements, be compliant with legislations and to deliver a credible net zero. As a result of the interdependencies across the plan our EAP will also act as a reference point for all positive environmental impacts achieved elsewhere including Losses, Visual Amenity and Flood.

Environmental Reporting covers:

- Fluid Filled Cable replacement and tagging
- Replacement of switchgear with a history of SF_6 leakage
- Removal of equipment contaminated with PCBs
- Biodiversity Baselining
- Nature based solutions for carbon removal
- Bunding to prevent oil contamination

As noted elsewhere, the RIIO-ED2 spend is significantly higher than RIIO-ED1 to address the issues mentioned above. The main drivers for the RIIO-ED2 spend are PCB replacement (£41.5m), FFC replacement and tagging (£37.4m) and afforestation (£25.6m)

Efficiencies in our asset replacement programme include **PCB unit cost targeted stretch.** We have additionally identified £14m in efficiency savings on unit rates which we apply for the transformer replacement and refurbishment due to PCBs

We have included an uncertainty mechanism for asset replacement for due to PCB. We have limited visibility of the prevalence of PCB on our network, as this was not information previously required to be logged or monitored. We have established an internal asset data task force to understand prevalence of PCBs and requirements for asset replacement. The uncertainty mechanism for replacement of transformers (ground and pole mounted) is to account for costs that we are unable to evaluate at this stage.

CV22 – Environmental Activities

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	6.8	8.4	9.0	8.2	5.9	3.4	34.8
SEPD	4.9	18.1	19.5	18.7	17.0	12.2	85.5
SSEN	**11.7**	**26.4**	**28.5**	**26.9**	**22.9**	**15.6**	**120.3**

As described in this section, we have proposed a large step change in costs for RIIO-ED2 to meet our environmental targets. For both SEPD and SHEPD, the costs are largely expected in the first half of the price control, due to our drive to reduce carbon emissions and the PCB deadline.

For more information see:

- Relevant Chapter – (**Chapter 13 - Environmentally Sustainable Network**)
- Relevant Annex – (**Annex 13.1 - Environmental Action Plan**)
- Relevant IDPs:
  8_SSEPD_ENV_Fluid_Filled_Cable_Investment
  9_SSEPD_ENV_SF6
  13_SSEPD_ENV_Environmental_Reporting
  447_SSEPD_ENV_Natural Capital
  448_SSEPD_ENV_Bunding

NON OP CAPEX

Property (Non-Op)

The RIIO-ED2 forecast includes upgrading existing sites to help meet environmental targets, relocation of sites to support and improve Safety, Operational Response, and logistics where sites are due to end of lease or site no longer being suitable for operational requirements; and the inclusion of additional storage to improve security, safety, and the environment. In addition, we plan to expand and modify our two training schools to accommodate and deliver the additional training requirements in RIIO-ED2.

Our proposed costs have been derived from agreed supplier rates with Trident and the remainder of projects were based on internal analysis and subsea cable storage costs are based on historical costs.

For both SEPD and SHEPD, we are expecting a step increase in costs from RIIO-ED1 to RIIO-ED2, in line with environmental action plan, relocation costs and an expansion of our training facilities which were not included in the RIIO-ED1 forecast, resulting in increased forecast costs during the RIIO-ED2 period.

C5 – Property (Non Op)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	3.2	2.4	2.9	3.9	3.9	3.9	16.9
SEPD	5.4	2.7	3.2	4.2	4.2	4.2	18.4
SSEN	**8.6**	**5.1**	**6.1**	**8.1**	**8.1**	**8.1**	**35.3**

For more information see:

- Relevant Chapter – (**Chapter 13 - Environmentally Sustainable Network**)
- Relevant Annex – (**Annex 13.1 - Environmental Action Plan**)
- Relevant Annex – (**Annex 16.3 - Workforce Resilience Strategy**)
- Relevant IDPs:
  6_SEPD_ENV_SUBSTATION
  326_SSEPD_NLR_PROPERTY

Vehicles and Transport (Non-Op)

As the majority of SSEN fleet are managed via lease contract, the main driver for costs in this table is specialist operational vehicles and plant mainly associated with tree cutting and mobile generation. In RIIO-ED2, SSEN forecasts £14.3m of spend. The spend level in the area is due primarily due to volume of work but also includes costs relating to our environmental ambitions to decarbonisation the SSEN fleet.

For our costs relating to volume of work, spend has been based on the average run rate of the actual spend of 6 years of RIIO-ED1 plus uplift for increased Tree Cutting deliverables.

In RIIO-ED2 while our underlying run rate remains the same, we have included additional costs of £2.2m for 30 Hybrid Generators to replace 30kva diesel generators in SHEPD and 20 Hybrid Generations to replace 30ka diesel generators in SEPD to support our environmental targets. These costs form part of our

Environmental Action Plan and will provide £1.4m financial benefits delivered by cheaper fuel costs and £1.5m societal benefits delivered by a reduction in carbon emissions and improved air quality.

For both SEPD and SHEPD, the underlying cost trends in RIIO-ED2 are very similar, with costs largely flat across the price control and being slightly higher than RIIO-ED1 averages. There are a couple of years with increased spends for both SEPD and SHEPD, both of which can be attributed to the Hybrid Generators being installed, as mentioned above.

C6 – Vehicles & Transport (Non Op)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	3.5	2.1	1.1	1.1	1.5	1.1	6.9
SEPD	4.0	1.3	1.3	1.3	1.5	2.0	7.4
SSEN	**7.5**	**3.4**	**2.4**	**2.4**	**3.0**	**3.1**	**14.3**

For more information see:

- Relevant Chapter – (***Chapter 13 - Environmentally Sustainable Network***)
- Relevant Annex – (***Annex 13.1 - Environmental Action Plan***)
- Relevant IDP: *10/SSEPD/ENV/BCF_GENERATION*

Small Tools and Equipment

The costs for Small Tools, Equipment, Plant and Machinery (STEPM) and is driven by operational delivery volumes, increased direct workforce size and fault location equipment. In addition, forecast includes continued spend for Bidoyngs, however we expect cost efficiencies compared to RIIO-ED1 levels as a result of more suppliers entering in the market.

In SHEPD, RIIO-ED2 also includes £1.4m for SUBsense Cable Condition Monitoring, which was an innovation project in RIIO-ED1 and is new to RIIO-ED2. It will be used to continually monitor our strategic circuits looking for changes in cable health or any signs which may indicate an intervention has to occur. This will also give us cable "fingerprints" when investigating future faults.

C7 – STEPM

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	6.4	0.7	1.2	2.2	2.2	2.2	8.7
SEPD	19.4	3.9	4.4	5.4	5.4	5.4	24.6
SSEN	**25.8**	**4.7**	**5.7**	**7.7**	**7.7**	**7.7**	**33.4**

For further details please refer to our ***Chapter 8 – Scottish Islands and supporting annexes (Annex 8.1) – Scottish Islands Strategy and our Innovation Strategy (Annex 14.1).***

For RIIO-ED2, we have assumed an increase on our RIIO-ED1 spend of 29% as shown in table above to reflect the increased volumes of work to be delivered by a larger direct workforce. Both of these factors lead to an increase in costs for hand and power tools, instruments and testing equipment, ladders, lifting and handling gear, and workshop equipment which in turn will increase our calibration and associated recertification costs.

NETWORK OPERATING COSTS

Faults

A key factor in our RIIO-ED2 plan is setting the right balance of proactive asset replacement, repairs/ maintenance activities, and the anticipated resultant level of faults which will still require a reactive response. We propose to invest £269.7m during RIIO-ED2 to manage faults on the network and to obtain the optimum balance of proactive and reactive interventions. This balance is a key component as we strive to meet the safety, resilience and reliability expectations of our customers and our associated reliability ambitions, to reduce the number and duration of customer interruptions, in the most cost-effective way.

The output of the intervention model, using the additions and disposals from across our plan, forecasts the total number of faults per asset category as per the 28 output categories. The relationship between underlying fault trends on historic assets and the direct replacement of assets drives the fault volumes. Therefore, SHEPD and SEPD differ, as underlying fault trends, total proposed investment and volume of assets differ.

As a result of this balancing act for RIIO-ED2 – we anticipate we will need to spend £208.9m and £60.8m respectively for our SEPD and SHEPD regions to address the level of faults, which we will see even given the level of expenditure we have set for the rest of our asset plan for RIIO-ED2. This compares to 5-year RIIO-ED1 costs of £203.4m and £78.2m, respectively for our SEPD and SHEPD regions.

CV26 – Faults

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	78.2	12.2	11.4	13.9	11.4	12.0	60.8
SEPD	203.4	41.6	41.8	41.9	41.8	41.8	208.9
SSEN	**281.6**	**53.8**	**53.2**	**55.7**	**53.1**	**53.8**	**269.7**

For SEPD, we have seen fault costs significantly vary year on year in the first 6 years of RIIO-ED1 ranging from annual spends of £29m to £46m. We have included an ambitious forecast for the remainder of RIIO-ED1, however dependent on the volume of faults, we may need to reconsider or position in subsequent forecasts / budget setting. For RIIO-ED2, we have included costs at similar average levels to RIIO-ED1, where the risk of additional faults due to aging assets is largely offset by our asset replacement programme.

For SHEPD, fault costs in between 2018 and 2021 were the highest annual spends we have seen during RIIO-ED1 period. In these three years, SHEPD experienced several subsea cable faults, which resulted in a large adverse impact to our costs. For the remaining years of RIIO-ED1 and the subsequent RIIO-ED2 costs, we have only included the underlying 'typical' costs (excluding exceptional events), with any further subsea issues requiring replacement included in Uncertainty Mechanism.

For more information see:

- Relevant Chapter *(**Chapter 7 - Maintain a Resilient Network**)*
- Relevant Annex *(**Annex 7.1 - Safe & Resilient, 7.2 - Reliability Strategy, 8.1 – Scottish Islands**)*

Severe weather

Severe weather events cause significant damage to the distribution network through high winds in excess of normal operating conditions, lightning strikes, snowstorms and ice loading. The resultant damage can be catastrophic with large numbers of wooden poles broken due to the sheer weight of line ice loading, overhead line feeders with broken conductor and faulty plant having been struck by lightning.

The SHEPD licence area has seen two of these events in the last 10 years. Although we haven't seen any events for the past two price control periods in SEPD, we see this as a risk to the network. We are experiencing continuing emerging patterns of high temperature and rainfall extremes and with global temperatures rising, the UK's weather is likely to become even more extreme. We have therefore used the same cost projection for both networks and uplifted the cost to reflect 20/21 prices.

We forecast (£19.2m), based on historic DPCR5 cost averages, has been included. Further information on the impacts of weather on our network can be found in ***Annex 13.2 Climate Resilience Strategy***.

CV27 – Severe Weather

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	0.0	0.0	0.0	0.0	9.6	9.6
SEPD	0.0	0.0	0.0	0.0	0.0	9.6	9.6
SSEN	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**19.2**	**19.2**

For more information see

- Relevant Annex - ***(Annex 7.1 Safe and Resilient)***

Occurrences not incentivised

Occurrences Not Incentivised (ONIs) include general enquires, and other types of faults that do not require emergency works, for example, street lighting faults. Although these costs are associated to faults, customers are not off supply therefore these are not captured within associated faults costs (CV26).

RIIO-ED2 forecast has been forecasted at a similar level to the last 5 years of RIIO-ED1. As our assets age, the probability of an ONI increases, however this risk is mitigated by our proactive asset management programme of replacement /refurbishment. A combination of external factors and minimal material change in trends during RIIO-ED1 has led us to believe the numbers will continue at the same rate in RIIO-ED2 as we've seen in the current control period.

As such, we propose to invest £47.7m during RIIO-ED2 to manage Troublecall Occurrences Not Incentivised (ONI) on our network. This includes non-urgent street lighting faults and reactive work that must be addressed quickly such as Category A defects requiring urgent action and Category B defects preventing work, which need resolving within a short timescale.

CV28 – ONIs

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	6.5	1.3	1.3	1.3	1.3	1.3	6.4
SEPD	41.3	8.2	8.2	8.2	8.2	8.2	41.2
SSEN	**47.8**	**9.5**	**9.5**	**9.5**	**9.5**	**9.5**	**47.7**

For more information see:

- Relevant Chapter – (***Chapter 6 - Safety and Compliance***)
- Relevant Annex – (***Annex 7.1 - Safe and Resilient***)

Tree cutting

Tree Cutting is a critical activity undertaken to maintain the safety and integrity of our overhead line network. Tree and vegetation growth represent a risk to the safety and reliability of our network and must be managed effectively, and we need to ensure that the overhead line network is compliant with statutory safety clearance regulations to ensure physical contact with our overhead lines from members of the public is avoided.

Our tree cutting activity incorporates the following activities:

- The associated cost to keep our network compliant with ESQCR requirements
- A commitment to making 20% of the 11kV and 33kV compliant by 2031 (ETR-132 resilience cut).
- Ash Dieback inspection to provide information for RIIO-ED2 Ash Dieback Uncertainty Mechanism (see Annex 28 for more detail).
- Flight inspections (LiDAR) of the overhead lines, an efficient alternative to foot patrols.

We have undertaken extensive assessment of our network in both our regions using LiDAR, which has highlighted an emergent need in our SEPD region for a substantial programme of work to maintain both the public safety and improve the resilience and the reliability of our overhead line assets. This has particular importance given the increasing numbers of severe weather events in SEPD which present increased risks to customer safety and service.

We are proposing reduced unit rates within our Tree-cutting activity in SEPD compared to our six-year average, resulting in an efficiency improvement of £24m compared to RIIO-ED1 equivalent unit rates.

As a result, the required expenditure for RIIO-ED2 is £140.3m and £49.4m respectively in our SEPD and SHEPD regions compared to an RIIO-ED1 forecast level of £96.2m and £40.0m to meet industry obligations and standards. This reflects the increase in work we must do in RIIO-ED2 to deliver our safety obligations, resilience and reliability commitments to our customers, and will deliver a tree clearance for nearly half a million spans over our all our voltages networks across both regions.

CV29 – Tree cutting

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	40.0	8.7	10.2	11.7	9.4	9.4	49.4
SEPD	96.2	28.2	30.9	26.9	26.9	27.3	140.3
SSEN	**136.2**	**36.9**	**41.2**	**38.6**	**36.3**	**36.7**	**189.6**

For more information see:

- Relevant Chapter – (**Chapter 6 - *Safety & Compliance***)
- Relevant Annex – (**Annex 7.*1* - *Safe and Resilient***)
- Relevant IDP*: 324_SSEPD_NLR_Tree_Cutting*

Inspections

Inspections of our network are a core activity required to run a safe, compliant and efficient network. This activity is carried out by inspectors and is key to meeting our ESQCR requirements and are in line with our internal policies and as per the inspection cycle requirements. The information gathered from the inspection forms the key data behind our CBRM asset management system, which then drives all of our NARMS related work.

The key drivers for cost are the time taken per activity, plus where applicable, any additional resources required; for example, helicopter flights to inspect 132kV tower lines. Costs have been forecast using RIIO-ED1 actual average unit rates, with stretch efficiencies built in to target industry efficient unit rates.

Due to the introduction of LiDAR flights, we have been able to reduce wood pole line inspection rate from 4-year cycle to 8, which has reduced the number of poles we inspect, and therefore costs over compared to RIIO-ED1 period. All other changes are in-line with our internal policies for the assets concerned.

We are proposing to spend £41.5m during the RIIO-ED2 period to ensure plant and equipment is inspected and to confirm it is operating correctly and safely. In order to ensure good quality data is captured and recorded in the asset register in a timely manner, key condition and defect information is collected during routine inspections. To ensure the quality of the data being captured correctly, SSEN inspectors are provided with the required training on condition assessments and the benefits of good data quality. This has led to more accurate information being collated and has provided a better understanding of the overall condition of our electrical assets which feeds into our decision-making tools such as CBRM. This approach has also enabled the prioritisation of high-risk defects allowing SSEN to plan activities more effectively resulting in appropriate rectification and a more efficient use of resources.

CV30 – Inspections

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	9.2	4.7	4.7	4.7	4.7	4.7	23.7
SEPD	18.8	3.7	3.7	3.5	3.3	3.7	17.9
SSEN	**27.9**	**8.5**	**8.4**	**8.2**	**8.0**	**8.5**	**41.5**

Our proposal for increased expenditure in this area differ by region.

- SHEPD cost increases significantly as it includes our enhanced subsea cable inspections (£16m) to provide an update on the health of our underwater assets. The underlying RIIO-ED2 costs are actually lower than the last five-year RIIO-ED1 forecast, although we are proposing to inspect more assets at a much lower unit cost.
- The RIIO-ED2 forecast is similar to the underlying SEPD costs, as we are proposing to inspect more assets, however the increase in volume cost is fully absorbed by the much-reduced unit cost. Due to the introduction of LiDAR flights, we have been able to reduce wood pole line inspection rate from 4-year cycle to 8, which has reduced the number of poles we inspect, and therefore costs over compared to RIIO-ED1 period. All other changes are in-line with our internal policies for the assets concerned.

- Subsea cable costs, namely the ROV inspections, are included within SHEPD inspections, totalling £17m for the period.
- Both SEPD and SHEPD are forecasts a reduction in inspection costs within RIIO-ED2, corresponding with the reduction in line patrols.
- Note: LiDAR costs are captured within tree cutting.

For more information see:

- Relevant Chapter – (***Chapter 6 - Safety and Compliance***)
- Relevant Annex – (***Annex 7.1 - Safe and Resilient***)
- Relevant Annex – (***Annex 8.1 - Scottish Islands***)

Repairs and maintenance

Repairs and Maintenance is conducted in line with policy which is driven by manufactures of our assets. This allow the asset to be kept in a safe and reliable state until the required asset is replaced. The maintenance programme is driven via our Maximo asset management system, this system contains all the defects and repairs that are required.

The scheduling of maintenance has a critical impact on the utilisation and effectiveness of an asset. Maintenance activities help to ensure an asset will reliably perform its function throughout its time in service and to ensure the safety of our staff and the public. We propose to spend £84.6m and £28.1m respectively in our SEPD and SHEPD regions. This compares to £48.9m and £15.8m we expect to spend in RIIO-ED1.

Maintenance activities can be time based or duty based, and this depends on the asset requirements (i.e., switchgear that has operated under fault conditions may need to be maintained prior to its planned maintenance to ensure it will function in a safe and timely manner). Maintenance forms part of the asset life requirements and by not doing this we will reduce the life span of the equipment. This increase in spend will allow the network to run more effectively and minimise un-planned outages which would have been caused by asset failure.

Our forecast expenditure incorporates efficiencies that we expect to achieve through increased productivity and economies of scale, amounting to £17m across both regions.

CV31 – Repairs and maintenance

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	15.8	5.0	5.8	5.8	5.7	5.8	28.1
SEPD	48.9	14.6	18.0	16.8	17.3	17.9	84.6
SSEN	**64.7**	**19.6**	**23.8**	**22.6**	**23.0**	**23.8**	**112.8**

For more information see:

- Relevant Chapter - (***Chapter 6 - Safety and Compliance***)
- Relevant Annex - (***Annex 7.1 - Safe and Resilient***)

Dismantlement

There are occasions when the power system's network becomes redundant. This can arise for a variety of reasons but in every case the situation requires a risk assessment to ensure the safety of the public and our staff is maintained, and to minimise any environmental risk, i.e. ensuring oil leaks do not occur. Redundant assets pose a significant safety risk as they run the risk of trespassing, vandalism and unauthorised interference. Where there is any doubt about ongoing safety and security of the equipment from theft or unauthorised interference, then the equipment should be removed.

It is important that appropriate measures are put in place when assets are redundant. The cost to deliver the required solution is £2.2m during RIIO-ED2. Based on feedback from our inspections work, volumes of dismantlement have been identified for RIIO-ED2, in particularly in SEPD. This has resulted in higher costs than expected in the RIIO-ED1 forecast. The BPDT and EJP details the volumes and associated unit rates for underpinning these costs.

CV32 – Dismantlement

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.2	0.0	0.0	0.0	0.0	0.0	0.1
SEPD	0.0	0.4	0.4	0.4	0.4	0.4	2.0
SSEN	**0.2**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**2.2**

For more information see:

- Relevant Chapter – (***Chapter 6 - Safety and Compliance***)
- Relevant Annex – (***Annex 7.1 - Safe and Resilient***)
- Relevant IDP: *325_SSEPD_NLR_DISMANTLEMENT*

Remote generation opex

SSEN have seven embedded island generation sites. These sites play a crucial role on the Scottish Islands often being the last resort to keep power flowing to homes and businesses during planned maintenance or faults on the network. They are used to provide security of supply for customers, and as backup and provide a security of supply to customers.

We have seven embedded island generation sites. These sites play a crucial role on the Scottish Islands often being the last resort to keep power flowing to homes and businesses during planned maintenance or faults on the network. They are only ever used as backup and provide a security of supply to customers. There are ongoing Operational costs associated with these sites including fuel for powering the generators.

C8 – Remote Generation Opex

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	39.3	5.3	5.7	4.9	4.9	5.3	26.0
SEPD	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSEN	**39.3**	**5.3**	**5.7**	**4.9**	**4.9**	**5.3**	**26.0**

The RIIO-ED1 forecast was adversely impacted by the subsea cable issues resulting in higher spend in Remote Generation. For RIIO-ED2, we have only included costs which we incur for a 'typical' year (excluding exceptional events), therefore we can see a large reduction when comparing price controls (-34%).

For more information see:

- Relevant Chapter – (***Chapter 6 - Safety and Compliance***)
- Relevant Annex – (***Annex 7.1 - Safe and Resilient***)
- Relevant Annex – (***Annex 8.1 – Scottish Islands***)
- *Relevant IDP: 386_SHEPD_REGIONAL_Remote Generation _ SSEPD*

Substation electricity

Electricity costs are charged by SSE Business Energy to both SHEPD and SEPD for substation electricity. These costs are broken down by site name and account number and are subsequently split between substation sites and other non-operational premises (electricity for non-operational premises is included in C14).

Substation sites are unmetered. The volume of units consumed annually is calculated from the number of substations of each relative voltage. Each site is broken down into the equipment contained therein, the length of time it is running for and the average units this equates to.

Our substation Electricity table has been informed using the consumption data reported in the 2020/21. We anticipate our consumption will remain consistent from 2020/21 throughout RIIO-ED2 and have based our costs on our contracted rates which as these are due to will be renegotiated in 2024/25 and are likely to be affected by the most recent commodity price increases.

CV33 – Substation electricity

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	7.9	1.4	1.4	1.4	1.4	1.4	7.0
SEPD	11.2	2.6	2.6	2.6	2.6	2.6	13.0
SSEN	**19.1**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**20.0**

Our overall RIIO-ED2 costs are 5% higher than the RIIO-ED1 (last 5 years) spend, which is largely due to the increase in electricity prices. In the last couple of months, we have seen natural gas prices increase significantly, resulting in hugely inflated electricity prices. We have managed this risk by entering into fixed price contracts with SSE Business Energy, albeit at slightly higher rates than in previous years.

For more information see:

- Relevant Chapter - (***Chapter 6 - Safety and Compliance***)
- Relevant Annex – (***Annex 7.1 - Safe and Resilient***)

Smart metering rollout

The primary driver to include a forecast in RIIO-ED2 was due to the slower than anticipated uptake of smart meters installations in RIIO-ED1, resulting in the installation deadline being moved to the end of June, 2025. This issue was further exacerbated by the COVID-19 impact; therefore, we expect smart meter installations, and potential interventions, in the first couple years of the new price control period. The installation of smart metering also supports our plans for 100% network visibility through a combination of LV monitoring and data analytics.

In terms of volumes, the first 5 years run rate of RIIO-ED1 was used as a baseline for the first two years, with an additional volume to reflect a catch up in installations as a result of COVID-19 impact.

CV34 – Smart metering rollout

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	1.3	0.5	0.5	0.0	0.0	0.0	1.0
SEPD	10.6	2.5	2.5	0.0	0.0	0.0	5.0
SSEN	**11.9**	**3.0**	**3.0**	**0.0**	**0.0**	**0.0**	**6.0**

The RIIO-ED2 forecast has been much reduced, when compared to RIIO-ED1 forecast, which highlights that we are towards the end of the smart meter roll out, with only two years' worth of costs remaining. As described above, COVID-19 impact has resulted in works being delayed into RIIO-ED2 and therefore reduces the variance between the two price control forecasts.

For more information see:

- *Relevant Chapter (**Chapter 6 - Safety and Compliance**)*
- *Relevant Annexes (**Annex 7.1 – Safe & Resilient, Annex 7.2 Reliability, Annex 10.1 Load related Plan Build & Strategy and Annex 11.1 DSO Strategy Noting appendix H Network Visibility**)*
- *Relevant IDPs:*
  417_SSEPD_IT_Smart_Meters+

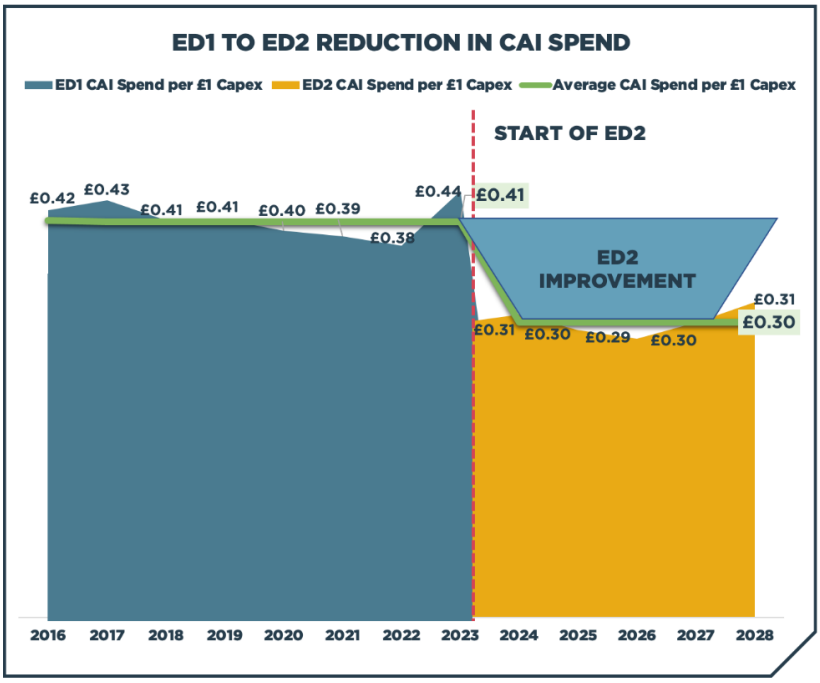
CLOSELY ASSOCIATED INDIRECTS (CAI) / BUSINESS SUPPORT COSTS (BSC)

Core CAI

RIIO-ED2 marks a step change both in terms of volume of delivery, new technologies in the form of Digitalisation and Data, Low Carbon Technologies and Net Zero, and new approaches such as DSO and Flexible Solutions. Due to this, our total indirect operational expenditure has increased over the later part of RIIO-ED1 and RIIO-ED2 period.

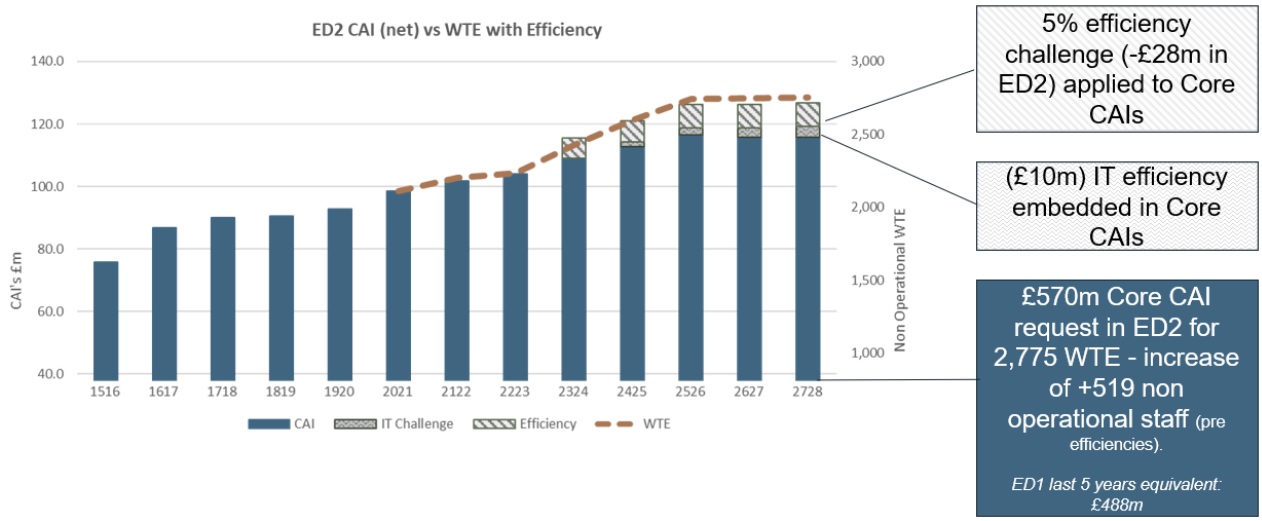
Efficiency is, and will remain, one of our core values, and whilst we recognise the need to grow our workforce in order to deliver the challenging RIIO-ED2 plan, we have designed our plan to target operating at the forefront of operational efficiency in the areas of CAI and BSC during RIIO-ED2, taking SHEPD Regional Factors into account. This is demonstrated below where we are reducing CAI spend per £1 of Capex and NOCs in RIIO-ED2 compared to RIIO-ED1 levels. This is a reduction of £0.11, or 25%, moving to an average of £0.31 CAI per £1 of Capex and NOC in RIIO-ED2.

RIIO-ED1 to RIIO-ED2 reduction in CAI spend per £1 of Capex and NOC



Our initial top-down assessment of workforce growth was supplemented by a bottom-up build which gave us an increased workforce growth total of 865 from the start of RIIO-ED2 (519 Indirect staff, 57 Trainees and 290 Direct staff). We expect digital enablement of systems (see ***Annex 5.1***) to enable the re-skilling of some of our remaining staff and have incorporated a cost **efficiency of 5% of Gross Workforce CAI costs (£28m net) in RIIO-ED2** within Core CAI in addition to **£10m efficiencies** to be delivered as a direct result of our RIIO-ED2 IT programme. We have phased our workforce growth in line with known internal recruitment constraints and market demographic information, both local and national. This has resulted in a realistic and deliverable workforce growth for RIIO-ED2.

RIIO-ED2 efficiencies included in CAI (net)



Our CAI's incremental cost between price controls is primarily based upon indirect headcount growth to deliver the increase in volumes and new policies for RIIO-ED2. Key drivers of headcount growth for RIIO-ED2 are shown in the table below: (further detail included in our ***Operating Business Cost Annex 15.6 and Workforce Resilience Strategy Annex 16.3***)

			RIIO-ED1 vs RIIO-ED2 CAIs		
		Net Core CAI £m RIIO-ED1 vs RIIO-ED2	**SEPD**	**SHEPD**	**Total**
Net Zero	**Load**	Designer Engineers, Land Consent Managers & Project Managers for the Load Schemes to deliver the larger RIIO-ED2 plan.	£8m	£3m	£10m
	DSO	DSO (Delivery, Commercial /Development / Design / Stakeholder)	£20m	£10m	£30m
	Whole System / Sustainability	Engineers, Managers and Environmentalists to deliver Whole Systems and Sustainability	£2m	£1m	£3m
	Environmental	Designers, Project Managers and Delivery Managers for Environmental Non-Load Delivery	£4m	£1m	£5m
Safe and Resilient	**Design and Portfolio Management**	Designer Engineers, Land Consent Managers, Portfolio Engineers, Project Managers to deliver the increases in volumes in Non-Load and NOC in RIIO-ED2	£9m	£3m	£11m
	Tree cutting	Team Managers for the delivery of increase Tree Cutting Volumes	£2m		£2m
	Subsea	Designers & Project Managers to deliver the subsea cable program		£5m	£5m
	Underground Cable	Project and Team Managers to deliver the increased Underground Cable replacement programme	£4m	£1m	£5m

Valued Service	**IT**	Change Managers and EMCS resource to support the IT delivery programme	£2m	£1m	£3m
	Customer and Vulnerability	Additional Customer Contact Staff, Complaint Handlers and Vulnerability managers and advisors to deliver Customer and Vulnerability commitments	£6m	£3m	£9m
	ED1 to ED2		**£56.4m**	**£26.5m**	**£82.8m**

C9 – Core CAI

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	170.3	37.7	39.2	40.0	40.0	40.0	196.8
SEPD	316.4	71.2	73.6	76.4	75.8	75.7	372.8
SSEN	**486.8**	**108.9**	**112.7**	**116.4**	**115.8**	**115.7**	**569.6**

Baseline Opex (CAI and NOC) does not include provision to deliver UMs. Some UMs will require a substantive Opex adjustment which will need to be accounted for. We discuss this further in ***Uncertainty Mechanisms (Annex 17.1)***

Wayleaves

The primary cost driver for this table is Wayleaves payments which are payments to owners and/or occupiers to cover the financial impact of having equipment on their land and for access to that equipment. Costs for the Administration of the Wayleaves payments and Substation Rents are also included.

Wayleaves (CAI) were built up by using actual RIIO-ED1 volumes (2016-2020) and applying an annual percentage increase, due to anticipated growth rate and in line with additional reinforcement work proposed in RIIO-ED2.

C10 – Wayleaves

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	20.9	4.2	4.2	4.2	4.2	4.2	21.0
SEPD	23.0	4.9	4.9	4.9	4.9	4.9	24.7
SSEN	**43.9**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**45.7**

Operational Training

For RIIO-ED2, the primary driver of costs for Operational Training is the increased size of the direct workforce and number of trainees required to deliver the RIIO-ED2 plan. Our RIIO-ED2 cost base includes:

- An increase of 25% above our RIIO-ED1 level for our Apprentices and Trainee programme during RIIO-ED2 creating an additional 57 trainee level roles. This is due to both the forecast increase in staff required to deliver our RIIO-ED2 plan and the age profile of our direct workforce.
- Additional training costs to upskilling and multiskilling the existing direct workforce and providing training for new entrants with transferable skills. New capabilities including, LV Monitoring and new technology requirements have also been factored into the Direct Workforce training costs for RIIO-ED2.
- Learner support costs and costs of increasing number of Trainers are also included in this cost base to facilitate the higher level of trainees.

This increase in spend will strengthen and broaden our current skillsets, allow our operations teams to drive further efficiencies.

CV35 – Operational Training (CAI)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	19.0	4.6	4.7	4.8	4.8	4.8	23.6
SEPD	30.5	6.7	7.2	7.3	7.4	7.4	36.2
SSEN	**49.5**	**11.3**	**11.9**	**12.1**	**12.2**	**12.2**	**59.8**

Vehicles and transport

The costs in this table cover our leased operational fleet and associated fuel and maintenance costs and is driven primarily by direct workforce size along with insourced activity type.

For RIIO-ED2, the direct workforce is planned to grow by 290 WTE over the RIIO-ED2 period along with an increase in trainees. This will therefore mean a larger operational fleet is required although due to our Regional Operating Model, efficiencies will be made within the current fleet offsetting in part the full impact to our fleet costs associated with Direct Staff increase.

In addition, SSE is committed to decarbonising 100% of fleet under 3.5tn and 50% of fleet over 3.5tn by 2030. For RIIO-ED2, both DNOs have committed to decarbonise 80% of operational fleet under 3.5tn (excluding large plant) to be replaced with EVs or decarbonised where it is economically viable to do so.

C11 – Vehicles and Transport (CAI)

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	35.6	7.3	7.4	7.5	7.5	7.5	37.4
SEPD	66.0	13.3	13.7	13.9	13.9	13.9	68.7
SSEN	**101.5**	**20.6**	**21.1**	**21.5**	**21.5**	**21.5**	**106.1**

Core Business Support

A large component of Core Business Support Costs (BSC) are charges for corporate services provided by the SSE Services Group company including provision of corporate services including Risk, Audit and Insurance, Legal, Corporate Affairs, Finance, HR, Training, Regulation, IT, Corporate Business Services and Other (consisting of Procurement, Investor Relations and Company Secretary, Facilities Management, Health and Safety, Other Corporate Services and Group Management cost).

The costs of corporate services are assessed and allocated on the following basis: a charge is calculated via the SSE Corporate Recharge model and based on a combination of drivers such as entity specific cost centres, individual managerial assessment of services provided by each corporate area to each licensee, headcount, number of staff occupying corporate properties.

For RIIO-ED2 our existing BSCs have been flexed with new corporate roles based on RIIO-ED2 volumes and workforce size along with Vulnerability funding required to deliver the RIIO-ED2 plan.

We have embedded a **£7.5m efficiency** within this category in RIIO-ED2.

C12- Core BSC

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	50.5	10.6	10.9	11.1	11.2	11.3	55.1
SEPD	97.3	21.7	22.0	22.4	22.6	22.8	111.5
SSEN	**147.8**	**32.3**	**32.9**	**33.5**	**33.8**	**34.1**	**166.6**

IT and telecoms (Business Support)

Our capital IT investment plan is the key driver of costs within IT&T Business Support, which for RIIO-ED2 is approximately double the investment required in RIIO-ED1 and will be supported by a 25% uplift in IT Business Support costs which includes a **£12.5m efficiency** target in RIIO-ED2 built into our forecast.

- The RIIO-ED2 costs in this table are based on existing committed Opex spend relating to our current systems and IT requirements (for those that will continue in RIIO-ED2) along with the Opex costs associated with the RIIO-ED2 deliverables.
- The new Opex costs are detailed in our IT EJPs for each of our RIIO-ED2 Non-Operational and Operational IT projects.
- IT costs driven by workforce size (for example Mobile Managed Services) have been flexed in line with workforce growth based on 20/21 actual costs
- Additional IT Business Support headcount from our Corporate IT departments have been included based on existing role costs and identified as part of the RIIO-ED2 project costing processes

C13- IT&T Business Support

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	74.7	17.4	18.5	19.6	20.0	20.5	96.0
SEPD	117.7	26.1	27.7	29.3	30.0	30.8	144.0
SSEN	**192.4**	**43.5**	**46.2**	**48.9**	**50.0**	**51.4**	**239.9**

The increase of Opex costs from RIIO-ED1 to RIIO-ED2 of £21.3m for SHEPD and £26.2m for SEPD are primarily associated with the delivery of our Operational and Non-Operational IT Capex work programme to support our core RIIO-ED2 objectives.

Mobile Managed Services including Telecoms, Cloud and data costs for digital equipment in response to the increased flexible working and digital office requirements and increased headcount in RIIO-ED2 +£0.8m SEPD, +£1m SHEPD.

Additional Project Managers and specialist IT staff are required to manage the increased IT Portfolio

Our RIIO-ED2 investments in IT, OT and telecoms projects, provide a whole life benefit of £245.4m. Our plan contributes to far wider societal benefits driven by flexibility, estimated by Carbon Trust/Imperial College London to be worth up to £40bn by 2050 when compared against electricity systems that do not deploy additional flexibility technologies and further details of the RIIO-ED2 IT programme can be found in our ***Digitalisation Investment Plan (Annex 5.1).***

Property management

For RIIO-ED2 our Property Management costs have been based on RIIO-ED1 run rates adjusted for changes built into our RIIO-ED2 Plan including

- Running costs associated with expansion and renewal of Control Centres in both SHEPD and SEPD
- Seven site relocations and one rebuild which impact market rental costs
- Increase in size of workforce with higher usage therefore higher running costs of properties

We anticipate that the savings derived from the Digital Workplace programme along with the flexible working options will enable us to offset the majority of increased spend via efficiencies in this category.

C14 – Property Management

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	15.0	3.1	3.2	3.3	3.3	3.3	16.2
SEPD	25.4	5.0	5.1	5.2	5.2	5.2	25.7
SSEN	**40.4**	**8.0**	**8.2**	**8.5**	**8.5**	**8.5**	**41.9**

OTHER (SHETLAND/INNOVATION)

Shetland

To maintain security of supply on Shetland, SHEPD is funded to operate Lerwick Power Station (fuel costs and O&M) and act as system operator, balancing the system in lieu of NG ESO. SHEPD is also funded to secure the islands' longer-term arrangements (Integrated Plan) as it transitions away from an islanded network.

These costs are to maintain security of supply on Shetland and cover:

- Running Lerwick Power Station (LPS). We assume that this is in full duty use until a new Transmission link to Shetland is operational (forecast to be November 2024)
- Operating the Active Network Management schemes on the Island to maximise the output from DG
- Identifying, procuring and implementing the enduring solution on Shetland. This enduring solution will be used once the Transmission link is in place. It will result in LPS being used in standby mode and greater use of flexible resources to maintain security of supply, in the event that the Transmission line fails or is out for maintenance.

The cost of running LPS until November 2024 are based on our RIIO-ED1 costs. We have been running the power station for a number of years and have high confidence in the costs. There is a change in costs in 2024/25 to fund the enduring solution. This involves a large upfront cost but reduction in annual costs going forward as we move away from full duty use of Lerwick Power Station. We are still running our procurement process to inform the total cost of the Enduring Solution. We have agreed with Ofgem to update these costs in April 2022 once that procurement process is complete.

The changes in costs in RIIO-ED2 reflect the need to identify, procure and implement an enduring solution on Shetland. It will be culmination of over 10 years work, starting with the NINES innovation project and has been a long-term goal for us and stakeholders. With this solution in place and the Transmission link to Shetland build, the costs for the remaining years of RIIO-ED2 are due to fall and we would expect these lower annual costs to continue into future price controls.

We have included an uncertainty mechanism for Shetland as some related future costs are outside our control. We describe our approach in detail in ***Uncertainty Mechanisms (Annex 17.1)***.

C25 - Shetland

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	114.3	27.8	56.3	6.6	5.4	3.7	99.8
SEPD	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSEN	**114.3**	**27.8**	**56.3**	**6.6**	**5.4**	**3.7**	**99.8**

For more information see:

- *Relevant Annex – (**Annex 8.1 – Scottish Islands)***
- Relevant IDP: *387/SHEPD/REGIONAL/SHETLAND*

Innovation in RIIO-ED2

We will look to use our RIIO-ED2 NIA allowance, to build upon our progress in RIIO-ED1, and intend to cocreate a high-quality portfolio of innovation projects with our stakeholders. Our NIA allowance will be focussed on projects which are more likely to deliver wider stakeholder, environmental or societal benefits rather network benefits directly to SSEN. The portfolio will focus on projects which *explore opportunities and deliver value added change for vulnerable customers, facilitate net zero and address whole system issues*

In RIIO-ED2, we are seeking an NIA allowance of £17.6m over the five-year period, plus our own 10% contribution to create a total fund of £19.3m for NIA. This will allow us to maintain the momentum and pace of our RIIO-ED1 progress and at least £14.5m of this will be allocated to third parties. These projects will help to inform and facilitate GBs transition to net zero, largely producing benefits for external stakeholders and involve significant cocreation with partners. Similarly, we will look to develop a portfolio of NIA projects which support customer in vulnerable situations and to ensure a Just Transition.

The level of risk involved in these projects, the uncertainty involved in their outcomes and the fact that benefits are not necessarily realised by SSEN, makes it inappropriate for them to be funded from our Totex allowances. We believe that NIA is the most appropriate mechanism for the delivery of these projects.

CV36a – Innovation in RIIO-ED2

£m	ED1 Last 5 years	2023/24	2024/25	2025/26	2026/27	2027/28	ED2 Total
SHEPD	0.0	1.2	1.2	1.2	1.2	1.2	5.8
SEPD	0.0	2.4	2.4	2.4	2.4	2.4	11.8
SSEN	**0.0**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**17.6**

For more information see:

- *Relevant Chapter – (**Chapter 14 – Innovation**)*
- *Relevant Annex (**Annex 14.1 – Innovation Strategy**)*

APPENDIX A: OFGEM'S MINIMUM REQUIREMENTS

	Ofgem minimum requirement	Where and how this is addressed in narrative
5.21	As a minimum requirement under Stage 1 of the BPI, DNOs must submit cost information as part of their Business Plans, as set out in this section.	Our Cost information is stated in summary throughout each annex and in our BP chapters. Related cost information can be found in supporting BPDTs and EJPs.
5.23	Companies must complete the Business Plan Data Templates (BPDTs) in accordance with the Ofgem BPDT guidance.	All BPDT tables have been populated and cross referenced accordingly against our cost information throughout the BP Chapters and Annexes.
5.24	Business Plans must clearly set out the key drivers of expenditure for the RIIO-ED2 period - for example, growth in demand, conditions of assets/utilisation, legislative requirements, and any other relevant drivers.	Key drivers of expenditure are laid out throughout our BP Chapters, annexes and EJPS.
5.26	In support of costs proposed, Business Plans must include:	
(a)	evidence of the efficiency of their costs, for example as compared to historical benchmarks and/or benchmarking with national and international comparators.	We also disucss benchmarking of historical costs in section 2 of this annex.
(b)	details of assumptions and justification for projected changes in the efficient levels of unit costs over time (ie ongoing efficiencies) caused by improvements in project delivery, technological innovation, procurement efficiencies, etc	We also discuss unit cost reductions, amounting to £410m, in section 3 of this annex.
(c)	a clear rationale for any associated assumptions they consider we should use when assessing costs. For example, justification for the extent to which regional and company-specific factors determine material (higher and lower) cost variations.	In section 2 of this annex we summarise our views on what should be included in the evaluation of costs for RIIO-ED2.
(d)	details of the activities and indicative costs that they propose are directly funded through totex allowances and that will be associated with achieving service levels	In sections 3 and 4 we summarise our costs and the drivers of activities.

(e)	details of which categories of expenditure are more uncertain and more difficult to forecast using historical/independent benchmarks. This should include: the risk of underutilisation/stranding that new/existing investments might face in the future under a range of plausible forecast scenarios. the risk that an alternative solution may be the most efficient means of addressing the network requirement. the risk that the investment is premature.	In our cost confidence annex, we set out the confidence we have regarding each cost category.
(f)	where this is the case, we expect companies' Business Plans to demonstrate consideration of mechanisms that mitigate risk associated with uncertainty, and/or other evidence to justify their submitted costs.	We detail our ***Uncertainty Mechanisms in Chapter 17 and Annex 17.1.***
5.29	Business Plans should demonstrate how their expenditure forecasts map onto relevant ODIs and PCDs.	In section 4 we signpost the relevant documents for each cost category.
5.30	BPDTs enable the collection of Business Plan data from all companies on a consistent basis. As a minimum requirement under Stage 1 of the BPI, DNOs must fully and accurately complete the detailed BPDTs as instructed by any guidance document. Final BPDTs and associated instructions and guidance will be published by Ofgem in October.	See BPDT tables.
5.31	output and financial data underpinning the Business Plan submissions that have been developed with the DNOs. These templates are broadly in line with the RIIO-ED1 current annual reporting pack. We believe this is a proportionate approach and should facilitate easier comparison of forecasts with historical data.	Guidance only.
5.32	We intend to work with the DNOs in the coming months to further develop the BPDTs and associated guidance.	Guidance only.
5.33	Cost Benefit Analysis (CBA) is an important decision support tool in providing justification for investment needs in RIIO-ED2.	Guidance only.

5.34	DNOs must produce and submit CBAs in accordance with the CBA templates and guidance document. Final CBA templates and guidance will be published by Ofgem in October with the BPDTs	See submitted CBAs produced in line with guidance.
5.35	Engineering Justification Papers (EJPs) are another important decision support tool,open to scrutiny and challenge, in conjunction with other appropriate means of justification for investment needs in RIIO-ED2	Guidance Only.
5.36	As a minimum requirement under Stage 1 of the BPI, DNOs must produce and submit EJPs in accordance with the EJP guidance document.	See submitted EJPs produced in line with guidance.
5.45	To enable us to assess Real Price Effects (RPEs) appropriately, as a minimum requirement under Stage 1 of the BPI, DNOs must provide us with the following information in their Business Plans:	
(a)	the input costs for which our measure of general output price inflation (ie CPIH) is a poor proxy, along with justification for why	See our ***Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5).***
(b)	the expenditure categories (eg direct opex) to which these input costs relate, and to what extent. We expect companies to consider the practical implications of their proposals, and in doing so show that each RPE is material relative to both totex and our measure of general output price inflation. This information should align with the data provided in the BPDTs	See our ***Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5).***
(c)	evidence to support all proposed RPEs, including clear evidence of a sustained and material deviation between input costs and our measure of general output price inflation	See our ***Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5).***
(d)	Proposed indices for any proposed RPEs, along with evidence to support their use in indexation and justification for their selection over alternatives. The plan should include proposed forecasts for any proposed indices, along with evidence of how these have been derived	See our ***Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5)*** and section 4 of this annex.
(e)	an explanation of any RPE cost profiling effects proposed throughout the price control.	See our ***Price Effects for the RIIO-ED2 Price Control Review (Annex 15.5).***

5.46	Our ongoing efficiency assumptions represent the reduction in the volume of inputs required to produce a given volume of output. Whereas RPEs relate to the changes in the price of inputs used by network companies, ongoing efficiencies relate, in part, to changes in the volume of those inputs used to provide services to users.	See sections 2 and section 3 of this annex.
5.47	To enable us to assess ongoing efficiency appropriately, as a minimum requirement under Stage 1 of the BPI, DNOs must set out in their Business Plans the ongoing efficiency assumptions submitted for each expenditure, along with evidence of how these assumptions have been derived. This could include:	
(a)	any proposed comparator industries for the purpose of cost assessment, along with a justification for those proposed.	See section 2 and ***Establishing an appropriate efficiency challenge (Annex 15.4).***
(b)	an explanation of how any historic data has been used to derive efficiency forecasts, including a justification for the time-period selected and how forecasts capture enduring effects from efficiencies generated in previous price controls.	See section 2 and ***Establishing an appropriate efficiency challenge (Annex 15.4).***
(c)	a comparison of efficiency forecasts against efficiency gains realised in previous periods.	See section 2 and ***Establishing an appropriate efficiency challenge (Annex 15.4).***
(d)	interactions with innovation stimulus funding (past and future).	See section 3 and ***Establishing an appropriate efficiency challenge (Annex 15.4).***
(e)	interactions between ongoing efficiency forecasts and output quality.	See section 3 and ***Establishing an appropriate efficiency challenge (Annex 15.4).***
5.48	This information must align with the data provided in the BPDTs and its corresponding guidance. All costs forecast within the BPDT tables must exclude ongoing efficiency assumptions apart from the RPEs and OE tab as instructed in the BPDT guidance.	See section 4 and our BPDT commentary.