

Baringa

The socio-economic value of SSEN Distribution's ED3 Business Plan

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Contents

Executive Summary **4**

1. Purpose of this report **12**

2. Introduction **14**

2.1 SSEN Distribution's ED3 Business Plan 14

2.2 Objectives of the ED3 Business Plan and rationale for quantifying the benefits 14

2.3 Describing the benefits 16

2.4 Dependencies 17

3. The energy transition and the role of distribution networks **20**

4. The counterfactual: the cost of not investing **23**

5. The value framework **29**

5.1 Overview of the framework 29

5.2 The value elements 32

6. Assessing the value: energy system benefits **45**

6.1 Customer outcomes 45

6.2 System security, efficiency and affordability 59

6.3 Distribution of benefits across customers 68

7. Assessing the value: emissions and environmental benefits **72**

7.1 Decarbonisation 73

7.2 Biodiversity and habitat 77

7.3 Climate adaptation and environmental resilience 79

7.4 Distribution of benefits across customers 82

8. Assessing the value: wider economy benefits **84**

8.1 Enabling growth 84

8.2 Supply chain benefits 91

8.3 Distribution of benefits across customers 101

9. Conclusion **103**

Appendix 1: Glossary **107**

Appendix 2: Supply chain benefits methodology **117**

Executive Summary



Executive Summary

This report sets out Baringa's independent assessment of the socio-economic value of SSEN Distribution's ED3 Business Plan (2028–2033). We used a recognised economic value framework to assess the Plan and applied it to quantify the Plan's socio-economic impacts. It aims to answer the following question: **what does SSEN's ED3 Plan deliver for customers, the energy system, the environment and the wider economy, and how much of that value is genuinely additional to what a lower-investment pathway would achieve?**

We estimate that the ED3 Plan delivers £4.4 billion of monetised, additional benefits over the ED3 period relative to a continuation of ED2 expenditure levels, alongside £10.2 billion of economic output that would otherwise be delayed or lost. Delivery of the Plan supports a further £1.5 billion of net Gross Value Added (GVA) as well as a net reduction of 3.97 $MtCO_2e$[1] emissions, equivalent to approximately one year's direct emissions from 900,000 average UK households.[2]

Our findings point to the value of targeted and well-timed investment, combining network build with flexibility and smarter use of existing assets. This can improve reliability, allow customers and businesses to connect and benefit from low-carbon technology savings, and avoid repeated and more costly investment.

Purpose and context for this assessment

Electricity demand in Great Britain is projected to more than double, from around 290 TWh today to as much as 785 TWh by 2050 in a highly electrified pathway, while installed wind and solar capacity may rise approximately fourfold. The Government's Clean Power 2030 mission targets at least 95% clean generation by 2030 and a fall in carbon intensity in the power sector from 171 to below 50 gCO_2e/kWh. The ED3 price control period from 1 April 2028 to 31 March 2033 is critical for the distribution networks to begin scaling both system capacity and organisational capability to enable this electrification shift.

The proposed level of ED3 expenditure for SSEN Distribution represents a material step up on the current ED2 price control, from £6.8[3] billion to £8.7 billion (both in 2025/26 prices) across SSEN's Scotland (SHEPD) and Southern (SEPD) licence areas. The National Infrastructure and Service Transformation Authority projects that annual distribution investment must roughly double, and potentially treble under some scenarios, to create the network capacity the clean energy transition requires. This step-up follows a sustained period of rising energy prices and cost-of-living pressures, with the average domestic dual-fuel bill having doubled since 2017. Investment must therefore be justified, demonstrating clear value for money for customers.

Ofgem's "build and flex" framework, requires proposed expenditure to be justified through robust engineering and economic evidence, and to maximise the use of flexibility and existing capacity before funding is approved. Our assessment serves three purposes:

- **Testing the overall needs case:** It assesses whether the outcomes the Plan delivers, for consumers, the system, the environment and the economy, justify the expenditure proposed, measured against a credible counterfactual.

[1] Million tonnes of carbon dioxide equivalent
[2] The ONS estimates 473 $MtCO_2e$ of UK residence-based emissions in 2025, of which 26.5% arose from consumer expenditure. That gives direct household emissions of approximately 125.3 $MtCO_2e$ in 2025.
[3] The projected outturn for SSEN Distribution ED2 expenditure is the best estimate as at November 2026. It will be subject to future business cost pressures, operational performance and regulatory decisions which may impact the remainder of the ED2 period to 31 March 2028.

- **Consolidating a dispersed evidence base:** SSEN's ED3 Plan is supported by Engineering and Digital Justification Papers and their associated cost benefit analyses, asset health and risk assessments, Strategic Development Plans, tRESP-informed spatial planning and SSEN strategies. Applying the framework across the Plan aggregates that analysis into a single view expressed in common units, against a common counterfactual and transition assumptions, with wider dependencies made explicit.
- **Supporting scrutiny and iteration.** A transparent benefits case allows Ofgem, Government, customers and wider stakeholders to test the trade-offs embedded in the Plan, and allows results to be revisited as the evidence base develops through submission, assessment, draft and final determinations and into delivery.

The framework applies the appraisal principles of HM Treasury's Green Book, considering additionality, opportunity cost, whole-economy and distributional impacts, long-term affordability rather than lowest upfront cost, and monetisation only where robust evidence exists. It is designed to be complementary to, and consistent with, the GB-wide network investment benefits case developed by the Energy Networks Association (ENA) and the Electricity Networks Growth Strategy published by ENA and BEAMA, so that SSEN Distribution's results can feed into and be reinforced by that wider sector evidence base.

Where estimates are not consistent with HMT Green Book principles, we make this clear and provide the reason.

Our approach and what we are estimating

The distribution network underpins the economy of the SSEN area, today and in future

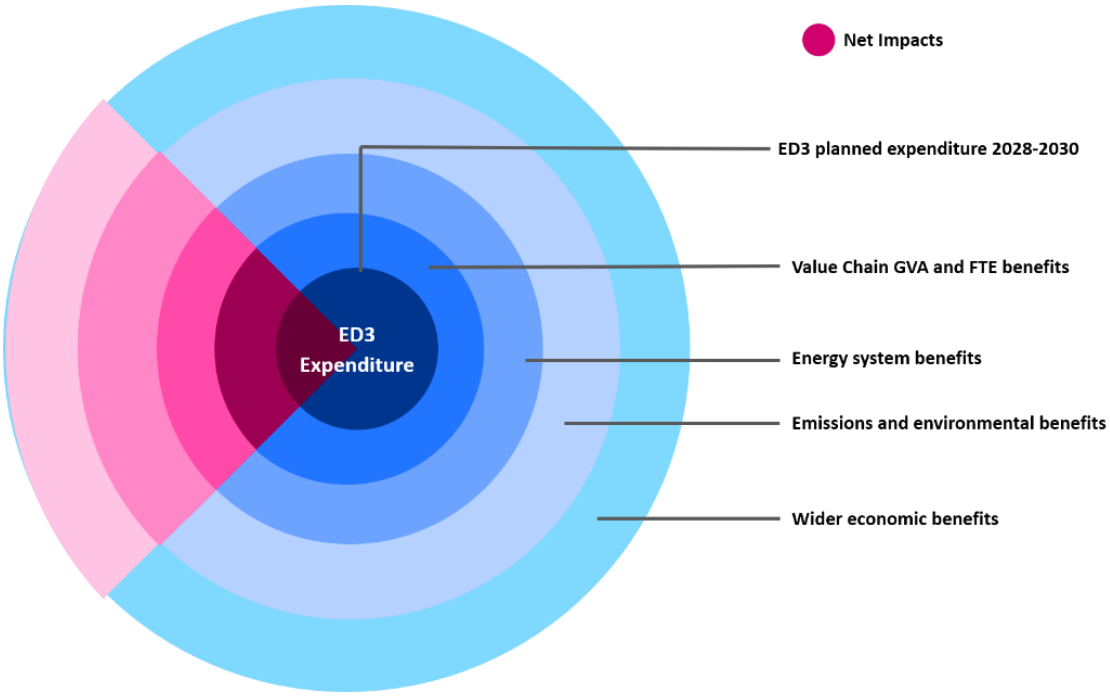
SSEN Distribution serves 3.9 million homes and businesses across the north of Scotland and central southern England. Almost every form of economic activity in those areas, such as a new housing development, a factory expansion, a hospital, a data centre, an electrified port, depends on the availability of network capacity in the right place at the right time. The distribution network is the enabling infrastructure on which the majority of economic activity in the licence areas already rests, and on which a larger share will rest as heat, transport and industrial process energy electrify.

An economy that increasingly runs on electricity requires a network that is efficiently sized for demand, neither constrained such that it becomes a bottleneck to growth and electrification, nor too far ahead such that customers pay for capacity that goes unused. The ED3 Plan (and associated Long-term Integrated Network Plan) should balance these considerations by investing where electrification and network need clearly demand it, holding off elsewhere, and combining network build with flexibility and smarter use of existing assets to manage residual uncertainty.

The value framework

In Figure ES.1 we categorise different types of economic benefits we incorporate into our Value and Benefits framework.

Figure ES.1 The value framework: what the ED3 Plan delivers and what it enables



The inner ring captures the outputs directly attributable to the ED3 Plan: the capacity released, the connections delivered, the asset health and resilience secured, the DSO, flexibility and digital capability built, and the supply-chain expenditure and skills committed. The outer rings capture the outcomes across the five value elements that the Plan enables, in combination with the other required conditions described above. This includes, for example the benefits a customer obtained from being able to connect an electric vehicle rather than pay for fuel. Such benefits are not captured in DNO activities, nor customer charges for electricity. As part of the framework, we segment the net, or additional, impact: the portion of value measured against a counterfactual of a lower investment pathway for distribution networks in ED3.

Network investment is a necessary but not sufficient condition for the benefits claimed

A key principle of our framework is that we do not attribute to the Plan outcomes that the network alone cannot deliver. SSEN Distribution does not build renewable generation, purchase electric vehicles or heat pumps, grant planning consent, nor set fuel prices or energy tariffs. Rather, network investment removes the connection, capacity, reliability and operability constraints that would otherwise prevent or delay those outcomes. Many customer benefits are therefore articulated as impacts the Plan enables, rather than impacts attributable to SSEN Distribution alone.

Gross and net benefit, assessed against an "as-is" counterfactual

The value of the ED3 Plan is assessed against a baseline, the counterfactual: what would reasonably be expected to happen if the proposed level and profile of investment were not delivered. The comparison isolates the additional value attributable to the Plan and avoids claiming benefits that would have happened anyway. The **"as-is" counterfactual** assumes a continuation of ED2 levels of expenditure into ED3, with lower and more reactive investment compared to SSEN Distribution's ED3 Plan, less anticipatory reinforcement and load-related spend prioritised towards the most constrained areas; comparing the Plan against this

baseline identifies the value of additional and discretionary investment. We report benefits across two layers so that readers can understand the absolute and the additional view of value:

- **Gross benefits** – the total value delivered by the activities, connections and capabilities enabled over ED3, in absolute terms. This is useful for conveying to customers and communities the overall scale of value the network enables. It is not a measure of additionality and is not, on its own, HMT Green Book compliant.
- **Net benefits** – the additional value delivered relative to an "as-is" counterfactual, which we define as a continuation of ED2 expenditure levels (£6.8[4] billion against £8.7 billion) with less anticipatory investment than the proposed Plan, with load-related expenditure prioritised across Grid Supply Points in order of projected constraint severity. This is the primary basis on which we assess additionality and value for money.

Gross benefits and net benefits are calculated for the elements of our framework, and cover the ED3 Plan as a whole. SSEN also assess the "incremental" benefits of individual projects or investments that go beyond the minimum required to meet operational and service requirements, or statutory and licence requirements. These project or investment level benefits are provided by SSEN Distribution in Investment Decision Packs (IDPs), as part of SSEN Distribution's ED3 Plan and inform project or investment level decisions. This report provides assessment of economic impact at a more aggregated level and can thereby capture wider economic benefits less visible at the project level.

The quantification follows a consistent four-step logic in each case: establish the population of customers, connections or assets affected; estimate the volume, uptake or level of service delivered through the Plan; estimate the equivalent under the counterfactual; and apply a unit value to the difference. The results presented are based on a pathway aligned to NESO's Holistic Transition Future Energy Scenario. We have considered a range of transition scenarios and key dependencies, including slower electrification, weaker growth and tighter supply chains, to inform interpretation of the benefits case. Impacts are monetised where robust evidence and recognised values exist, and reported in physical or qualitative terms where they cannot reliably be valued, consistent with HMT Green Book guidance.

Estimated benefits across the value elements

Table ES.1 summarises the estimated impacts across the five value elements on gross and net bases. Monetised resource benefits are presented over the ED3 appraisal period. Economic output measures are reported separately on a GVA basis and are not additive to the resource benefits, since GVA measures economic activity enabled rather than a saving in resource cost.

[4] The projected outturn for SSEN Distribution ED2 expenditure is the best estimate as at November 2026. It will be subject to future business cost pressures, operational performance and regulatory decisions which may impact the remainder of the ED2 period to 31 March 2028.

Table ES.1 Summary of economic value of ED3 Plan

Value element and impact	Unit	Gross	Net (vs "as-is")
Domestic energy savings and export revenue from LCT uptake enabled (EVs, heat pumps, solar)	£m Present Value (PV)	2,170	508
Reduced interruptions and outage duration – domestic and non-domestic	£m PV	Not reported	639
Sub-total – customer outcomes	**£m PV**	**2,170**	**1,147**
Renewable utilisation: reduced curtailment, accelerated connections, transmission output absorbed, reduced losses	£m PV	645	141
National system-operation costs avoided through distributed energy resources (DER) visibility, dispatch and voltage management	£m PV	102	35
Reliability and resilience: fault and emergency response, consequential damage, contingency arrangements, DER availability protected	£m PV	Not reported	120
Avoided, deferred or more efficiently sequenced transmission and distribution investment	£m PV	2,515	1,750
Sub-total – system security and efficiency	**£m PV**	**3,262**	**2,046**
Net emissions impact of the ED3 Plan (3.97 $MtCO_2e$ net of counterfactual, monetised at Green Book carbon values)	£m PV	5,623	1,208
Total monetised benefits (consumer, energy system and environment)	**£m PV**	**11,055**	**4,401**
Enabling growth: economic output associated with new development demand served across the licence areas	£bn GVA over ED3	71.5	10.2
Value chain: direct, indirect and induced GVA supported by ED3 expenditure	£bn GVA over ED3	7.2	1.5
Private investment unlocked by new and expanded connections during ED3	£bn over ED3	12.5	–
Average annual jobs supported across Great Britain over the period of ED3	FTE jobs	20,066	4,414

Note: Figures shown as "not reported" are on the basis that gross impacts would be presented relative to a distribution network with zero spend over the ED3 period. ED3 Plan expenditure is sized to achieve the operational standards the network is required to meet for quality of supply, asset risk and licence obligations.

Taken together, Table ES.1 shows that the ED3 Plan delivers a broad range of economic benefits for consumers, the wider energy system and the wider economy. These include direct consumer benefits from lower energy costs and improved reliability, whole-system benefits from reduced constraints, curtailment and inefficient future reinforcement, and wider economic benefits from enabling growth, supporting jobs and unlocking investment. The ED3 Plan also enables significant decarbonisation benefits, with the comparison to the counterfactuals showing that a substantial share of these benefits would be delayed or foregone under a lower-investment pathway. In particular, we find that:

Investing to be ready for expected demand can avoid later, repeated or reactive intervention and leads to more affordable outcomes for consumers in the long-term

The benefit of avoided, deferred or more efficiently sequenced transmission and distribution investment is £1.75 billion, or approximately 40% of the total monetised benefit. Intervening once at an appropriate scale,

responding to well evidenced anticipated growth in ED3, is cheaper over the whole life for consumers than a sequence of incremental reinforcements, carrying their own design, consenting, mobilisation, excavation, outage and reinstatement costs, and exposed to potential cost premia that compressed timescales attract. This also addresses the question, central to the Green Book, of whether investment increases costs today but whether deferral raises whole-system costs over time.

The opportunity to realise consumer benefit is significant although concentrated in specific technologies in the near term

Electric vehicles account for the majority of the domestic energy cost savings enabled, at approximately £575 per household per year, with solar microgeneration adding a smaller but material amount and heat pumps close to neutral (on an average basis) on current tariffs and after retrofit costs. The net benefit arises in those Grid Supply Point (GSP) areas projected to face capacity shortfalls during ED3 but falling outside the prioritised expenditure envelope in a lower-investment pathway, where connections would be delayed to ED4 or later or offered on constrained terms. The reliability benefit, at £639 million, is weighted towards long-duration interruptions and towards rural, island and worst-served customers, and rises in real terms over the period as households that have electrified heat and transport lose more when supply is interrupted.

The wider economic prize is substantial, larger than the resource-cost benefits, and more dependent on factors outside SSEN Distribution's control

Around £10.2 billion of GVA over ED3 is associated with development that would be delayed or lost under the counterfactual, concentrated in commercial floorspace across the Thames Valley, west London and the major SEPD urban centres, and in the data centre corridor where a delayed connection is most likely to mean a permanently lost investment rather than a deferred one. Delivery of the Plan itself supports a further £1.5 billion of GVA and around 4,400 average annual FTE jobs, in well paid occupations, net of the counterfactual.

The Plan facilitates decarbonisation and improved energy security

The net emissions benefit of 3.97 $MtCO_2e$ demonstrates the acceleration of decarbonisation that the ED3 Plan can enable, rather than a change in the end-point for Net-zero ambitions. Connecting more renewable generation and allowing more of its output to be used rather than curtailed, reduces exposure to volatile international markets.

Economic benefits realisation

SSEN Distribution's ED3 Plan remains subject to review and change through Ofgem's assessment, draft and final ED3 determinations, and the operation of relevant uncertainty mechanisms. Demand forecasts, evolving regional plans and progress of relevant projects, for example at the transmission level, may also affect the programme. The socio-economic impact estimates in this report should consequently be read as an assessment of SSEN Distribution's ED3 Plan and assumptions presented, not as economic benefits to be realised in any subsequent Ofgem settlement.

Where Ofgem makes changes to SSEN Distribution's ED3 Plan, this will likely alter socio-economic impacts. Ofgem, therefore – in line with its new Growth duty – should incorporate these effects in its assessment of the impact of its interventions.

Realisation of benefits depends on effective delivery and the wider transition

Realising these socio-economic benefits requires SSEN Distribution to turn expenditure into timely, efficient and effective delivery. Its management case is therefore a critical counterpart to the economic assessment. Effective governance, programme sequencing, procurement, workforce and supply-chain capability, risk

management and benefits monitoring must support delivery of the required network outputs and operational capabilities. The value identified here does not assess the status of these requirements for delivery.

The benefits also depend on developments beyond SSEN Distribution's control. Network capacity is a necessary but not sufficient condition for households to adopt low-carbon technologies, businesses to invest, or renewable projects to proceed. The scale, location and timing of energy demand will depend on wider policy commitments and their implementation, consumer and business incentives, movements in relative energy prices, technology costs, planning decisions and market developments.

Slower demand growth could reduce or defer benefits and leave capacity under-utilised, and faster growth could increase the value of timely investment and mean that consequences of delay are more costly. Our overall conclusion, while conditional, is that there is strong evidence to support the case that the assessed ED3 Plan enables substantial additional value relative to a lower-investment pathway, provided that it is delivered effectively and is responsive to the evolution of demand and the wider clean energy transition.

1 Purpose of this report

1. Purpose of this report

This report provides Baringa's independent assessment of the socio-economic impact of SSEN Distribution's ED3 Business Plan (2028–2033). It describes the value framework we developed based upon established economic appraisal techniques and applies it to quantify the Plan's broader economic impacts. A structured assessment of value is needed to test both: (a) the needs case for investment; and (b) whether the Business Plan manages to deliver against both long-term policy commitments and the continuing uncertainty over the precise course, pace and shape of the energy transition. As set out in the framework that we describe in Chapter 2, this value extends well beyond immediate bill impacts to encompass system security and efficiency, economic growth, decarbonisation and wider social outcomes, and is assessed against a credible counterfactual of lower and more reactive investment spending.

The ED3 period arrives at a decisive juncture in the UK's clean energy transition. Electricity demand in Great Britain is projected to more than double, from around 290 TWh today, up to approximately 785 TWh by 2050 in a highly electrified scenario, driven by the anticipated pace of fuel switching across transport, heat and industry. Installed wind and solar capacity may rise approximately fourfold, from 55 GW today to 226-248 GW. NESO identifies the period 2025-2030 as the critical "acceleration" phase of this transition, and the Government's Clean Power 2030 mission targets at least 95% clean generation and a reduction in carbon intensity from 171 to below 50 gCO_2e/kWh. ED3 is the price control through which distribution networks must begin scaling to enable this shift.

The proposed level of SSEN Distribution's ED3 investment represents a material step up on ED2. The National Infrastructure and Service Transformation Authority projects that annual distribution investment must roughly double, and potentially treble under some scenarios, to create the network capacity the energy transition requires, and Ofgem's ED3 guidance recognises the need for local network capacity to stay ahead of the curve. This required investment step up follows a sustained period of rising energy prices and cost-of-living pressures: the average domestic dual-fuel bill has doubled since 2017, from approximately £927 to £1,862. Although this has been driven largely by inflation and volatile wholesale gas prices, rather than network costs, investment must therefore be justified with particular rigour, demonstrating clear value for money for customers already under pressure.

The ED3 Plan must meet Ofgem's regulatory standards and tests. Under its "build and flex" framework, set out in the Sector Specific Methodology Decision, Ofgem expects proposed expenditure to be justified through robust engineering and economic evidence, and to maximise the use of flexibility and existing capacity, before funding is approved. A robust economic value framework, and its consistent application to quantify the impacts of the Business Plan, is therefore important in providing an independent evidence base against which Ofgem and other stakeholders can test the Plan. It can also help inform and raise standards of evidence across the GB distribution sector, supporting network companies to justify and improve their Business Plans so that they optimise for system and wider economic outcomes over time.

Independence and basis of preparation

SSEN Distribution commissioned Baringa Partners LLP ("Baringa") to develop a value framework and to apply it in providing an independent assessment of the economic value of SSEN Distribution's ED3 Business Plan. In undertaking this assessment, we have drawn on documents and data provided by SSEN Distribution for reference, including the Business Plan Financial Model (BPFM), Strategic Development Plans (SDPs), Distribution Future Energy Scenarios (DFES) and Engineering Justification Papers (EJPs). We have used this information in our analysis but have not audited or independently verified it. The methodology, analysis, judgements and conclusions set out in this report are Baringa's own. SSEN Distribution reviewed a draft of this report for factual accuracy.

2 Introduction

2. Introduction

2.1 SSEN Distribution's ED3 Business Plan

SSEN Distribution serves 3.9 million homes and businesses across its two licence areas, Scottish Hydro Electric Power Distribution (SHEPD) and Southern Electric Power Distribution (SEPD). ED3 is the next electricity distribution price control period, covering 2028-2033, through which Ofgem sets the funding, outputs and incentives for Distribution Network Operators (DNOs) including SSEN. SSEN Distribution's ED3 Business Plan sets out what it plans to invest in, the outcomes customers can expect, and why this represents good value for them. The Plan has been developed through extensive analysis of the benefits and costs of achieving commitments and the best long-term outcomes, as well as through extensive customer and stakeholder engagement, including the Options Paper published in August 2026 and will be submitted to Ofgem in November 2026.

Investment is required because ED3 is a critical staging post on the journey to Net-zero in Scotland by 2045 and across Great Britain by 2050. Four key drivers trigger investment in the network: load growth from the electrification of heat and transport, ageing assets, climate resilience, and enabling new connections. The Plan represents a material step up on ED2 investment, reflecting accelerating demand, an ageing asset base and more frequent extreme weather. This investment is planned to deliver reliable supply, faster and more certain connections, readiness for low-carbon technologies (LCTs), a more resilient network, and support for regional economic growth.

SSEN Distribution is seeking to balance short-term affordability with long-term value creation through a deliberately phased plan: investing with conviction where electrification and network need clearly demand it, holding a high bar elsewhere when anticipating future network needs, and combining network build with flexibility and smarter use of existing capacity. A meaningful assessment does not just consider the total cost of the network, customer bills in average and for distinct customer groups, but also the unit cost of delivering each kWh of electricity, accounting for the reliability and security of supply, and conscious of the uncertainty as to the path and pace of the clean energy transition.

The value of the ED3 Plan refers to the wider benefits the Plan delivers for customers, the energy system, the economy and society, compared with a credible lower-investment counterfactual. It includes outcomes such as improved reliability, faster connections, enabling low-carbon technologies, reduced whole-system costs, decarbonisation, economic growth and supply-chain development.

2.2 Objectives of the ED3 Business Plan and rationale for quantifying the benefits

In this report, we apply the value framework set out in Section 5 to quantify the benefits that SSEN Distribution's ED3 Business Plan delivers across the energy system and wider economy, and to assess whether the Plan is well designed and appropriately sized. It is therefore helpful to be explicit at the outset about the objectives a distribution network should be seeking to meet when it designs and sizes its Business Plan for the price control, and against which the benefits case can be assessed.

The ED3 Business Plan should be calibrated to deliver the greatest net value to consumers, the energy system, and the wider economy over the whole life of the assets and the clean energy transition, rather than minimising expenditure in any single period. Consistent with HM Treasury's Green Book and Ofgem's ED3 Business Plan Guidance, this means justifying each element of proposed expenditure through robust engineering, operational and economic evidence, principally the Engineering Justification Papers (EJPs),

Digital Justification Papers (DJPs), Cyber Resilience Investment Documents (CRIDs) and Cost Benefit Analysis (CBA) required under the guidance, and demonstrating that the additional costs of the Plan are outweighed by the additional benefits. Within this overarching objective, a well-designed distribution Business Plan seeks to:

- **Maintain a safe, secure and reliable network –** sustaining security of supply and resilience as assets age and extreme weather intensifies, so that the network continues to meet its statutory and licence obligations and protects customers, particularly vulnerable customers, from the rising costs and consequences of supply interruptions.
- **Enable the energy transition –** providing the capacity, connection-readiness and digital and flexibility capability needed to support electrification of heat and transport, connect renewable generation, and keep pace with Clean Power 2030 and Net-zero trajectories, investing ahead of need where the case is clear so that the network is an enabler of, rather than a bottleneck to, decarbonisation and economic growth.
- **Protect affordability and value for money –** balancing near-term bill impacts against long-term whole-system cost, so that the Plan keeps the total unit cost of energy manageable and delivers demonstrable value for customers already under cost-of-living pressure, with due regard to how impacts fall across different customer groups and regions.
- **Support economic growth and wider social outcomes –** unlocking new and expanded connections for housing, industry and high-growth sectors, and strengthening the domestic supply chain, skills and workforce, in line with the Electricity Networks Sector Growth Plan and Ofgem's Net-zero and growth duties.
- **Remain robust to uncertainty –** designing the Plan to perform across a range of plausible transition pathways, combining network build with flexibility and smarter use of existing assets, and preserving optionality so that capacity is not committed significantly ahead of clear need. This is central to Ofgem's "build and flex" ED3 framework and to avoid the twin risks of stranded, under-utilised assets on the one hand and constrained, reactive investment on the other.

These objectives are, to a degree, in tension, as a plan sized only for lowest near-term cost would under-invest and expose customers to higher long-term costs, delayed connections and reduced resilience, while a plan sized purely for maximum headroom would risk over-investment and unnecessary bills. The task of the Business Plan is therefore to identify the level and profile of investment that best balances these objectives, sizing the Plan as "do-minimum plus", consistent with the phased approach described above: investing with conviction where electrification and network need clearly demand it, holding a high bar elsewhere, and using flexibility to manage residual uncertainty. Quantifying the impacts within the value framework provides the evidence base for this judgement. On the basis of our assessment, we find that the proposed Plan delivers significant value relative to an alternative profile of lower investment.

This quantification exercise also serves an important consolidating role. The ED3 Business Plan is supported by an extensive body of underlying analysis, including Engineering Justification Papers and their associated Cost Benefit Analyses, asset health and risk assessments, the Strategic Development Plans and tRESP-informed spatial planning, the DSO, LV and Local Renewable Energy strategies, as well as customer and stakeholder engagement. Each of these components evidences a particular investment, activity or capability, however they are necessarily prepared at different levels of granularity. Applying our economic value framework across the Plan allows this analysis to be aggregated into a single, coherent view of the Plan's overall impacts, expressed in common units and assessed against a common counterfactual and transition assumptions, with wider dependencies identified explicitly. This makes it possible to see how individual interventions combine to deliver value across the five value elements, where the largest sources of benefit lie, and how the balance between network build, flexibility and smarter use of existing assets plays out in aggregate.

Quantification is also intended to be useful beyond the ED3 Plan submission itself, providing evidence and insight for stakeholders and a basis for the continued development of the strategy and transition planning. A transparent, well-evidenced benefits case gives Ofgem, Government, customers and wider stakeholders a clear account of what the proposed expenditure delivers, for whom, and over what timescales, and allows the trade-offs and judgements embedded in the Plan to be scrutinised and challenged: results can be revisited as the evidence base develops, as scenarios are updated, and as the Plan is refined through the ED3 review process. This supports iteration through Business Plan submission, Ofgem's assessment, draft and final determinations and into delivery, and allows the Plan to respond to further policy and regulatory developments, such as the evolution of the RESP framework, connections reform, Clean Power 2030 and the Warm Homes Plan implementation. Quantification therefore not only demonstrates the value of the Plan as proposed, but also helps identify where risks should be managed through flexibility or optionality, and how investment should adapt as the clean energy transition pathway develops.

2.3 Describing the benefits

This report is for audiences with different needs. How the value framework is described is therefore as important as how it is calculated. These audiences include Ofgem and its assessment teams, who will test the Plan against the Business Plan Guidance and expect additionality to be demonstrated against a credible counterfactual; Government and policy stakeholders, who are interested in the Plan's contribution to clean power ambitions, Net-zero and economic growth objectives; and customers and wider stakeholders, for whom the more relevant question is what the network delivers for them. We have therefore adopted an approach that keeps the presentation of results clear and accessible without compromising analytical rigour.

We present two formulations of economic value. The first is **gross benefits**: the total benefits arising from the activities, connections and capabilities delivered over the ED3 period, for example the total reduction in household bills enabled by EV charging connections made during ED3. The second is **net benefits**, measured relative to the "as-is" counterfactual described in Section 4, that is a continuation of ED2 investment levels. Each formulation can be used for different requirements, as summarised in Table 1.

Table 1 The formulations used to describe the socio-economic impact of the ED3 Plan

Layer	What it measures and against what	Illustrative example	Primary purpose and audience
Gross benefits	The total value delivered by the activities, connections and capabilities enabled over the ED3 period, presented in absolute terms rather than against an investment counterfactual.	The total bill savings realised by all households connecting EV charging during ED3, and the associated emissions reductions.	Conveys the scale of value the network enables. Not a measure of additionality and not, on its own, Green Book compliant.
Net benefits (relative to "as-is")	The additional value delivered by the ED3 Plan relative to a continuation of ED2 levels of expenditure (the "as-is" counterfactual).	The bill savings realised by households in constrained GSP areas whose EV connections would be delayed beyond ED3 under a continuation of ED2 spend levels.	Demonstrates additionality and value for money for the proposed step-up in expenditure. This approach is consistent with Ofgem's requirements.

The summary tables and illustrations in this report reflect benefits measured using both formulations, so that the reader can move between understanding the absolute and additional views of value without conflating them. Reporting the formulations side-by-side also makes the relationship between them

transparent: the gross figure establishes the overall economic scale of what the network enables; and the net figure isolates what the proposed step-up in expenditure adds relative to a continuation of ED2 spend. This can be somewhat simplified as describing the gross benefit as measuring what customers receive for the whole of the network charges component in their electricity bill, whereas the net benefit measures the benefits from the increase in the network charges component of their electricity bill[5].

The net benefits formulation ensures consistency with the HMT Green Book and supports the demonstration of value for money to Ofgem, since both are measured against explicitly defined counterfactuals and capture only outcomes genuinely attributable to the Plan. The gross formulation is not intended to serve that purpose and is not presented as evidence of additionality; it is useful for conveying the overall scale of value the network enables for customers and wider stakeholders, where the relevant question is what the investment makes possible rather than what it adds relative to a hypothetical alternative. Care has been taken throughout to label each figure with the correct formulation, to avoid double-counting between both formulations and value elements, and to ensure that headline messages drawn from the net figures remain consistent with, and can be traced back to, the gross analysis.

ED3 Plan non-load related expenditure for asset replacement, faults, tree cutting, resilience and restoration, is sized to meet the operational standards the network is required to meet for quality of supply, asset risk and licence obligation. In this area the ED3 Plan is sized to a "do-minimum", so no value is claimed as discretionary or anticipatory.

Alongside quantification of gross and net economic benefits, we also present a number of case studies which provide tangible examples of how SSEN Distribution activities create the benefits which we quantify.

2.4 Dependencies

The value delivered by the ED3 Business Plan does not depend on the successful delivery of the Plan alone. It also depends on how the wider energy system and economy evolve around it. The pace of electrification, the volume and location of new generation, the maturity of flexibility markets, commodity prices and the strength of economic growth all influence the scale and timing of the benefits assessed under each value element. For example, faster electrification increases the customer, decarbonisation and growth benefits of timely investment, while a slower or more uncertain transition changes the balance between the value of investing ahead of need and the risk of under-utilised assets. The estimates presented in this report should therefore be considered alongside these dependencies, rather than as outcomes guaranteed by network investment alone.

Recognised external reference points, such as NESO's Future Energy Scenarios (FES) and Clean Power 2030 analysis, inform the context, and this report focuses on quantified results for an ED3 Plan assessed in the context of a transition broadly aligned with the Holistic Transition FES scenario. Additionality is assessed against the counterfactuals described in Section 4, using a consistent transition scenario for the Plan and the counterfactuals. These lower-investment counterfactuals are distinct from alternative scenarios for the wider transition.

The most important drivers to bear in mind when interpreting the results include:

- **Market**: wholesale electricity, gas and transport-fuel prices; flexibility market liquidity and cost; commodity and supply-chain cost inflation; and the cost of capital, all of which affect avoided system costs, whole-wallet savings and deliverability.

[5] This description is intentionally simplified as there is not a simple relationship between expenditure and customer charges as many other regulatory parameters such as the capitalisation rate, depreciation rate, allowed returns and incentives also impact the precise profile of customer charges for electricity distribution.

- **Policy and regulation**: the pace of Clean Power 2030 and Net-zero delivery; Ofgem's "build and flex" framework and uncertainty mechanisms; the Warm Homes Plan and heat policy; connections reform and queue management; and the Modern Industrial Strategy and Electricity Networks Sector Growth Plan.
- **Technological**: the cost, performance and availability of EVs, heat pumps, solar and storage; the maturity of digital and flexibility solutions; and the relative role of energy vectors such as, heat networks and gas.
- **Behavioural**: the rate and distribution of consumer LCT adoption; willingness to shift demand and participate in flexibility; and the pace of business and industrial electrification, including large strategic loads such as data centres.

The assumptions underpinning our analysis reflect NESO's Holistic Transition FES scenario and this is the basis on which the quantified benefits are reported. Downside risks include delayed heat-pump and other LCT uptake, weaker economic growth, slower renewable deployment and tighter supply chains. These risks may reduce or delay benefits, alter delivery costs or increase the risk of capacity being provided ahead of demand; they are not presented as a separately quantified downside scenario. Conversely, faster electrification or stronger demand could increase the value of timely capacity and the consequences of delay.

The purpose of this report is to quantify the benefits of SSEN Distribution's ED3 Plan in the context of NESO's transition pathway. The Holistic Transition pathway provides an appropriate basis for this assessment because it is the principal planning basis that Ofgem expects DNOs to use in developing their ED3 load projections and long-term network plans, providing a consistent reference point between the investment needs identified in the Business Plan and the benefits quantified here. Wider uncertainty around the pace and shape of the transition remains important and is reflected through the dependencies described above and in interpreting the results, rather than through separate benefit estimates for alternative transition pathways.

3 The energy transition and the role of distribution networks

3. The energy transition and the role of distribution networks

Over the past 15 years, the electricity system has undergone a profound transformation. What was once a system dominated by large, centralised fossil-fuel generation has evolved into one characterised by rapidly growing renewable generation, increasingly distributed sources of supply, and greater participation from customers. Across Great Britain, renewable generation has increased from a relatively niche component of the energy mix to the largest source of electricity generation, supported by substantial growth in onshore and offshore wind, solar PV and battery storage. This transition has been particularly visible across SSEN Distribution's licence areas, which host some of the UK's most significant renewable energy resources, including major onshore and offshore wind developments, island generation schemes and growing volumes of generation connected directly to the distribution network.

The pace of change is expected to accelerate further during ED3. The Government's Clean Power 2030 mission envisages a power system supplied predominantly by low-carbon generation, while NESO's Future Energy Scenarios (FES) indicate that electricity demand could more than double by 2050 under highly electrified pathways. Growth is expected to be driven by the electrification of transport, heating and parts of industry, alongside increasing deployment of renewable generation, storage and demand-side flexibility. Millions of electric vehicles and heat pumps are expected to connect to distribution networks over coming decades, while electricity-intensive sectors such as data centres and advanced manufacturing increase demand for network capacity. In parallel, the volume of renewable generation seeking connection to both transmission and distribution networks continues to grow.

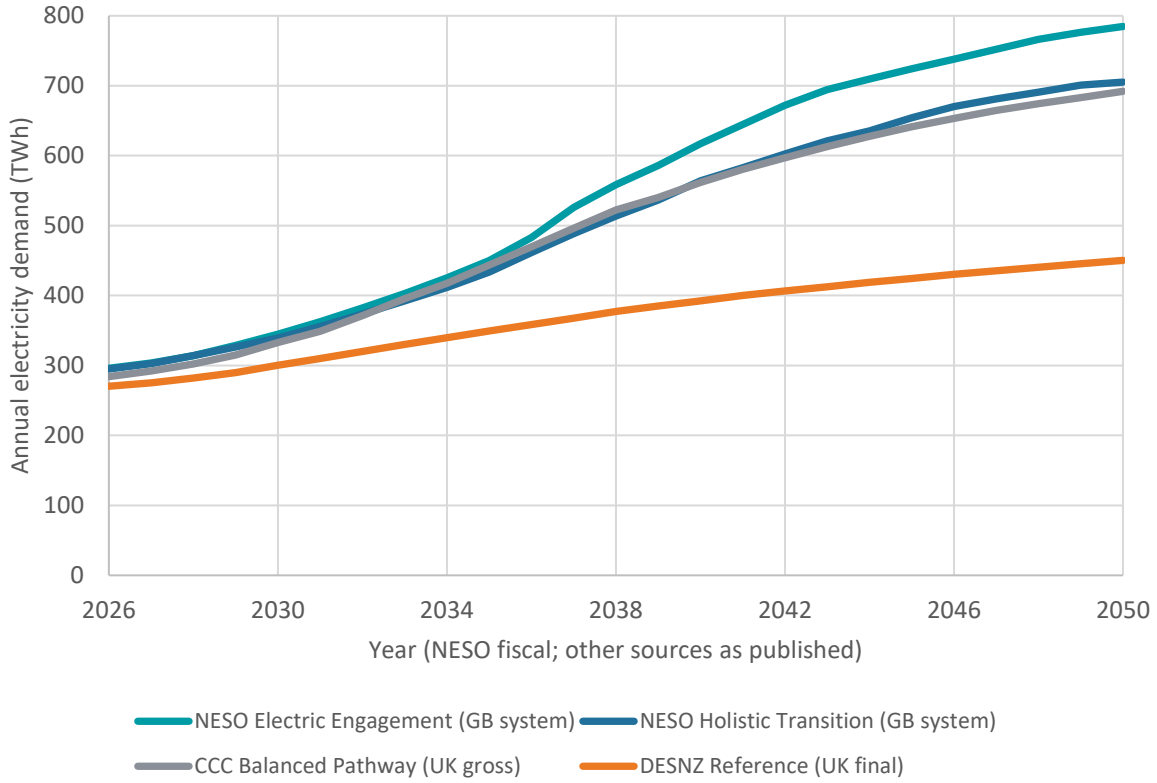
This transformation is changing not only the scale of the electricity system but also the way it operates. Historically, electricity flowed predominantly in one direction through transmission networks to consumers. Increasing levels of distributed generation, storage and flexible demand mean that electricity networks must now manage bi-directional power flows, more dynamic operating conditions and a much larger number of connected assets. Customers are becoming active participants in the energy system, exporting electricity from solar PV, charging and discharging electric vehicles, and responding to price signals through flexible technologies. As highlighted through SSEN Distribution's DSO, LV and Local Renewable Energy strategies, this requires networks to evolve from being passive infrastructure providers to active system operators capable of coordinating generation, demand, storage and flexibility services in real time.

Digitalisation and cyber resilience is therefore becoming as important as physical infrastructure investment. The future distribution system will require enhanced resilience, monitoring, forecasting, automation and control capabilities to manage a more complex and decentralised network efficiently. Greater visibility of low-voltage networks, improved data and analytics, and increasingly sophisticated flexibility markets will allow networks to maximise the utilisation of existing assets, defer unnecessary reinforcement where appropriate and support customers to participate in the energy transition at lower overall cost. The future network will consequently be both larger and smarter, combining traditional reinforcement with digital and flexibility-based solutions.

While the direction of travel is clear, significant uncertainty remains regarding the precise pace and shape of the transition. NESO's Future Energy Scenarios, the Climate Change Committee's pathways to Net-zero and wider government analysis all envisage substantial electrification, but differ in the timing and relative contribution of individual technologies. Some pathways place greater emphasis on direct electrification through electric vehicles and heat pumps, resulting in higher electricity demand and greater requirements for network capacity. Others envisage a larger role for sustainable fuels, carbon capture and storage, and energy efficiency measures, reducing some direct electricity demand growth while still requiring extensive

infrastructure investment. Across all credible pathways, however, electricity becomes increasingly central to the energy system, renewable generation expands substantially, and distribution networks play a more important role in enabling decarbonisation, economic growth and energy security.

Figure 1 Scenarios for growth of GB and UK electricity demand, 2026-50 (TWh)



Source: NESO

NESO's transitional Regional Energy Strategic Plan (tRESP) provides an important step towards more coordinated, place-based planning for ED3 network investment, identifying areas where proactive reinforcement could enable local projects and better align future energy needs with local ambitions. The full RESP framework will continue to evolve and uncertainty remains over the precise long-term pathway for demand, generation, flexibility and local economic growth; this reinforces the need for network investment to be planned from a long-term perspective. Networks cannot be expanded instantaneously once demand materialises. Building network infrastructure has long lead times, with long operational lives and significant dependencies on supply chains, planning processes and workforce capability. Investing only once demand has fully emerged risks higher costs, delayed customer connections, reduced reliability and missed opportunities for economic growth and decarbonisation. Conversely, well-targeted well-planned investment can reduce whole-system costs, support timely electrification and avoid the need for more disruptive or expensive interventions in future. This principle is reflected in Ofgem's evolving "build and flex" framework, which seeks to balance proactive investment with flexibility and efficient use of existing assets.

4 The counterfactual: the cost of not investing

4. The counterfactual: the cost of not investing

As set out in the preceding sections, the ED3 Business Plan represents a material step up in investment compared with ED2, reflecting the increased pace of the energy transition and the expanded role distribution networks must play in enabling electrification, connecting renewable generation, supporting economic growth and maintaining resilience.

Network investments are typically necessary but not sufficient to create wider benefits. SSEN Distribution does not build renewable generation, purchase electric vehicles or heat pumps, grant planning consent, or set fuel prices or energy bills. Rather, network investment removes the connection, capacity, reliability and operability constraints that would otherwise prevent or delay those outcomes.

The value of any intervention can only be understood by comparing its outcomes against a credible alternative. Our assessment therefore compares the impacts of the proposed Plan, including the benefits it enables and the risks it mitigates, with those of a lower-investment approach.

This approach is consistent with established principles of economic appraisal, and in particular HM Treasury's Green Book. The Green Book requires that the impacts of an intervention be assessed relative to a clearly defined counterfactual, a realistic view of how the world would evolve in the absence of the proposed action. The counterfactual provides the baseline against which costs and benefits are measured, and is central to demonstrating *additionality*: distinguishing those outcomes that occur *because* of the Business Plan from those that would have arisen had business continued on its current track. Defining a robust counterfactual is therefore required for a credible assessment, ensuring that benefits are neither overstated by attributing pre-existing trends to the Plan, nor understated by ignoring the consequences of inaction.

Our counterfactual needs to be credible, but is primarily an analytical construct to determine when to start measuring net benefits rather than gross benefits. It is not a compliant level of expenditure for the ED3 period; rather increased regulatory requirements add to both net costs and to net benefits. We capture such changes in our net benefits.

Depending upon the precise setting of the counterfactual, it also serves as a useful way of explaining what consumers are receiving for the *increase* in their bills.[6]

Relative to this counterfactual, the value framework identifies the economic, customer, environmental and system consequences of the ED3 Business Plan, and quantifies these further in Sections 6 and 7, in line with the value elements set out in Section 5. The benefits attributed to the ED3 Business Plan represent the difference between outcomes under the proposed Plan and those expected under the counterfactual across each value element: customer outcomes, system security and affordability, economic growth, decarbonisation, and wider economic and social value.

A consequential benefit of the counterfactual is to make visible the long-term costs and risks that customers would ultimately bear in the absence of timely network upgrades. These extend well beyond conventional engineering considerations and affect the wider economy and society. Qualitatively, they include:

- Delayed or restricted connections for new homes, businesses, industrial users, data centres and low-carbon technologies, slowing regional economic growth and creating "no-growth" zones where networks become a bottleneck rather than an enabler.

[6] The profile of network charges and recovery of increased ED3 expenditure over time is not in the scope of this report. This is separately included in the ED3 Plan by SSEN Distribution.

- Localised network constraints limiting adoption of electric vehicles, heat pumps and rooftop solar, delaying the bill savings these technologies offer and prolonging household exposure to volatile fossil-fuel costs.
- Increased network congestion, constraint costs and renewable curtailment, raising whole-system costs that ultimately flow through to consumer bills.
- Greater exposure to outages and reduced resilience as ageing assets are sweated harder and climate-related weather events intensify, with vulnerable customers most affected.
- Higher future reinforcement costs, as interventions are undertaken reactively and under compressed timescales, with a stop-start approach resulting in the loss of potential efficiencies from "touch the network once" coordinated delivery and stable supply-chain planning.
- Reduced ability to capture the benefits of flexibility, digitalisation and strategic, place-based network planning.
- Slower progress towards Net-zero, Clean Power 2030 and wider energy-security objectives, and the intergenerational impact of deferring costs onto future bill payers.

These impacts reflect the importance of the Green Book concepts of *opportunity cost* and *dynamic efficiency*. The relevant question is not just whether investment increases costs today, but whether deferring expenditure results in higher whole-system costs, reduced value or foregone benefits over time. In many cases a proactive investment pathway increases short-term network expenditure while reducing the total cost borne by consumers across the wider energy system and economy over the longer term. To be consistent with the Green Book's emphasis on whole-life value and long-term affordability rather than lowest upfront cost, the counterfactual comparison is designed to capture these dynamic effects rather than a narrow, single-period view of expenditure.

It is recognised that the proposed ED3 Business Plan is not the only alternative to the "as-is" scenario. A range of higher-investment pathways could also be envisaged. However, the primary purpose of the value framework is to establish whether the proposed ED3 Plan represents an economic value improvement relative to a lower-investment baseline. Quantitative assessment therefore focuses on comparison with the as-is counterfactual. We have not quantitatively assessed higher-investment alternatives, and our findings should not be read as concluding that the Plan is optimal relative to all possible pathways. Qualitatively, the Plan's approach of balancing well-planned investment with flexibility and optionality is consistent with avoiding committing customers to capacity ahead of clear need.

The pace of electrification, the rate of deployment of new electricity generation, and the relative contribution of technologies such as hydrogen, energy efficiency and flexibility all remain uncertain, and both demand for electricity and the location of new demand may shift over time. Consideration of wider dependencies informs discussion of the value of investing ahead of need and the risks of over- or under-investment.

The following section lays out the four methodological components that we follow to construct the counterfactual, as well as a worked example to illustrate how this allows us to compute net economic benefits.

Component 1 Level of counterfactual spend

Quantification of benefits requires a counterfactual to credibly establish the gains for customers and the economy from planned expenditure.

For the purposes of this framework, the counterfactual is primarily defined as an "as-is" investment pathway reflecting a continuation of ED2 spending and investment levels. Investment is targeted primarily at maintaining existing services, addressing essential asset replacement and responding to demand only once a clear and immediate need has materialised, relying more heavily on flexibility and utilising existing assets to keep near-term bills closer to existing levels in real terms. This is not a "do-nothing" scenario as a baseline level of investment continues, but one that is more limited, more reactive and less demand centred than the proposed ED3 Business Plan.

This approach also aligns with the counterfactual adopted in the Energy Networks Association (ENA) benefits assessment. The ENA emphasises comparing proposed network investment against a credible lower-investment baseline in order to quantify the value of earlier, more coordinated investment, and notes that significantly higher levels of network investment will be required in ED3 than ED2 even under a rollover approach, framing the question as one of the *timing* and *scale* of investment rather than whether additional investment is required. Adopting a closely aligned counterfactual with the ENA study ensures consistency between the SSEN Distribution ED3 Business Plan assessment and wider network industry assessment of the evidence base supporting network investment.

Component 2 Distribution of counterfactual spend

Once the level of expenditure is established, we need to capture how this will be distributed across key activities and across regions.

Expenditure categories: For the "as-is" counterfactual we apply the ED2 distribution of expenditure in the ED3 period. These are set out in Table 2 below.

Table 2 ED2 forecast and ED3 proposed expenditure by BPFM category and licence area

	ED2 – 2025/26 prices			ED3 – 2025/26 prices		
	£m	£m	£m	£m	£m	£m
BPFM Category	**SHEPD**	**SEPD**	**SSEN**	**SHEPD**	**SEPD**	**SSEN**
Load related capex	524	1,012	1,536	1,025	1,597	2,622
Non-load related capex - asset replacement	506	1,007	1,513	578	1,530	2,108
Non-load related capex - other	657	328	985	329	405	734
HVP	-	-	-	-	-	-
Faults	169	375	544	167	397	564
Tree Cutting	65	137	202	60	187	247
Controllable Opex	754	1,245	1,999	887	1,551	2,438
Total	**2,676**	**4,104**	**6,780**	**3,046**	**5,666**	**8,713**

Source: SSEN Distribution

Regional distribution: The regional distribution of impacts depends on the prioritisation of load-related spend under a lower investment counterfactual, which determines how anticipated network constraints will be addressed across the different Grid Supply Points (GSPs).

- We allocate load-related spend across GSP according to how constrained a given GSP is estimated to become.

- We assume that a proportion of the new and expanded connections anticipated in the ED3 period in GSPs which are not prioritised in the counterfactual, beyond those that can be satisfied with current capacity, would be delayed by >5 years (post-ED3) or subject to restrictions.

Component 3 Benefits from serviced demand per GSP

As load related spend is a key differentiator between the ED3 Business Plan and the counterfactual, the difference in benefits delivered is mainly driven by how underlying demand is serviced.

- We utilise DFES projections at Local Authority level to understand demand and connections growth.
- We have used GSP spatial boundaries and computed the overlap with LA boundaries to apportion the growth in demand for the different GSP areas.
- This identifies which, and how many, customers will benefit given the GSPs which are serviced in the counterfactual.
- For each type of connection affected we define an appropriate methodology for quantifying economic benefits.

Worked Example: Electric vehicle household benefits

- DFES scenarios at the Local Authority level provide a view of projected growth across different household (and industrial) technologies that will require additional network capacity, including electric vehicles.
- For each technology we define an approach to quantifying benefits relative to the counterfactual, including energy cost savings per household
- In the case of electric vehicles, household savings are defined by the difference in use and ownership costs compared to an ICE vehicle.
- Assuming a typical annual mileage per household, cost per mile of running an EV compared to the cost per mile of an ICE vehicle, and the average annual maintenance and insurance costs provides an estimate of annual savings per household of owning an EV.
- The average total savings per household, for households using an EV, is approximately £575 per year.

Table 3 Worked example assumptions and calculation of annual household savings from electric vehicle ownership

	Step	Unit	Value
A	Set the annual mileage assumption	miles per year	8,500
B	Set ICE fuel cost per mile based on fuel cost and average ICE efficiency	£ per mile	0.17
C	EV £ per mile based on average cost of a full charge and associated mileage	£ per mile	0.08
D	Annual cost of usage ICE (A*B)	Annual £	1,445
E	Annual cost of EV usage (A*C)	Annual £	680
F	EV maintenance and other costs of ownership premium[7]	Annual £	190
	Savings per household per year (D-E-F)	**Annual £**	**575**

Source: DESNZ, Baringa analysis

[7] The ownership premium is composed of the difference in ownership costs between an EV and ICE vehicles upfront vehicle cost, maintenance and servicing, insurance and applicable taxes.

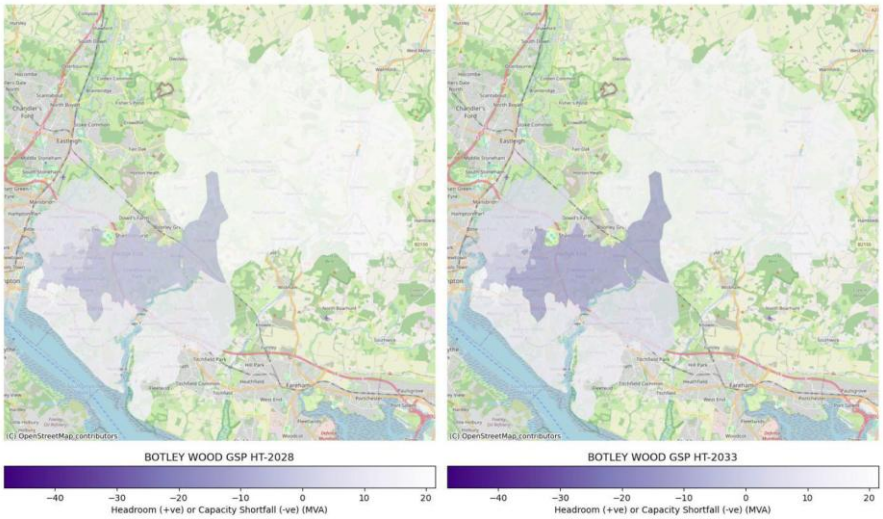
Component 4 Curtailed demand growth foregone benefits

Having computed the benefits for a given connection (e.g. household savings from EV ownership), we can quantify the foregone benefits under a constrained level of spend as some GSPs are assessed to delay grid reinforcement spend that would be needed to accommodate connection growth.

Identified GSPs that are projected to face network capacity shortages within the ED3 period, but which fall outside of the prioritised GSP locations, may need to delay or restrict usage of a proportion (by location) of household EV charging points until ED4 at the earliest.

Worked example: Constrained GSP with delayed spend – Botley Wood

One GSP area which would be unlikely to be assigned load related reinforcement expenditure in a constrained ED3 scenario is Botley Wood, which ranks 26th out of 33 SDPs assessed. Over the course of ED3 (2028 – 2033) it would see approximately 33% of the GSP area experiencing a peak capacity shortfall of around 10 MVA on average, without additional shifting of demand away from peak periods.



Source: Botley Wood Strategic Development Plan (2026), Spatial Plan of Future Needs, Holistic Transition

We estimate that delays or restrictions on new EV charger connections would lead to approximately 25% of anticipated demand for EVs in the ED3 period being foregone**.**

Botley Wood GSP overlaps with Southampton, Eastleigh, Fareham and Winchester Local Authorities.

Table 4 Projected household electric vehicle demand and curtailed growth in the Botley Wood GSP

Projected demand for household Electric Vehicles, Holistic Transition Scenario (number of EVs)						
GSP	Local authority	% of LA in GSP	2028	2033	DFES Demand growth	Curtailed ED3 demand growth
Botley Wood	Winchester	22%	3,459	10,405	6,946	1,737
	Southampton	33%	9,244	21,740	12,496	3,124
	Fareham	20%	3,384	9,368	5,984	1,496
	Eastleigh	45%	7,532	21,743	14,212	3,553
					39,638	**9,910**
					Household savings (undiscounted)	**£5,697,963**

Source: SSEN Distribution, Baringa analysis

Applying the total calculated savings to the curtailed demand yields a total of £5.7 million in foregone household savings in 2033.

5 The value framework

5. The value framework

5.1 Overview of the framework

Our value framework provides an approach for assessing the outcomes delivered by SSEN Distribution's ED3 Business Plan. It recognises that network investment creates value through multiple impact or transmission channels beyond direct customer benefits from using electricity. A narrow focus on the near-term cost of operating the network alone would understate the contribution that timely, well-targeted investment makes to the wider energy system, the economy and society.

The framework therefore considers both direct customer benefits, such as reliability, access to low-carbon technologies and service quality, and wider economic, environmental and societal outcomes, enabling a balanced assessment of long-term value. In doing so, it provides a consistent basis for comparing the proposed ED3 Plan against the counterfactuals described in Section 4, identifying and estimating the additional value delivered by the Plan.

The approach is also designed to align with emerging regulatory thinking on consumer value. It draws on Ofgem's evolving expectations for ED3 and aligns with the wider industry work led by the Energy Networks Association (ENA). We have also considered the ambitions of the Electricity Networks Sector Growth Plan, and applied the appraisal principles set out in HM Treasury's Green Book. The remainder of this section describes each of these reference points before setting out the value elements that structure our assessment.

5.1.1 Alignment with Ofgem's consumer value principles

Ofgem's ED3 Sector Specific Methodology Decision[8], and National Grid's analysis on embedding consumer value in the ED3 framework[9], signal a broader assessment of consumer value than used in previous price controls. The framework leverages the target ED3 consumer outcomes, which are closely aligned with Ofgem's Consumer Interest Framework, and also reflect other key drivers of change shaping the price control as identified in Ofgem's Decision such as: regional decarbonisation, evolving consumer behaviour, social policy imperatives, increased reliance on electricity, and the growing importance of resilience[10].

Firstly, the framework recognises Ofgem's new statutory duties relating to Net-zero and economic growth, and the associated need to make decisions that extend beyond the traditional remit of the price control. Second, it acknowledges that lowest cost today will not be the sole, or even the most important, consideration in ED3, given the price control's critical role in governing a pivotal phase of the UK's energy transition. Third, it reflects the social imperative of ED3: ensuring that all consumers, including those who are vulnerable or less able to participate, have the opportunity to benefit from the energy transition. Fourth, it treats resilience and security of supply as core elements of value rather than secondary considerations. Together, these considerations support an assessment that weighs short-term bill impacts against long-term economic, environmental and social value, distributional fairness and system resilience.

[8] Ofgem, ED3 Sector Specific Methodology Decision, 2026
[9] National Grid - Annex 2 - Embedding Consumer Value in the RIIO-ED3 framework, 2024
[10] Ofgem, ED3 Framework Decision, 2025

5.1.2 The ENA benefits case for network investment

In parallel with SSEN Distribution's ED3 Plan development, the ENA has developed a GB-wide network benefits case for network investment, assessing the benefits and trade-offs of investing more versus less, and investing earlier rather than later. SSEN Distribution's value framework is designed to be complementary to, and consistent with, this work.

The ENA benefits case seeks to:

- **Evidence the opportunity costs and risks of delay**, including higher future costs, delivery and supply-chain risks, reduced investability, and benefits foregone from constraints to electrification and growth.
- **Make consumer value explicit and defensible**, translating short-term bill impacts into long-term affordability, avoided system costs, improved reliability and intergenerational fairness.
- **Demonstrate whole-system benefits**, including reduced inefficiencies, lower constraint costs and rework, improved coordination across transmission and distribution, and the role of networks in enabling flexibility and system optimisation.
- **Establish a robust analytical case for investment**, comparing more proactive and reactive pathways, and quantifying the trade-offs in costs, risks and outcomes.
- **Integrate and build on existing ENA and network analysis**, creating a coherent and aggregated synthesis across ED3, T3, Value of Lost Load (VoLL), constraint cost analysis and the Electricity Networks Sector Growth Plan (explained below).

Adopting a comparable counterfactual and consistent value elements ensures that our analysis can be used alongside the ENA's GB-wide evidence base.

5.1.3 The Electricity Networks Sector Growth Plan

The SSEN value framework is also informed by the Electricity Networks Sector Growth Plan[11], which sets out the sector's contribution to economic growth, supply-chain development and investment across Great Britain. The Growth Plan is relevant to the assessment of the SSEN Distribution ED3 Business Plan in several respects. It establishes the strategic context in which network investment is expected to support wider industrial strategy, regional development and energy-security objectives, and provides evidence for the scale of investment, supply-chain capacity and skills the transition will require. It also underpins the economic and social value of the framework, informing estimates of Gross Value Added (GVA), employment and supply-chain benefits associated with sector-wide ED3 delivery. By aligning with the Growth Plan, our value framework demonstrates how SSEN Distribution's investment contributes not only to customer and system outcomes but also to national and regional economic growth. It is therefore consistent with the Sector Growth Plan, while also presenting SSEN Distribution's contribution to the sector aggregate impact.

5.1.4 Green Book appraisal principles

Finally, our value framework applies the appraisal principles set out in HM Treasury's Green Book[12], the UK Government's guidance on the economic appraisal of policies, programmes and projects. The Green Book provides a rigorous, widely-recognised basis for assessing value for money, and so following these principles will ensure that our assessment of the ED3 Business Plan is robust, transparent and consistent with the approach used across government. Several Green Book concepts are particularly relevant to assessing the value of SSEN's ED3 Plan, as summarised in Table 5, alongside their implications for our value framework methodology.

[11] ENA and BEAMA, Electricity Networks Sector Growth Plan, 2026
[12] HM Treasury, Green Book, 2026

Table 5 Green Book appraisal principles and their implications for our value framework

Green Book concept	Explanation	How we incorporate implications for our value framework
Additionality	Distinguishing outcomes that occur because of the intervention from those that would have happened anyway.	Benefits are assessed against a counterfactual, so only value attributable to the step-up in expenditure in the ED3 Plan is quantified. We also provide gross estimates to show the impact of the ED3 Plan as a whole and not compared to a counterfactual. This is still useful for showing total value creation, even if that value could be reasonably expected to continue without the ED3 Plan.
Opportunity cost	Resources are scarce, and delaying action can itself create costs. The cost of delay reflects the value lost when timely investment is deferred, including foregone benefits and potentially higher future costs.	The framework captures the costs and benefits foregone by deferring investment, including higher future reinforcement costs and delayed electrification benefits.
Whole-economy impacts	Significant investment can generate effects beyond the immediate project boundary.	Wider economic effects, such as GVA, jobs and enabled growth, are assessed alongside direct network and customer impacts.
Distributional impacts and fairness	Significant emphasis is placed on understanding who benefits and who bears the costs, including by region.	Impacts are considered by customer group and region (e.g. vulnerable customers, LCT adopters versus non-adopters, and the SHEPD and SEPD licence areas) reflecting distributional fairness.
Long-term affordability rather than short-term cost	This encourages consideration of full lifecycle costs and whole-life value rather than lowest upfront expenditure.	Consistent with the Long-term Integrated Network Plan, value is assessed over the whole life of assets and the transition rather than a single price-control period. However, the ED3 price control covers the distinct 2028-2033 time period and so metrics are assessed for this period.
Social value and health benefits	Recent Government guidance is increasingly supportive of incorporating health, wellbeing and social outcomes.	Health and wellbeing benefits, such as warmer homes, improved air quality and fewer outages for vulnerable customers, are included where robust evidence exists.
Monetisation where possible	This encourages monetisation where robust evidence exists, while recognising some outcomes are difficult to value precisely.	Benefits are monetised using recognised values (e.g. Value of Lost Load and carbon values). Benefits that cannot be robustly monetised are presented qualitatively and in physical units.
Strategic alignment	Whether interventions contribute to wider government objectives.	Our framework tests alignment with Net-zero, Clean Power 2030, economic growth and industrial strategy, regional development, energy security and the Warm Homes Plan.

Source: HMT (2026) "The Green Book (2026)", Baringa

5.2 The value elements

Our value framework assesses the value of the ED3 Business Plan across five elements, grouped under three overarching areas of value: the energy system, emissions and environment, and the wider economy. Within the energy system, value is captured both through direct customer outcomes and through system security, efficiency and affordability. The wider economy area captures value from enabling growth and from supply chain value. Together, these elements provide a comprehensive and structured view of how network investment creates value, spanning direct customer benefits, whole-system efficiency, decarbonisation and wider economic and social outcomes.

Figure 2 summarises the structure of our value framework, and the remainder of this section describes the methodology for assessing the impact of the ED3 Plan across each element in turn.

Figure 2 The elements of the value framework

<table>
<tr><th>Energy system</th><th>Emissions and environment</th><th>Wider economy</th></tr>
<tr><td>Customer outcomes

How the Plan affects outcomes for domestic customers, businesses and communities through better access to LCTs, faster connections, improved reliability and service, and associated health and wellbeing benefits.</td><td rowspan="2">Decarbonisation and environmental benefits

The environmental value created by connecting more renewable generation, enabling electrification and reducing the carbon intensity of the energy supplied.</td><td>Enabling growth

How network investment unlocks economic development by enabling new connections and capacity for housing, industry and high-growth sectors</td></tr>
<tr><td>System security, efficiency and affordability

How the Plan contributes to a more secure, efficient and lower-cost energy system over the long term, reducing whole-system costs, network constraints and renewable curtailment.</td><td>Supply chain value

The economic value created through ED3 supply-chain expenditure, jobs, skills and workforce development.</td></tr>
</table>

Source: Baringa

The analytical approach is proportionate to the evidence available for each category. Where the evidence supports the creation of a counterfactual case, we quantify both gross and net economic impacts and monetise these where recognised valuation approaches are available. Where a robust counterfactual or monetary valuation cannot be supported, we assess the impact using physical outputs, programme commitments, scheme-specific evidence and alignment with relevant regulatory, engineering or policy standards. Figure 3 summarises the key inputs, methodology and outputs of our value framework.

Figure 3 Summary of SSEN value framework

Inputs	Methodology	Outputs
• ED3 investment and cost data • Tailored value themes and metrics • Counterfactual investment and cost data • LCT, connection and bill-impact data • Assumptions informed by NESO FES and wider transition dependencies	• Consistent definition of the counterfactual • Quantification approaches for customer, system, economic and environmental value • Monetisation approach using Green Book consistent discounting, VoLL and carbon values • Assessment of central case and consideration of wider transition risks and dependencies	• Company-level evidence of benefits and supporting case studies • Quantified/monetised metrics at SSEN level that aggregate into the ENA GB-wide benefits case • Evidence for Ofgem, Government and wider stakeholders

5.2.1 Customer outcomes and service quality

In plain terms: this is about helping customers get the most from the energy transition. By investing in the local distribution network, the ED3 Plan enables households and businesses to get connected; and then receive a reliable, safe source of power in order to plug in an electric car, use a heat pump or add solar panels when they want to.

Description: This element considers how network investment delivers benefits within the energy system to domestic customers, businesses and communities through improved access to low-carbon technologies (LCTs), faster and more certain connections, greater network reliability and better customer service. Customers face varying exposure to power outages, fuel poverty and poor housing conditions, so this element has an important distributional aspect. This element relates to benefits wider than the consumption of electricity, for which customers pay retail electricity charges, and which they are assumed to value at least the amount of the charges (otherwise they would not consume)[13].

Rationale: A central objective of the ED3 Plan is to enable customers to participate in the energy transition and realise financial savings and other non-financial benefits that can be valued or monetised, that would otherwise be unavailable or significantly delayed in the counterfactual. The flow of impacts runs from ED3 investment to a network that is more reliable, more resilient and better able to support customer needs. Relative to the counterfactual, the Plan brings these benefits forward and extends them to more customers, with the greatest incremental benefit often accruing to vulnerable groups.

Key dependencies

The key dependencies driving customer value are:

- **Rate of LCT adoption**: the pace at which customers choose to adopt EVs, heat pumps and solar (informed by FES and DFES scenarios) determines how many customers realise benefits and the timing of those benefits.

[13] This approach does not consider consumer surplus – the additional value obtained by certain customers above the retail price of electricity.

- **Relative fuel and electricity prices**: savings depend on the gap between electricity prices and gas and transport-fuel prices, which drives the payback from electrification.
- **Upfront costs and policy support**: falling technology costs and the availability of grants (e.g. the Warm Homes Plan which subsidises heat pump installation) affect both adoption levels and the attribution of benefits to network investment.
- **Housing stock and suitability**: the proportion of properties suitable for LCTs, including looped, off-gas or poorly insulated homes, shapes both the need for, and the benefit from, network investment.
- **Valuation of reliability**: the value customers place on avoided interruptions (e.g. Value of Lost Load and willingness-to-pay) affects the monetised reliability benefit.
- **Delivery of enabling programmes**: the pace at which LV upgrades, unlooping and connections are actually delivered determines how quickly benefits are realised.

How benefits are assessed

Our approach assesses the growth in customers (households, businesses and public sector organisations) adopting LCTs during ED3 to inform the gross estimate, as well as the additional number of customers enabled to adopt LCTs relative to the counterfactual, and how much earlier this adoption can occur to inform the net estimate. Customer financial benefits are monetised through avoided energy costs for LCT archetypes (EVs, heat pumps and distributed generation), net of upfront costs and avoiding double-counting of Government grant-funded measures. Reliability benefits are assessed through reduced interruption frequency and duration and monetised using Value of Lost Load and willingness-to-pay measures.

Critical to this analysis is the estimation of the as-is counterfactual for when network capacity provides a constraint on LCT connections, and how that constraint would be implemented (e.g. no new connections or constrained usage etc).

Table 6 Customer outcomes and service quality - impact categories and methodology

Category	Methodology description
Monetised impacts	
Financial impacts of low-carbon technology adoption enabled	Estimate the volume and timing of LCT uptake enabled by available network capacity relative to the counterfactual. For domestic EVs, heat pumps and solar PV, estimate customer financial impacts using technology-specific energy, capital and operating-cost assumptions. For non-domestic electrification, monetise only those pathways for which the evidence supports a robust economic saving; otherwise report physical electrification outcomes.
Reduced interruptions and outage durations	Assess changes in Customer Interruptions (CI) and Customer Minutes Lost (CML), including long-duration, repeat and short-duration interruptions where supported by the evidence, and value using appropriate VoLL and willingness-to-pay measures differentiated by customer type and vulnerability.
Non-monetised impacts	
Additional households enabled to adopt LCTs	Assess the additional number of households (and how much earlier) which are able to adopt EVs, heat pumps and solar PV following ED3 capacity, connections and unlooping activity, compared to the counterfactual.
Non-domestic electrification enabled	Assess the scale and timing of fleet, heating, process-energy and behind-the-meter generation/storage connections enabled by network capacity. Report physical outcomes such as vehicles, floor area, MW and MWh.
Distributional impacts for vulnerable customers	Assess how interruption and resilience outcomes are distributed across customer groups, including PSR and other vulnerable customers, recognising their greater exposure to prolonged interruptions.
Health and wellbeing impacts	Recognise potential secondary health and wellbeing outcomes associated with heating, air quality and reliable energy supply qualitatively where supported by evidence. These effects are not monetised separately because of limitations in attribution and potential overlap with customer and decarbonisation outcomes.

5.2.2 System security, efficiency and long-term affordability

In plain terms: spending more on the distribution network in the near term can mean spending less elsewhere across the energy system. By building network capacity and using the network smartly, the ED3 Plan can make room for cheaper to run, home-grown renewable power, avoid costly bottlenecks and repeat network intervention, and bring down the overall cost of every unit of energy customers use over time.

Description

We assess the extent to which ED3 investment can contribute to a lower-cost, more secure and more efficient energy system over the long term. While network investment increases distribution expenditure in the near term, it can reduce costs elsewhere in the system by enabling electrification, reducing network constraints, facilitating flexibility and improving the utilisation of low marginal-cost renewable generation.

This element ensures the value assessment focuses on the unit cost of delivering energy across the whole system, rather than the cost of the distribution network in isolation.

Rationale

Timely, well-targeted distribution investment can lower total energy system costs over the long term, even though it raises distribution expenditure in the near term. Investment in reinforcement, flexibility enablement and digital capability to the distribution network in ED3 can release capacity, improve visibility of local energy resources, coordinate flexibility and accommodate more low-marginal-cost renewable generation. Relative to the counterfactual, where reactive investment leads to congestion, higher curtailment and costly repeat interventions, the SSEN ED3 Plan lowers whole-system cost per unit of energy and brings forward the point at which total energy system unit costs begin to fall.

Key dependencies

The key dependencies driving system security, efficiency and long-term affordability are:

- **Pace and location of electrification**: how quickly and where demand grows determines the scale of constraint and curtailment savings realised.
- **Renewable and storage deployment**: the volume and location of new generation connecting to the network affects curtailment levels and constraint costs.
- **Flexibility market maturity**: the liquidity, cost and reliability of flexibility affect how much reinforcement it can economically defer or avoid.
- **Whole-system coordination**: alignment between transmission (RIIO-T3) and distribution investment influences overall system efficiency.
- **Wholesale and commodity prices**: gas and transport-fuel prices affect the value of avoided costs in other energy vectors.
- **Counterfactual timing**: assumptions about when reactive investment eventually occurs under a lower investment pathway affect the size of avoided and deferred costs.

How benefits are assessed

We draw on NESO FES, Clean Power 2030 modelling and Baringa analysis to assess the contribution of the ED3 Plan to support reductions in whole-system costs to inform the gross estimate and also compare the impact on whole-system costs for the Plan against the counterfactual to inform the net estimate. Analysis of NESO and Elexon Balancing Mechanism (BM) data indicates that upwards of 3 TWh onshore wind generation may have been curtailed in Great Britain during 2023/24.[14] The approach quantifies changes in generation, network and other-vector costs, as well as avoided constraint costs and renewable curtailment. We assess the value of avoided or deferred future reinforcement, and reliability and resilience impacts.

Reliability and resilience impacts are separated between: (i) the system costs of maintaining reliability under current and expected operating conditions, assessed under the energy-system element; and (ii) adaptation to the changing physical climate over the operational life of network assets, assessed under climate adaptation and environmental resilience. Customer interruption impacts are separately captured within customer outcomes.

All impacts in this element are monetised, and are also presented where helpful in physical terms (e.g. MWh of curtailment avoided or operator actions).

[14] Baringa analysis of NESO and Elexon data for onshore wind generation

Table 7 System security, efficiency and long-term affordability - impact categories and methodology

Category	Methodology description
Monetised impacts	
Reduction in system operation costs	Assess reductions in national electricity system-operation costs enabled by improved visibility, forecasting, coordination and dispatch of distributed energy resources. Consider impacts on reserve and response, balancing and redispatch, constraint management, duplicated or conflicting system actions, and voltage/reactive-power management, with additionality assessed relative to capability expected in the counterfactual.
Renewable utilisation and generation costs	Assess the additional renewable output utilised through reduced curtailment, accelerated distribution connections, increased utilisation of transmission-connected renewable output and reduced technical losses. Value the resource benefit using the cost of displaced generation; assess associated carbon impacts separately in the decarbonisation element.
System reliability and resilience;	Assess the resource costs associated with network failure and emergency response, including reactive intervention, consequential asset damage, temporary generation and contingency arrangements, and loss of DER availability. Exclude the value of customer interruptions captured separately within customer outcomes.
Avoided, deferred or more efficiently sequenced network investment	Compare whole-life expenditure under the ED3 Plan and counterfactual, capturing the cost of later, repeated or reactive reinforcement and, where supported by scheme evidence, savings from coordinated delivery and 'touch the network once'.

5.2.3 Enabling growth and future demand

In plain terms: where network capacity is available in the right place at the right time, new homes, business expansions and high-growth sectors such as data centres can connect when they are ready, rather than waiting in the connections queue or scaling back investment.

Description

Distribution networks are a critical enabler of economic development. This element of the value framework captures how network investment facilitates growth by enabling new connections, increasing network capacity and allowing businesses to expand their electricity usage to support increased productivity and investment. It reflects both the growth unlocked by connecting new demand and the growth protected by avoiding network-constrained "no-growth" zones.

Rationale

Access to timely network capacity is a critical input to economic activity, and constraints on capacity translate directly into foregone or delayed economic growth. ED3 investment leads to capacity being available and for faster connections, which allows housing, commercial, industrial and high-growth sectors (such as data centres, manufacturing and logistics) to connect and expand as soon as they are ready. Where capacity is not available, businesses face delays, relocate, or scale back investment, and networks become a bottleneck rather than an enabler, as illustrated by international experience where thousands of businesses have been left waiting for connections. Recent GB evidence shows this is already a live issue: Ofgem reported that contracted offers in the demand connections queue increased from 41 GW in November 2024

to 125 GW by June 2025, including 29 GW on distribution networks, exceeding even ambitious demand forecasts[15]. Relative to the counterfactual, the Plan brings forward and protects economic output, private investment and jobs that would otherwise be delayed or lost.

Key dependencies

The key dependencies for the distribution network enabling growth and future demand are:

- **Macroeconomic conditions and demand**: overall economic growth and business investment appetite determine how much latent demand for capacity exists.
- **Location and sectoral demand**: the emergence of data centres, industrial clusters and housing near available capacity shapes where and how much growth is enabled.
- **Connections reform and queue management**: how quickly connection applications progress affects the pace at which growth is realised.
- **Attribution of growth to network investment**: whether growth would have occurred anyway, or is genuinely network-constrained, determines additionality.
- **Planning, consenting and land availability**: non-network enablers of development influence whether enabled capacity translates into economic activity.
- **Business mitigation options**: the ability of businesses to relocate, operate across multiple sites or self-generate affects the value of avoided constraints.

How benefits are assessed

The approach assesses the future generation and demand connections enabled through ED3 capacity investment, and quantifies associated economic activity using sector-specific power-intensity and GVA metrics. Two complementary lenses are applied: a business- and opportunity-led lens, which estimates GVA growth enabled by new and expanded business connections; and a spatial, constraint-led lens, which uses Strategic Development Plans to identify areas where growth could be delayed or lost without ED3 investment, and estimates the economic output at risk. Private investment unlocked and GVA are monetised, drawing on ONS and connections data to estimate the potential GVA contribution from new connections.

Our methodology acknowledges that parts of SSEN Distribution network are not likely to be constrained, at least during the ED3 period, because of sufficient capacity headroom to meet projected demand. This means that distribution network capacity will not be a constraint on growth in these areas in the short-term. Our assessment therefore focusses on those local areas where constraints can arise earlier.

[15] Ofgem acts to free up grid capacity by tackling speculative data centre projects, 2026

Table 8 Enabling growth and future demand - impact categories and methodology

Category	Methodology description
Monetised impacts	
Private investment unlocked	Estimate the private capital investment enabled by new and expanded connections during ED3.
Enabled economic output (GVA) from connected customers	Apply sector power-to-GVA ratios to enabled connections and capacity, assessing GVA enabled from new connections and from relieving constrained "no-growth" zones identified through SDPs.
Non-monetised impacts	
Physical growth in key sectors	Describe enabled growth in sectors such as data centres, manufacturing, ports, logistics and other high-tech clusters.

5.2.4 Decarbonisation and environmental benefits

In plain terms: the distribution network is part of the core backbone of a cleaner energy system. By connecting more wind, solar and storage, and helping people switch from petrol, diesel and gas to electricity, the ED3 Plan cuts carbon emissions sooner, supporting progress towards the UK's climate and clean power goals.

Description

A core role of the ED3 Plan is enabling delivery of Net-zero and clean power objectives. This element captures the environmental value created through greater renewable generation, electrification of demand and reduced carbon intensity across the wider energy system. It reflects the emissions avoided both from connecting more low-carbon generation and enabling customers to switch from fossil fuels to electricity for heat and transport.

Rationale

Electricity networks are key enablers of decarbonisation, and timely investment brings forward emissions reductions that would otherwise be delayed. ED3 investment provides additional network capacity and connection-readiness, allowing more renewable generation to connect and export. Customers are also able to adopt LCTs that displace emissions created through usage of petrol, diesel and gas. Together these reduce the carbon intensity of electricity supplied and cut emissions across transport and heat. Relative to the counterfactual, in which constrained networks delay renewable connections and LCT adoption, and curtail more low-carbon output, the SSEN Distribution ED3 Plan accelerates decarbonisation. As we assume long-term decarbonisation objectives need to be met, even in the counterfactual, benefits are considered principally in terms of the timing and pace of emissions reductions.[16]

[16] To meet long-term decarbonisation objectives, a lower ED3 Investment pathway is expected to require increased investment in ED4 and beyond, compared to the ED3 Plan.

Key dependencies

The key dependencies for decarbonisation and environmental benefits are:

- **Grid carbon-intensity trajectory**: the future emissions factors of the generation displaced by renewables and electrification determine the emissions saved.
- **LCT adoption rate**: the number of EVs, heat pumps and solar installations deployed drives emissions savings from transport and heat.
- **Renewable connection volumes**: the GW of low-carbon generation connected via the distribution network affects avoided emissions and curtailment.
- **Carbon values**: the Green Book / UK ETS carbon price path used to monetise emissions reductions.
- **Counterfactual catch-up**: the extent to which, and when, decarbonisation would occur anyway under the counterfactual affects the additional benefit attributed to the Plan.
- **Curtailment levels**: the network's capacity to absorb renewable output determines how much low-carbon generation is used rather than curtailed.

How benefits are assessed

Our approach identifies technology-specific emissions factors and future grid-carbon assumptions, and estimates the emissions reductions from renewables connections growth, avoided curtailment and electrification. Both distribution and transmission connected renewables can benefit from addressing constraints at the distribution level. We estimate the emissions reductions delivered via these channels for the ED3 Plan to provide the gross estimate and relative to the counterfactual for the net estimate. Emissions reductions are calculated both from the changing generation mix connected to the network (grid decarbonisation) and from LCT uptake in the licence areas (displacing petrol/diesel cars and gas boilers). Emissions reductions are monetised using recognised carbon values (UK ETS current and projected, and Green Book appraisal values) and are presented as both annual and cumulative lifetime impacts, with a catch-up assumption applied to the counterfactual where relevant.

Wider environmental benefits for biodiversity and climate adaptation are described and quantified on a gross basis for the ED3 Plan where evidence is available. SSEN Distribution is not responsible for the construction of renewable generation sources, or household LCT purchases. Therefore, the value of the emissions reduction cannot be attributed solely to activities of SSEN Distribution. However, without SSEN Distribution investment, such emissions reductions would not be possible. Throughout this report, they are described as benefits which are enabled by the ED3 Plan.

Table 9 Decarbonisation and environmental benefits - impact categories and methodology

Category	Methodology description
Monetised impacts	
Value of carbon emissions reductions	Estimate tCO_2e reductions from electrification, renewable output, curtailment reduction, technical losses and monetise using Green Book / UK ETS carbon values. Incorporate potential emissions increases from embodied network carbon and construction activity.
Non-monetised impacts	
Additional renewable generation capacity connected to distribution network	Estimate GW of renewable generation capacity connected versus the counterfactual.
Additional low-carbon technologies deployed	Estimate LCT measures deployed, reframed from the customer outcomes element to focus on shift in energy type and amount of energy consumption rather than the number of households or businesses affected.
Carbon emissions reductions	Estimate tCO_2e reductions from grid decarbonisation and LCT uptake.
Reduction in renewable curtailment	Quantify curtailment avoided, expressed as a share of the associated emissions reductions.
Biodiversity impacts	Describe gross assessment metrics drawing on evidence of statutory compliance, habitat creation/restoration, Natural Asset Platform, onsite enhancement and habitat disturbance outcomes.
Climate adaptation	Describe outcomes supported based on physical outputs, evidence and standards, rather than a monetisation methodology

5.2.5 Supply chain value

In plain terms: delivering the ED3 Plan supports jobs and economic activity within SSEN Distribution and across the supply chain, including skilled roles and apprenticeships in Scotland and southern England, with a share of the value retained in the UK.

Description

Beyond operational outcomes, investment creates direct, indirect and induced economic activity through supply chains, workforce development and regional employment. This element captures the wider economic value generated through the delivery of the ED3 programme itself - the network of suppliers, manufacturers, contractors and skilled workers that the step-up in investment supports across Great Britain, and particularly within SSEN Distribution's two licence areas.

Rationale

The step-up in planned ED3 investment can support the development of domestic supply-chain capacity and create enduring, high-quality jobs, generating economic value well beyond the network itself. The ED3 Plan leads to supply-chain spending across engineering, manufacturing, construction and digital activities. This supports direct, indirect and induced GVA and employment, strengthens skills and workforce capability, and

where it is optimal to procure, increases the share of activity retained in the UK. A clear, stable forward investment pathway gives suppliers the confidence to invest in capacity and skills. Relative to a lower-investment, "stop-start" counterfactual, the Plan supports more jobs, greater domestic content and stronger long-term delivery capability. This element is closely aligned with the ambitions of the Electricity Networks Sector Growth Plan and the wider Modern Industrial Strategy.

Key dependencies

The key dependencies for the creation of GVA and jobs are:

- **Domestic supply-chain capacity**: the ability of UK suppliers to scale determines how much expenditure is retained domestically.
- **Procurement strategy**: the balance struck between lowest overall cost procurement and supporting domestic content and skills shapes the domestic economic value created.
- **Economic multipliers**: the regional and sectoral GVA and employment multipliers applied (Type I and Type II) affect the estimated wider impact.
- **Labour market and skills availability**: the workforce pipeline, training and apprenticeship capacity affect how many quality jobs are created and sustained.
- **Investment profile and certainty**: the stability and visibility of the forward programme influences suppliers' willingness to invest in growing capacity.
- **Wider sector demand**: aggregate GB network investment competing for the same supply chain affects capacity, cost and reshoring potential.

How benefits are assessed

Our approach maps ED3 expenditure to sectors within the UK economy and applies recognised input-output and GVA multipliers (drawing on ONS Supply and Use Tables and multipliers, and Baringa's UK GVA model) to estimate direct, indirect and induced GVA and associated employment. Domestic and local proportions of expenditure are assessed using a mix of supplier commitments, surveys and supply-use norms, highlighting the potential reshoring impact. Employment effects are quantified, alongside indicative workforce-development outcomes such as apprenticeships and a regional wage premium as an indicator of job quality.

We assess SSEN Distribution's contribution within the context of the ENA Sector Growth Plan, and draw links to energy-sector industrial strategy objectives. We estimate both the additional GVA and jobs impact relative to the counterfactual, as well as economic contribution in gross terms which helps explain the economic contribution of the entire ED3 Plan.

Table 10 Supply chain value - impact categories and methodology

Category	Methodology description
Monetised impacts	
Total supply-chain expenditure	Obtain ED3 supply-chain expenditure by type and region, drawing on the ED3 Business Plan, Business Plan Data Tables and SSEN finance data.
Direct, indirect and induced GVA	Apply Type I and Type II multipliers (ONS Supply and Use Tables) to expenditure to derive total GVA impact.
Non-monetised impacts	
Jobs supported and safeguarded	Estimate direct, indirect and induced jobs supported, including a regional (England/Scotland) split, and quantification of jobs safeguarded.
Share of expenditure retained within the UK	Describe estimated proportion of expenditure retained domestically, demonstrating onshoring and reshoring impact.
Wage premium of skilled technical roles	Estimate the regional wage premium for skilled and green technical roles as an indicator of job quality.

6 Assessing the value: energy system benefits

6. Assessing the value: energy system benefits

6.1 Customer outcomes

Our economic assessment considers how the expenditure proposed in SSEN Distribution's ED3 Business Plan translates into outcomes for customers. The Plan proposes expenditure to create additional network capacity, replace and refurbish assets, improve network operations and support security of supply. We therefore assess the associated customer impacts, ranging from the value associated with low-carbon technology uptake to changes in the likelihood and duration of supply interruptions. This section quantifies those impacts for customers connected to SSEN Distribution's networks, with a focus on existing connections. The impacts of the ED3 Business Plan on new demand are addressed separately in Section 8.

Two key mechanisms convert ED3 expenditure into domestic and non-domestic customer outcomes, summarised in Table 11. **Load-related expenditure** creates the primary (or medium-voltage transport) and secondary (or low-voltage transport) capacity, and the connection-readiness, that meets customer demand including the electrification of transport, heat and industrial process energy, as well as exports from customers: their own power generation. The benefit is the value of the electrification enabled, or enabled earlier, than in the counterfactual. **Non-load-related expenditure and operational programmes** ensure this capacity is utilised by maintaining and improving the condition, resilience and operability of the network. A key benefit to customers, which we value, is the avoided customer disruption. These two mechanisms are addressed in Sections 6.1.1 and 6.1.2 respectively, with the analysis in each case distinguishing between domestic and non-domestic customers.

Table 11 Summary of how ED3 expenditure translates into customer outcomes

ED3 expenditure	Domestic customers	Non-domestic customers
Load-related expenditure **Primary and secondary reinforcement, connections, fault level, LV unlooping and load management**	Bill savings and export revenues from earlier and wider adoption of EVs, heat pumps and solar microgeneration; avoided need for restricted or managed connections.	Enabled electrification of fleets, heating and hot water, and industrial process energy; self-generation savings and export revenue; flexibility-service margin.
Non-load-related expenditure and programmes **Asset replacement and refurbishment, faults, tree cutting, resilience, automation, monitoring, restoration, operational IT**	Fewer and shorter unplanned interruptions; fewer repeat and long-duration interruptions; improved outcomes for Priority Services Register and vulnerable customers; reduced planned-interruption disruption.	Avoided business interruption and lost output; improved power quality; reduced cost of onsite back-up and mitigation; business continuity and reduced emergency response.

Network investment does not deliver all of these benefits by itself. For example, it removes the connection, capacity, reliability and operability constraints that would otherwise prevent or delay households and businesses from adopting the electricity-based technologies that can offer bill savings. The benefit is therefore expressed as the benefit brought forward or *enabled* by the ED3 Plan, relative to a counterfactual in which the customer remains on fossil fuels, adopts a more expensive workaround, scales back a project, connects later, or bears a higher level of supply interruption.

In each case the quantification follows the same four steps: first, we establish the population of customers affected and the technology or service in question; second, we estimate the uptake, volume or level of service delivered by the ED3 Plan; third, we estimate the equivalent in the counterfactual, using the GSP prioritisation and delay assumptions set out in Section 4; and fourth, we apply a unit value - a bill saving, or a value of lost load - to the difference. Results are reported in **gross** terms (the total value enabled by activity delivered during ED3) and **net** terms (the value additional to a continuation of ED2 levels of spending).

Carbon and wider environmental impacts arising from the same activity are quantified in Section 7, and the supply-chain impacts of the expenditure itself are addressed in Section 8.

The FES pathways provide the framing for Great Britain's potential electricity demand, which rises from around 290 TWh today to as much as 785 TWh by 2050 in a highly electrified pathway, with Holistic Transition - the pathway underpinning the Clean Power 2030 Action Plan and SSEN Distribution's Strategic Development Plans - following a balanced route and used here. Growth in the two licence areas can be decomposed into three components:

- **New connections** – demand arising at premises, sites and developments that do not exist or are not connected today, including new housing, commercial and industrial developments, new data centres and depot-based charging infrastructure. This component is the most directly exposed to connection queues and capacity constraints, and its benefits are assessed in Section 8.
- **Fuel switching at existing connections** – demand that transfers to electricity from gas, oil, LPG, petrol or diesel at premises that are already connected, principally through EVs, heat pumps and industrial process electrification. This component drives the customer energy cost savings assessed and is the primary focus of this section.
- **Organic demand growth at existing connections** – underlying growth in consumption at existing premises that is not attributable to fuel switching, reflecting rising output, occupancy, digitalisation and appliance load.

Table 12 sets out the decomposition, with demand volumes derived from DFES. The wider FES pathways inform consideration of how the pace and shape of the transition could affect customer outcomes; separate pathway results are not presented in this report.

Table 12 Decomposition of electricity demand growth across the licence areas (TWh)

Component of demand	Basis of estimate	2028	2033	2040	2050
Baseline demand (2028)	DFES licence-area demand at the start of ED3	31.5	31.5	31.5	31.5
Growth from new connections	New connections pipeline, DFES new development floor space and connections queue	-	3.5	8	15.5
Growth from fuel switching at existing connections	DFES EV, heat pump and process-electrification uptake at existing premises, converted to annual consumption	-	3	12	26
Organic growth at existing connections	Residual growth after new connections and fuel switching are removed	-	0.5	1.5	2
Total demand	Sum	31.5	38.5	53	75

Source: NESO, SSEN, Baringa analysis

6.1.1 Load related

The availability of sufficient network capacity is one factor that can determine whether, and when, customers are able to use all the electricity they require. Where primary and secondary capacity is available and the low-voltage network is connection-ready, a household or business can install an EV charger, a heat pump, rooftop solar or an electrified process when it chooses to. Where it is not, the customer in a given location faces one of three outcomes: abandoning or deferral of the connection until reinforcement is delivered; a reduced or managed connection that constrains when and how the technology can be used; the cost of an alternative means to facilitate the connection such as a private wire or onsite generation. Each of these outcomes either reduces or delays the benefit the customer obtains from using electricity, and it is the difference in timing and volume between the ED3 Plan and the counterfactual that determines the amount of the benefit we quantify.

Flexibility moderates but does not eliminate this effect. In the counterfactual, a greater reliance on flexibility, managed connections and the prolonging life of existing assets means that some of the benefits of low carbon technologies can still be realised at lower levels of network expenditure. However, managed connections constrain the times at which customers can charge, heat or export, which reduces the value they capture - for example by limiting access to the cheapest overnight tariff windows, by curtailing export at times of high local generation, or by requiring commercial fleets to charge over longer windows than their duty cycles allow. Our assessment therefore 'credits' the counterfactual with a proportion of the available benefits, and assesses the ED3 Plan on the additional volume of uptake enabled, the acceleration of that uptake, and the higher value realised per unit of uptake where customers can use their assets without restriction.

Our approach to quantification is consistent across technologies and customer types. For each technology, we estimate the uptake across the network in the ED3 Plan and in the counterfactual, using the DFES and SSEN's Strategic Development Plan projections apportioned to GSP areas, and multiply the difference by the estimated annual bill (or energy cost) saving per unit of uptake. Energy cost savings are derived from published assumptions, and summarised below, and are expressed net of the incremental capital and maintenance costs of the technology so that the benefit represents a genuine cost saving. Where the

counterfactual delays rather than prevents uptake, the benefit is assessed as the value of the years of saving brought forward, discounted at the Green Book social time preference rate.[17]

One overall qualifier applies to the non-domestic assessment. In some applications, and under some tariff and price assumptions, electrification increases gross energy costs relative to using fossil fuels. This is most likely for heating and for applications of industrial process energy, where the ratio of the non-domestic electricity price to the gas price exceeds the efficiency advantage of the electric alternative. Businesses should be incentivised to choose the lowest-cost route to decarbonisation, and where electrification is pursued it should be because it is the most economic option available to that business, taking account of carbon costs, policy support, capital cycles, product quality, controllability and process requirements. It would therefore be misleading to assume that every unit of enabled non-domestic electrification produces a positive operating-cost saving. For non-domestic customers we consequently focus on quantifying the impacts of the ED3 Plan in terms of the electrification it enables, for example the number of vehicles, the floor area of heating, and the volume of process energy that can be connected and operated, rather than on the monetisation of an energy cost saving, thereby monetising only those pathways where the evidence supports a robust and positive net saving.

Domestic

Domestic benefits are assessed for the three technologies that account for the overwhelming majority of household electrification and increased network demand for existing connections across the licence areas: electric vehicles, domestic heat pumps and solar microgeneration. Each is quantified using a per-household annual saving derived from published sources and applied to the uptake enabled by the ED3 Plan. The assumptions are set out in Table 13.

[17] The discount rate used in the Green Book is known as the social time preference rate (STPR). For our analysis, it is set at 3% in real terms.

Table 13 Domestic low carbon technology savings assumptions (per household, per year)

Technology	Key bill impact /energy cost assumptions	Basis of saving	Average annual saving per household with each technology
Electric vehicle	8,500 miles per year; ICE fuel cost £0.17 per mile; EV energy cost £0.08 per mile assuming home charging; EV maintenance and other ownership premium of £190 per year	Difference in fuel, running and ownership costs versus an equivalent internal combustion engine vehicle	**£575**
Domestic heat pump	Typical annual gas consumption 9,500 kWh; capped gas unit rate 7.33p per kWh (annual gas heating cost £696); heat pump running cost £596 assuming effective operation on a smart tariff	Difference in space and water heating running costs versus a gas boiler net of retrofit costs	**Neutral**[18]
Solar microgeneration	4.5 kWp (kilowatt-peak) representative system generating 2,850 kWh per year; 35% self-consumed at a capped import rate of 26.1p per kWh (£260); 65% exported at a representative SEG rate of 13.5p per kWh (£250)	Avoided electricity purchases plus export revenue net of installation costs	**£211**

Source: UK Government, Solera Cap HPI, Baringa analysis

Our assumptions are broadly consistent, but slightly lower than recent Climate Change Committee assumptions which suggested: *"a typical household could save around £1,200 a year today by combining an EV, a heat pump, solar panels and a time-of-use tariff."*[19]

Table 14 summarises the domestic population affected and the monetised benefits.

Table 14 Domestic consumer benefits summary – ED3 Period

Technology	Customers affected (uptake enabled over ED3 period)	Gross benefit (£m PV)	Net benefit vs "as-is" (£m PV)
Electric vehicles	1,559,000	2,028	485
Solar microgeneration	288,000	142	23
Total	1,847,000	2,170	508

Source: Baringa analysis

Electric vehicles: Electric vehicles are the largest single source of benefits for domestic customers, both because the per-household saving is the largest of the three technologies and because uptake is projected to

[18] Some customer segments with high demand and thermally efficient homes are likely to achieve energy cost savings, whereas others may see higher household costs, at least in the short-term, largely due to costs of improving building thermal efficiency.
[19] https://www.theccc.org.uk/2026/06/24/faster-electrification-would-cut-uk-household-bills-say-climate-advisers/

advance most quickly during ED3 (and beyond). Under the Holistic Transition pathway, the Strategic Development Plan projections indicate around 870,000 domestic electric cars across the two licence areas in 2028, rising to approximately 2.43 million by 2033 and 4.28 million by 2050, of which around 2.11 million in 2033 are within SEPD and around 322,000 within SHEPD. Applying the estimated £575 per household annual saving, the undiscounted household savings amount to approximately £500 million per year in 2028, rising to around £1.4 billion per year by 2033 and £2.5 billion per year by 2050 across the licence areas. Almost £900m of additional annual savings are estimated in 2033 compared to 2028. The gross figures reported in the table above represent the total estimated value realised by the growth in households owning or operating EVs in the SSEN licence areas over the ED3 period.

The net benefit is calculated by applying the GSP prioritisation described in Section 4. In GSP areas which are projected to face capacity shortfalls within the ED3 period, but which fall outside the prioritised expenditure envelope in the counterfactual, a proportion of anticipated domestic charging connections are assumed to be delayed until ED4 at the earliest. Approximately 75% of the GSP areas are estimated to face severe shortfalls by 2033, and around a quarter of the additional EVs projected across the ED3 period are delayed, equating to approximately £485 million of foregone discounted household savings.

Unlooping adds a further component of customer benefit: approximately 425,000 properties across the licence areas share part of a service cable with one or more neighbours. The ED3 Plan enables low carbon technology adoption at 14,029 properties in SEPD and 5,712 in SHEPD through a combination of physical unlooping and load management, prioritised using tRESP-informed spatial data towards the areas of highest expected uptake. In the counterfactual, fewer homes are unlooped, and this curtailment of demand also contributes to the reduction in uptake of EVs.

Heat pumps: Using the Holistic Transition scenario, we assume there will be around 122,000 domestic heat pumps[20] across SSEN Distribution's licence areas in 2028, rising to approximately 690,000 by 2033, 1.70 million by 2040 and 2.72 million by 2050. Assuming a £100 average annual household bill saving, gross household savings, before upfront costs, are approximately £12 million per year in 2028, £69 million per year by 2033 and £272 million per year by 2050. The per-household saving is materially smaller than for EVs and is more sensitive to tariff design, heat pump system design and installation quality. £100 is aligned with the Government's representative estimate, after accounting for capital grants, although this does not include other retrofit costs that may be needed to prepare a home for efficient heat pump use, such as installing insulation. The estimated saving assumes the heat pump is operated effectively on a smart tariff, with savings potentially lower or negative on other tariffs or in poorly designed systems.[21] It is also sensitive to the relative movement of gas and electricity prices. After accounting for retrofit costs, we estimate the annual impact on household spending is close to zero on average.

SSEN Distribution's role here is distinct from that of enabling EVs. Heat pump demand is coincident with system peak demand and is concentrated in winter, so it bears more heavily on secondary distribution capacity and on looped supply and constrained service arrangements than on total energy. The counterfactual therefore constrains heat pump uptake more directly than EV uptake, since the mitigations available to a constrained EV connection, such as shifting charging into off-peak hours, or charging over a longer window, are less available to a household that needs heating. The net benefit reflects both delayed uptake in GSP areas where investment is delayed and the properties that remain looped or load-managed and are consequently unable to install a heat pump of the required capacity.

Solar microgeneration: Our analysis, drawing on DFES Holistic Transition projections, sees domestic-scale solar PV capacity (i.e. under 10 kW) rising from around 1 GW across the licence areas in 2028 to

[20] Non-hybrid, air-to-water heat pumps
[21] https://cleanenergy.campaign.gov.uk/heat-pump/

approximately 2.3 GW by 2033, 3.7 GW by 2040 and 4.6 GW by 2050. Using the Energy Saving Trust's representative 4.5 kWp average system size, this equates to approximately 230,000 installations in 2028 and 518,000 by 2033. Applying the £211 estimated annual saving combining reduction in electricity bills from reduced consumption, export revenue, and annualised upfront costs, household benefits are approximately £48 million per year in 2028, £109 million per year by 2033 and £213 million per year by 2050.

Solar PV installations are exposed to network constraints due to the limitations of the low-voltage network to accept export at times of high local generation and low local demand. In the counterfactual, a greater proportion of installations would be offered export-limited or zero-export connections, or would experience voltage-driven inverter tripping, both of which reduce the export revenue component of the saving. In some cases installation is delayed, whereas in other cases installation will proceed but with households realising reduced export payments. The net benefit therefore consists of two components: the additional installations enabled, and the higher proportion of generation that can be exported and remunerated where the network has been reinforced.

Non-domestic

Electrification processes for non-domestic customers are more varied than domestic customers, spanning fleets, buildings and industrial processes across sectors with very different usage patterns, capital cycles and energy intensities. Our assessment focuses on the volume of electrification enabled by the ED3 Plan rather than on a monetised energy cost saving. Businesses will pursue the lowest cost routes to decarbonise, and this is expected to involve electrification for many businesses and processes. However, this may lead to increased costs, at least in the short- to medium-term, compared to current operations. Table 15 summarises the pathways considered.

Table 15 Non-domestic electrification pathways and quantification treatment

Pathway	Technologies	Basis of benefit/cost	Electrification enabled by 2033 (Holistic Transition)
Vehicle energy costs	Electric cars, vans (LGVs), buses and coaches, HGVs, refuse vehicles, forklifts and other mobile machinery	Difference in fuel/energy, maintenance and incremental capital costs across the fleet	c. 297,300 non-domestic EVs by 2033 (c. 222,600 added over ED3); gross operating-energy saving of c. £872m per year by 2033
Heating and hot water	Heat pumps, heat recovery, electric boilers in selected applications, electric water heating	Avoided gas, oil or LPG cost, net of electricity, maintenance and incremental capex	c. 9 million m² of floor space electrified; c. 0.3 TWh/yr of electricity demand displacing c. 1.1 TWh/yr of gas and oil; c. 130 $ktCO_2e$/yr avoided (operating-cost differential reported, not monetised)
Industrial process energy	Industrial heat pumps, electric ovens, induction heating, infrared heating, electric kilns, mechanical vapour recompression and other process-electrification technologies	Change in energy consumption per unit of production, multiplied by the relevant fuel and electricity prices	c. 0.4 TWh/yr of electrified process demand (c. 100–150 MW of connected capacity), informed by 31 Strategic Energy Need projects (operating-cost impact not monetised)
Onsite and self-generation	Displaced diesel generation; behind-the-meter solar, storage and CHP	Avoided fuel, maintenance, rental and replacement capex for onsite generation, net of grid electricity and network charges; self-consumed generation at the avoided import price plus exported generation at the export price, less operating costs	c. 0.7 GW of additional behind-the-meter solar and storage, generating c. 0.65 TWh/yr; avoided onsite generation monetised only where a network constraint is binding
Flexibility-service revenue	Demand turn-down and turn-up, export from behind-the-meter storage	Margin earned on flexibility payments, net of the value of lost production or utility	c. 300–500 MW of non-domestic flexible demand and behind-the-meter storage able to participate in flexibility markets; net margin reported only where evidenced

Source: NESO, Baringa analysis

Vehicle energy costs: Commercial fleet electrification is the clearest source of potential non-domestic customer savings. A diesel LGV travelling 20,000 miles per year incurs fuel costs of approximately £4,580 against £1,880 of charging costs for the electric equivalent, an annual operating-energy saving of £2,700 per vehicle. For buses and coaches travelling 50,000 km per year, diesel energy costs of £9,600 compare with £6,639 of charging energy, a saving of £2,962 per vehicle. For a rigid HGV travelling 80,000 km per year, diesel energy costs of £30,720 compare with £23,174 for the charging equivalent, a saving of £7,546 per vehicle. These are energy-cost comparisons only: they exclude vehicle capital costs, charger installation, maintenance differentials, clean-air-zone charges, and public rapid charging (which can reduce or eliminate the saving where depot charging is not available). Refuse vehicles, forklifts and other mobile machinery are treated on the same basis, using duty-cycle-appropriate mileage and consumption assumptions.

Applied to the DFES projections for the licence areas, the enabled fleet rises from approximately 74,700 non-domestic electric vehicles in 2028 to around 297,300 by 2033 and 1.00 million by 2050, comprising LGVs, buses and coaches, and HGVs. The associated gross operating-energy savings are approximately £205 million per year in 2028, rising to around £872 million per year by 2033 and £3,028 million per year by 2050. HGVs account for a disproportionate share of the later growth, reflecting both the high per-vehicle saving and the later start of heavy-duty vehicle electrification.

Heating and hot water: Non-domestic heat electrification involves heat pumps, heat recovery and electric water heating/boilers, and is assessed on a floor-area basis. Using CIBSE benchmark gas consumption of 120 kWh per m² per year,[22] an existing boiler efficiency of 85% and a heat pump seasonal performance factor of 3, the electric alternative consumes approximately 34 kWh of electricity per m² per year against 120 kWh of gas. At the Q1 2026 average non-domestic prices of 5.17p per kWh for gas and 24.14p per kWh for electricity, this produces an annual operating cost of £6.20 per m² for gas heating against £8.21 per m² for the heat pump - a negative operating-cost differential of approximately £2.00 per m² per year.[23] At average tariffs, and without sustained high gas prices, electrification of non-domestic heat may increase overall energy costs, while reducing emissions by approximately 14.4 $kgCO_2e$ per m² per year. We therefore quantify the enabled floor area and the associated emissions reduction, and report the operating-cost differential rather than presenting it as an economic benefit. Site-specific circumstances may change the conclusion, for example waste heat recovery, high-grade demand (e.g. demand for premium green products), favourable tariffs, avoided replacement capital, or sites off the gas grid may achieve cost reductions.

If around 10% of the c. 90 million m² of existing non-domestic floor space across the licence areas electrifies its heating over ED3, broadly consistent with the pace of non-domestic heat pump uptake in the Holistic Transition pathway, the ED3 Plan would support the electrification of approximately 9 million m² by 2033, equivalent to around 0.3 TWh per year of additional electricity demand displacing around 1.1 TWh per year of gas and oil, and reducing emissions by approximately 130 $ktCO_2e$ per year.

Industrial process energy: Process electrification is assessed on the basis of the change in energy consumption per unit of production, multiplied by the relevant fuel and electricity prices. This pathway covers industrial heat pumps, electric ovens, induction heating, infrared heating, electric kilns and other process-electrification technologies. The efficiency gain from electrifying varies across these technologies, and therefore the operating-cost outcome depends heavily on the technology adopted and the process electrified. Mechanical vapour recompression, induction and infrared heating applied to suitable processes typically produce a positive net cost saving even at current price ratios whereas direct resistive substitution generally does not. We therefore quantify the enabled process load, expressed as connected capacity and annual consumption by sector and do not monetise the operating-cost impact. Wider benefits of process electrification such as improved controllability, product quality, reduced local emissions and lower maintenance are a further benefit, but dependent upon the electricity-powered equipment used.

In the Holistic Transition pathway, we estimate that the ED3 Plan enables around 0.4 TWh per year of electrified process demand across both licence areas by 2033, equivalent to approximately 100–150 MW of connected capacity, concentrated in sectors such as distilling, food and drink, ports and manufacturing, and informed by the 31 Strategic Energy Need projects SSEN Distribution has identified for consideration in its ED3 submission (25 in SEPD and 6 in SHEPD).

[22] CIBSE Energy Benchmarking Dashboard, accessed November 2026

[23] Gas prices have risen significantly beyond this level in 2026, reaching 8p per kWh for gas. While this price is sufficient to entail an expected positive operating-cost differential for electrification, gas prices at this level are not projected to persist in our analysis

Onsite and self-generation: A sufficiently strong and reliable connection reduces the operation of costly diesel generation and avoids investment in private generation required solely because the grid connection is constrained. Where a constrained connection is the binding limitation on behind-the-meter solar, storage or Combined Heat and Power (CHP), it also enables businesses to install self-generation at the scale that suits their operations. The benefit therefore has two components: the avoided fuel, maintenance, rental and replacement capital cost of onsite generation, net of the cost of grid electricity and network charges; and the value of self-generation, where self-consumed generation is valued at the avoided electricity import price plus exported generation valued at the export price, less operating costs. As with domestic microgeneration, the self-generation benefit has two dimensions: the additional capacity installed, and the higher proportion of output that can be exported and remunerated where the network can accept it. Both components are monetised only where a network constraint is estimated to be the binding driver, and the treatment is considered in coordination with the resilience benefits assessed so that avoided back-up generation is not counted twice. We estimate that the ED3 Plan supports around 0.7 GW of additional behind-the-meter non-domestic solar and associated storage across the licence areas by 2033, generating approximately 0.65 TWh per year, a material share of which would otherwise be export-limited or deferred under the counterfactual.

Flexibility-service participation: With greater grid investment and improved DSO market facilitation, non-domestic users can receive payments for changing their demand or exporting stored energy. Greater network capacity may reduce the local scarcity value of flexibility and therefore the headline payment to flexibility providers. What matters for the consumer benefit is not the size of the payment but the margin the customer retains, because a substantial part of any flexibility payment compensates the business for lost production value, deferred activity or reduced amenity. The benefit is the net margin available to flexibility providers across the licence areas, the payment received less the value of the production or utility foregone.

In our analysis aligned with the Holistic Transition pathway, we estimate that around 300–500 MW of non-domestic flexible demand and behind-the-meter storage across the licence areas could participate in local and national flexibility markets by 2033.

6.1.2 Non-load related expenditure

Non-load-related expenditure and operational programmes deliver benefits for customers through the following process:

Figure 4 Non-load expenditure benefits

Non-load ED3 Plan benefits: causal chain								
ED3 expenditure Asset replacement, resilience schemes, automation, monitoring and operational capability	→	**Assets treated and capabilities deployed** Higher-risk assets refurbished or replaced; faults detected and managed more effectively	→	**Failure risk reduced** Lower probability of asset failure and lower consequence when faults occur	→	**Interruptions avoided or shortened** Fewer customer interruptions and faster restoration when outages occur	→	**Monetised social and economic benefit** Reduced outage costs for households, businesses and vulnerable customers, valued using reliability metrics
Interpretation: ED3 investment improves asset health and operational response, reducing both the likelihood and impact of failures. This leads to fewer and shorter interruptions.								

Some of the expenditure categories that drive these benefits are asset replacement and refurbishment (both NARM[24] and non-NARM), civil works, fault response, tree cutting and overhead line clearance, flood mitigation and wider climate resilience, physical security, electricity system restoration, and the programmes of investment in digitalisation, communications and automation that provide visibility, enable faster switching support efficient operations of a system with more demand flexibility and variable generation.

The analysis compares two cases:

1. **The ED3 Plan** - The proposed programme of asset replacement, refurbishment, automation, monitoring, vegetation management, flood and storm resilience, operational technology and restoration capability, sized to deliver the reliability, resilience and asset-risk commitments set out in SSEN Distribution's ED3 Business Plan.
2. **The counterfactual** - Broadly ED2-equivalent level of expenditure, or intervention limited to statutory and safety-critical works, with assets ageing, loading increasing as electrification proceeds, and operational standards maintained only where feasible.

The sizing of non-load-related investment is aligned to the operational standards the network is required to meet for quality of supply standards, asset risk and long-term network risk targets, statutory clearances, and licence obligations on interruptions and restoration. The ED3 Plan is therefore close to a do-minimum in this area, and an "as-is" continuation of ED2 expenditure would risk missing those operational standards. The key question to address is what would happen to customers if expenditure were held at ED2 levels while the asset base ages and load grows. The justification for ED3 Plan expenditure is developed in detail through SSEN Distribution's Engineering Justification Papers and their associated cost benefit analyses. The estimation presented here draws on this analysis and monetises the consumer impacts.

Treatment of network charges and regulatory incentives

The costs of delivering the ED3 Plan will ultimately be recovered through network charges paid by customers, with the revenues that SSEN Distribution is able to recover also affected by its performance against the outputs and incentives established through the ED3 price control. Ofgem's RIIO framework deliberately links network company revenues to performance, and its ED3 framework retains strong incentives intended to drive improvements for consumers.

The Interruptions Incentive Scheme (IIS) provides a financial incentive for distribution networks to improve performance in areas including the frequency and duration of unplanned interruptions, thereby creating a direct regulatory incentive for SSEN Distribution to realise reliability improvements for customers. This means that the economic value created for customers from fewer and shorter interruptions should not be interpreted as being fully captured in customer bills: where improved performance results in an incentive reward for SSEN Distribution that is ultimately funded by customers through network charges, customers will pay for a proportion of the benefit.

[24] The Network Asset Risk Metric (NARM) was developed to quantify the benefit, to consumers, of network companies' asset management activities. It is designed to demonstrate that investment is targeted to manage network risk effectively. Some investments are not covered by the NARM methodology, such as installation of new network assets, or investment in non-network assets.

Quantification approach

The quantification of non-load benefits proceeds in four steps.

1. **We segment customers** by licence area, network type (urban, rural, remote and island), customer class (domestic, small non-domestic, large non-domestic) and vulnerability status, identifying separately the approximately one million households on the Priority Services Register and the customers currently classified as worst served. Segmentation matters because the value of a lost unit of supply varies by more than an order of magnitude across these groups, and because the incidence of interruptions is not evenly distributed: overhead-dominated rural and island networks experience materially higher fault rates and longer restoration times than urban underground networks.
2. **We value reductions in outage duration and frequency**, applying value of lost load and willingness-to-pay measures differentiated by customer segment and interruption duration. Long-duration interruptions of more than 12 hours, repeat interruptions within a rolling 12-month period, and interruptions affecting Priority Services Register customers are valued separately, reflecting the disproportionate harm they cause.
3. **We estimate the change in interruptions** (Customer Interruptions and Customer Minutes Lost), and their long-duration, short-duration and repeat components. In the ED3 Plan, these follow from the reliability commitments in the Business Plan and the modelled effect of asset replacement, automation and vegetation management on fault rates and restoration times. In the counterfactual, fault rates are projected forward from the observed relationship between asset health, age and failure probability, with allowance for the increased consequence of failure as loading rises and for the observed intensification of severe weather.
4. **Lastly, we apply the valuation to the difference** between the two cases to derive the gross benefit of the ED3 Plan and the net benefit relative to the counterfactual, discounted over the appraisal period. Table 16 summarises the parameters used and the segmentation applied to each.

Table 16 Non-load-related quantification parameters

Parameter	Basis	Segmentation
Customer interruptions (CI)	Interruptions per 100 customers per year	Licence area; network type; customer class
Customer minutes lost (CML)	Average minutes lost per customer per year	Licence area; network type; customer class
Long-duration interruptions	Interruptions exceeding 12 hours	Licence area; vulnerability status
Repeat interruptions	More than one interruption within a rolling 12 month period	Circuit; worst-served customers
Short-duration interruptions	Interruptions under three minutes	Customer class; sensitive load
Value of lost load	£ per MWh unserved, or £ per customer-interruption	Domestic; small non-domestic; large non-domestic
Willingness to pay	£ per household per year for improved reliability	Domestic; vulnerable and PSR customers

Source: Ofgem, SSEN, Baringa analysis

Domestic

For domestic customers, the economic benefit of non-load expenditure is the value of avoided interruptions, monetised by applying an assessment of domestic value of lost load and willingness-to-pay to the reduction in customer interruptions and customer minutes lost delivered by the ED3 Plan relative to the counterfactual.[25] Our assessment distinguishes the routine reduction in average interruption frequency and duration, which affects all customers, from the targeted reduction in long-duration and repeat interruptions, which is concentrated on rural, island and worst-served customers and carries a materially higher unit value.

A separate weighting is applied to Priority Services Register and vulnerable customers. For these households an interruption is not simply an inconvenience: it can interrupt medical equipment, heating and refrigerated medication, and it carries a materially higher welfare cost. As electrification proceeds this exposure increases across the whole customer base, because a household that has replaced a gas boiler with a heat pump and a petrol car with an electric vehicle loses not only lighting and appliances during an interruption but heat and mobility as well. The value of reliability therefore rises over the appraisal period in real terms, and this is reflected in the valuation rather than held constant.

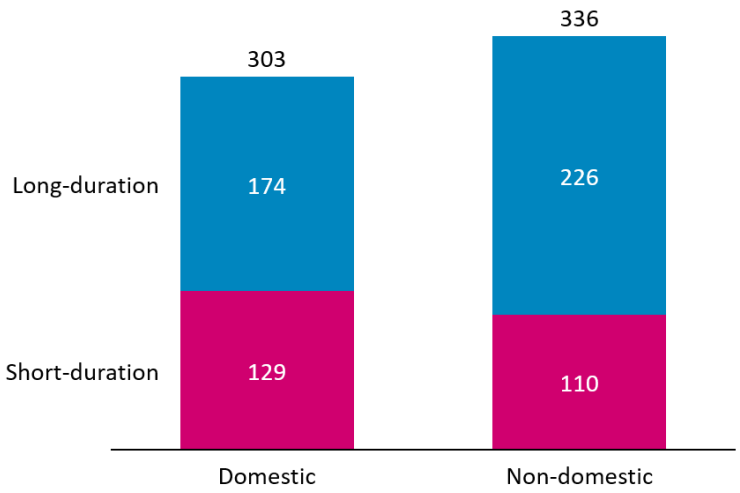
Non-domestic

For non-domestic customers, the economic benefit is avoided business interruption: the value of output, service and activity lost when supply is unavailable, together with the cost of restarting interrupted processes and the value of spoiled or scrapped product. This is monetised using non-domestic value of lost load differentiated by customer size and, where the evidence supports it, by sector, recognising that the cost of an hour's interruption varies enormously between a continuous industrial process, a data centre, a cold store, a port and a small retail unit.

Two adjustments are applied. First, larger and more critical sites frequently maintain their own mitigation options, such as standby generation and business continuity arrangements, so the gross value of lost output overstates the realised loss. The benefit is assessed net of the mitigation the customer would otherwise deploy, with the cost of that mitigation itself counted as an avoided cost. The same electrification dynamic that raises the value of reliability for households applies to businesses that have electrified fleets, heat and process energy, and the valuation reflects the growing consequence of interruption over time.

[25] ENA, Value of Lost Load Study in Great Britain, 2026

Figure 5 Estimated customer benefits from reductions in interruptions for ED3 Plan compared to the counterfactual over ED3 Period (£m)



Source: Baringa analysis

Additional impacts

In addition to avoided interruptions, non-load-related investment and operational programmes are associated with further consumer impacts that may be material but which we do not quantify, either because the available evidence does not support robust valuation or because doing so would risk double counting the interruption benefits assessed above. Table 17 summarises these impacts and the evidence that can be used to assess their scale.

Table 17 Additional consumer impacts of non-load-related expenditure

Impact	Description	Relevant evidence
Business continuity	Reduced disruption to trading, production, service delivery and supply chains beyond the direct value of lost output, including reputational effects and contractual penalties	Number and size of non-domestic customers exposed to long-duration and repeat interruptions under each case; case-study evidence from critical sites such as ports, wastewater treatment plants, data centres and cold storage
Changes to planned disruption	Coordinated, place-based delivery reduces the number of separate planned interruptions a customer experiences, at the cost of longer individual outages in some cases	Planned interruptions per customer per year under each case; number of customers experiencing more than one planned interruption on the same circuit within 12 months
Power quality	Fewer voltage excursions, dips and short interruptions, reducing damage to and tripping of sensitive equipment and low carbon technologies	Number of customers with sensitive load in areas benefiting from voltage management and monitoring; equipment damage claim volumes
Restoration capability and community resilience	Faster restoration, and reduced reliance on diesel-based emergency generation (e.g. on island and remote networks) following severe weather and major incidents	Modelled restoration times under 1-in-20 severe weather conditions; reduction in diesel embedded generation running hours

Source: Baringa analysis

6.2 System security, efficiency and affordability

Greater ED3 expenditure in the near term can reduce the total long-run cost of supplying and decarbonising our energy supply compared to the counterfactual. The ED3 Plan intends to reduce constraints and balancing actions, enable greater use of low-cost renewable generation, unlock distributed flexibility, and reduce the need for repeated or reactive network interventions.

This section quantifies these effects through four benefit channels:

1. Greater utilisation of renewable generation and the associated reduction in generation costs;
2. Lower national system-operation costs arising from improved visibility and controllability of distributed resources;
3. Improved reliability and resilience at distribution and whole-system level, beyond the customer disruption benefits captured above; and
4. Avoided, deferred or more efficiently sequenced network investment across both distribution and transmission.

Each channel is described in terms of the mechanism by which the benefit arises, the quantification approach, and the estimated scale of benefit in gross terms and relative to the counterfactual. As the four channels are physically linked, a single network constraint may cause curtailment, a balancing action and a future reinforcement need.

6.2.1 Renewable curtailment and generation costs

How benefits are realised

A *constraint* is a physical or operational limit on the network, such as thermal, voltage, fault level or stability, that prevents power flowing as it otherwise would. *Curtailment* is the reduction in renewable output that may be instructed, or self-imposed under a non-firm connection agreement, as one of several ways of managing that limit. A constraint does not always cause curtailment, since it may instead be managed by increasing local demand, charging storage or procuring flexibility. Curtailment does not always arise from a network constraint, since it may reflect system-wide security requirements or market conditions.

The ED3 Plan enables greater utilisation of renewable electricity through four distinct mechanisms, summarised below. These mechanisms apply to different segments of generation and demand and are therefore quantified separately.

Table 18 Mechanisms to enable greater utilisation of renewable electricity

Mechanism	How the ED3 Plan enables greater renewables utilisation	Benefit captured
1. Release export capacity for distribution-connected generation	Reinforcement, monitoring, real-time thermal ratings, coordinated voltage control and improved ANM forecasting allow more distribution-connected wind, solar, hydro and storage to export before network constraints trigger curtailment.	Additional MWh delivered to the system, valued at the cost of the generation it displaces.
2. Accelerate and increase renewable connections	Additional distribution capacity can bring forward connection dates and increase available export capacity for renewable projects that might otherwise face delays, restricted exports or costly enabling works.	Additional low-carbon generation connected and generated earlier.
3. Enable greater use of transmission-connected renewables	Increased import capacity allows demand from electrified heat, transport and industry to grow, while improved visibility and dispatch of demand-side flexibility helps distribution demand respond to national system conditions	More renewable output consumed rather than curtailed or displaced by higher-cost, higher-carbon generation.
4. Reduce losses and improve the efficiency of delivered energy	Targeted reinforcement of heavily loaded circuits, better matching of local generation to local demand and coordinated voltage control, can reduce technical losses.	Less generation required to deliver each MWh of electricity to customers.

Source: Baringa analysis

The extent to which renewable output from the SSEN Distribution areas can be utilised also depends on wider transmission capability, including the 400 kV reinforcements in northern Scotland, the East Coast upgrades, the Eastern Green Link projects and, in southern England, National Grid's North London Reinforcement project. Distribution investment benefits therefore need to be enabled by complementary transmission investment in many cases. The quantification therefore treats planned and consented transmission investment as part of the modelling baseline in both the counterfactual and ED3 Plan cases, rather than as a benefit of the ED3 Plan.

Quantification approach

Our approach is to develop a bottom-up, GSP-level energy balance, consistent with the spatial methodology used to specify the counterfactual in Section 4. For each GSP and each year of the appraisal period, we estimate the volume of renewable energy utilised in the ED3 Plan and in the counterfactual, and then value the difference.

Our approach values avoided curtailment at the short-run cost of the generation displaced, rather than at the wholesale price or at the compensation paid to generators, since the latter are transfers between parties rather than resource savings and are not admissible as economic benefits under the Green Book. Carbon benefits arising from the same MWh are quantified in Section 7 and are excluded here.

Estimated benefits

The **gross** benefit is the total value of renewable output utilised across the licence areas as a result of connections and capability delivered during ED3. The **net** benefit is the additional output utilised relative to a continuation of ED2 levels of expenditure.

Table 19 Estimated benefits - renewable curtailment and generation costs – ED3 Period

Impact	Unit	Gross	Net (vs "as-is")
Reduction in curtailment of distribution-connected renewable generation	£m	95.4	21.3
Additional renewable output from accelerated connections	£m	222.6	46.8
Transmission-connected renewable output consumed on the distribution network	£m	241.1	57.5
Reduction in technical losses	£m	86.0	15.7

Source: Baringa analysis

The benefits identified are highly locational, concentrated in generation-rich parts of SHEPD and in a smaller number of constrained SEPD zones. We find the counterfactual is not one of zero renewable utilisation: in a lower-investment pathway a proportion of the increase in renewable output would still be delivered, in some cases later or through more constrained connection arrangements, and only the difference may be attributed as being enabled by the increase in investment in the ED3 Plan.

6.2.2 System operation costs

How benefits are realised

DSO investment in ED3 can reduce national system-operation costs where it enables distributed generation and demand to respond to system needs, rather than NESO relying solely on transmission-connected actions or on curtailing renewable generation. NESO has identified DSO development and improved visibility of DER as central to a smarter and more efficient flexibility system. Resources which already exist become usable: without visibility, forecasting and dispatch capability, distributed assets are not available to national system operation and cannot be relied upon.

The path through which the system operation benefit is realised is set out below:

Figure 6 Illustration of ED3 system operation cost-reduction potential

How ED3 distribution network investment can reduce system operation costs				
ED3 investment inputs Reinforcement, automation, monitoring, forecasting, flexibility platforms and DSO capability	**Operational capabilities improved** Better visibility of DER, more accurate local forecasts, clearer constraint locations and more coordinated DSO-NESO actions	**Local system actions enabled** Targeted flexibility procurement, distributed generation dispatch, storage optimisation and smarter connection management	**System effects** More constraints managed locally, less renewable curtailment, lower redispatch volumes and reduced balancing-energy requirement	**Cost outcomes** Lower constraint-management costs, lower balancing costs, avoided high-cost actions and reduced whole-system cost per unit of energy
Cost-reduction pathways: 1) improved visibility and forecasting make DER more usable for constraint management; 2) local flexibility and dispatch reduce the need for more expensive national redispatch and balancing actions; 3) additional distribution capacity allows more low-cost renewable output to be used rather than curtailed; and 4) better coordination avoids repeat interventions and supports lower long-run system operation costs.				

Four categories of activity at national level are affected.

1. **Forecasting and reserve requirements**: Better visibility of embedded generation and flexible demand reduces the uncertainty NESO must cover through additional reserve and response, and reduces the volume of margin held against unexpected embedded generation behaviour.
2. **Balancing and redispatch actions**: Where distributed resources can be identified, contracted and dispatched, more of the required response can be met from lower-cost local resources rather than from transmission-connected plant.
3. **Constraint management**: Distributed flexibility located behind a transmission boundary can relieve that boundary directly, reducing both constraint payments and the need to instruct alternative plant.
4. **Conflicting or duplicated actions**: Without coordinated data exchange, transmission and distribution instructions can offset one another, meaning the system pays twice for a single outcome. Common data standards and shared operational processes remove this inefficiency.

A fifth and increasingly material mechanism is voltage and reactive power management at distribution level. As distributed generation and low-load conditions become more common, reactive power exported from distribution networks onto the transmission system contributes to rising system voltages, which NESO must manage at cost. The ED3 Plan enables distribution networks to manage reactive power within their own boundaries through coordinated voltage control schemes, transformer and tap-changer control, revised operating envelopes, reactive capability from connected assets and, in future, the provision of day-ahead voltage services to NESO. The benefits are a reduction in NESO's voltage-management actions and reactive power procurement, fewer disconnections of distributed generation and customer equipment caused by voltage excursions, improved power quality, and a reduction in losses where voltage optimisation reduces unnecessary current flows.

Quantification approach

System-operation costs are incurred nationally, whereas the enabling investment is made by distribution networks. Attribution is therefore the key analytical challenge, and we address it by triangulating between a top-down and a bottom-up estimate, using each to sense-check the other.

Top-down approach. This takes published GB-level estimates of the value of improved DER visibility and access and apportions a share to SSEN Distribution. NESO has estimated the benefit of improved visibility of and access to distributed resources at around £150 million per year for NESO alone, while more recent analysis estimates potential consumer cost reductions of approximately £3 billion over the next decade.[26] This can be apportioned using a measure of SSEN Distribution's share of the addressable resource - for example the licence areas' share of GB distribution-connected generation, storage and flexible demand capacity, weighted by the extent to which that capacity is located behind materially constrained boundaries. The calculation takes the general form:

Benefit (£) = GB-level annual system-operation saving from full DER visibility (£) × SSEN Distribution share of addressable DER capacity (%) × proportion of that benefit achievable through the ED3 Plan and not in the counterfactual (%) × realisation profile over the ED3 period

Bottom-up approach. This builds the estimate from the specific capabilities funded in SSEN Distribution's ED3 Plan and the operational actions each affects. For key capabilities such as: LV and HV monitoring, DER registers and operational metering, short-term forecasting, control-room integration, Transmission-Distribution operational data exchange, and coordinated voltage control, we identify the system-operation action it influences, the volume of that action in the counterfactual, the proportion avoidable, and the unit cost. Unit costs are drawn from published NESO balancing-cost data by action category.

[26] LCP Delta, DER and CER visibility and control Quantitative Benefits Assessment, 2025

Table 20 Bottom-up mapping of ED3 DSO capability to national system-operation cost categories

ED3 capability	System-operation action affected	Metrics	Valuation basis
Network and DER monitoring; DER register; operational metering	Reserve and response held against embedded generation uncertainty	MW of reserve avoided; reduction in forecast error (MW)	Reserve and response procurement costs (£/MW/h)
Short-term forecasting and probabilistic scenario capability	Conservative operating margins and pre-fault positioning	Number and volume of avoided precautionary actions	Average cost per balancing action by category
Flexibility market platform, dispatch and availability interfaces	Redispatch and constraint management using transmission-connected plant	MWh of distributed flexibility substituted for transmission actions	Cost differential between transmission and distributed actions (£/MWh)
T-D boundary operational data exchange and shared processes	Conflicting, duplicated or offsetting instructions	Number of conflicting actions avoided	Cost of the duplicated action
Coordinated voltage control, reactive capability and voltage services	NESO voltage management and reactive power procurement	MVAr managed within distribution; voltage excursions avoided	Reactive power service costs (£/MVAr); avoided disconnection costs

Source: SSEN, NESO, Baringa analysis

It is important to consider additionality: while SSEN's ED3 Plan will contribute, a share of the DER visibility benefit will be delivered in any event through licence obligations on other parties, wider progress of the Data Sharing Infrastructure and market-led developments, and only the increment attributable to the SSEN ED3 Plan may be claimed. We also seek to avoid double counting. Reduced renewable curtailment is one of the outcomes of improved visibility, and replacement generation costs could already be embedded in modelled system-operation savings. We therefore define Section 6.2.1 as capturing the physical energy effect (MWh of renewable output additionally utilised, valued at the cost of displaced generation) and Section 6.2.2 as capturing the operational effect (the cost of the actions taken to manage the system).

Estimated benefits

We estimate that improved visibility, forecasting and dispatch of distributed resources enabled by the ED3 Plan reduces national system-operation costs by approximately £102 million over the ED3 period in gross terms**.** Relative to the counterfactual in which distribution-level visibility and operational capability remain at current levels, the estimated benefits are £35m. This equates to an average of around £20 million per year, rising through the period as capability is delivered and as the volume of addressable distributed resource grows.

This estimate can be placed in context. If the GB-wide benefit of improved DER visibility is of the order of £150 million per year to NESO alone, an SSEN Distribution contribution averaging around £20 million per year implies a share of roughly 13 per cent of the GB benefit. This is broadly consistent with the licence areas' share of GB customers and distributed capacity and there is a concentration of constrained, generation-rich network in the north of Scotland. The estimate is nonetheless sensitive to the pace at which NESO and DSO operational processes mature, and to the extent to which comparable capability is delivered by other DNOs, since some of the benefit is only realised once visibility is achieved across GB rather than in one licence area alone.

Table 21 Estimated benefits - system operation costs

Impact	Gross (£m)	Net (£m)
Reduction in national system-operation costs from improved DER visibility and dispatch	102	35
Of which: avoided reserve, response and forecast-error costs	20	8
Of which: avoided redispatch and constraint-management actions	26	9
Of which: avoided transmission-level voltage and reactive power costs	56	19

Source: SSEN, NESO, Baringa analysis

This benefit accrues to the national energy system rather than to SSEN Distribution or its customers directly, and should therefore be considered as a whole-system consumer benefit. The operational capabilities underpinning these whole-system benefits are illustrated by SSEN Distribution's proposed investment in DSO network operations, which seeks to make distributed resources more visible and usable in real time.

Case Study 1: Using digital operations to unlock network capacity and reduce whole-system costs

Better visibility and control can help SSEN Distribution to accommodate more low-carbon technologies, use flexibility more effectively and manage voltage and losses before resorting to conventional reinforcement.

ED3 Plan investment: SSEN Distribution proposes a coordinated network-operations capability integrating network visibility, Active Network Management, flexibility markets, outage planning, voltage management and control-room decision-making. The preferred option represents £44.36 million of ED3 expenditure, including digital systems, monitoring and control equipment, targeted voltage and losses interventions, and specialist operational capability.

Value enabled: More accurate forecasting and coordinated dispatch should allow flexibility to be used more routinely, reduce renewable curtailment, support faster and lower-cost connections and reduce conflicting actions between distribution and national system operation. The investment is intended to create more than 1 GW of additional hosting capacity, sufficient to support up to 300,000 EV chargers and 100,000 heat pumps, while improving the use of existing network assets. Dynamic voltage optimisation is also expected to reduce annual domestic electricity consumption by approximately 47.5 GWh, while improving power quality and reducing technical losses.

SSEN Distribution's supporting cost-benefit analysis estimates approximately £96.6 million of undiscounted benefits during ED3 for the preferred option, including £42.6 million from faster and lower-cost connections, £28.9 million from voltage-management benefits and £22.1 million from reinforcement deferred through flexibility. These benefits depend on successful integration with the wider ADMS and digital programme, effective flexibility-market participation and the readiness of NESO systems and coordination arrangements.

This planned investment supports the system security, efficiency and affordability value element by increasing usable network capacity and reducing the need for conventional reinforcement, increasing efficiency of national system operations, and thereby reducing whole-system costs.

6.2.3 Reliability and resilience

We capture the value of reduced disruption to domestic and non-domestic customers, monetised through Value of Lost Load and willingness-to-pay measures, under customer outcomes in Section 6. This section addresses the remaining reliability and resilience value that accrues to the distribution system itself and, where justified, to the wider energy system. In broad terms, section 6 answers the question: "what is the value to customers of not losing supply?", whereas this section answers the question: "what does it cost the system to deliver that reliability, and how does the ED3 Plan reduce that cost and the risk around it?".

How benefits are realised

At the **distribution level**, we have identified four relevant impacts of the ED3 Plan:

1. First, *lower fault and emergency response costs*: proactive asset replacement, tree cutting, undergrounding and improved condition monitoring reduce the number of faults, while automation, remote switching and better fault location reduce the cost of responding to those that do occur. Reactive and emergency intervention is materially more expensive per unit of work than planned intervention, and is more exposed to overtime, mobilisation and supply-chain premia.
2. Second, *avoided consequential asset damage*: faults that are detected and isolated quickly cause less damage to adjacent plant, reducing subsequent replacement expenditure and extending asset life.
3. Third, *reduced use of temporary and contingency arrangements*, including mobile generation, temporary cabling, standby crews, welfare provision and third-party support during prolonged events.
4. Fourth, *lower exposure to reliability incentive and guaranteed standards penalties*: these are transfers rather than resource costs and are therefore reported separately from the Green Book compliant economic benefits assessment, but remain relevant to the value case narrative for the Plan.

At **whole-system level**, the ED3 Plan can *protect distributed generation and flexibility availability*: as the system becomes more dependent on resources connected to distribution networks, a distribution fault no longer only interrupts demand, it also removes generation, storage and flexibility from the national system at the moment it may be needed. A more resilient distribution network also additionally contributes to national security of supply and reduces the reserve the system must hold against that risk.

Quantification approach

Our assessment uses a risk-based, expected-value approach, drawing on the Network Asset Risk Metric (NARM) methodology used to support non-load-related expenditure and the Green Book approach to the appraisal of risk. Monetised risk is calculated as the product of the probability of an event, the consequence of that event, and the exposure of the network to it, and the benefit of the ED3 Plan is the reduction in monetised risk relative to the counterfactual:

Benefit (£) = Σ [probability of failure under counterfactual × consequence (£)] − Σ [probability of failure under ED3 Plan × consequence (£)], summed across asset groups, event types and years, excluding the customer interruption consequence valued in section 6

Three practical steps follow. In Step 1 we draw on our analysis of non-load related expenditure impacts to define the counterfactual and ED3 Plan reliability trajectories including probability of asset failure and consequence when faults occur. Step 2 is to then quantify and value the resulting differences in fault volumes, repair costs, emergency response requirements and contingency arrangements. Step 3 is to quantify and value the system-level components: the MW of distributed generation, storage and flexibility whose availability is protected.

Table 22 Reliability and resilience - impact categories, metrics and estimated benefits

Impact category	Metric and valuation basis	Estimated benefit (net, £m)
Avoided fault and emergency response expenditure	Faults avoided × differential unit cost of reactive versus planned intervention	44
Avoided consequential asset damage and premature replacement	Change in monetised asset risk and residual asset life	36
Reduced use of temporary generation and contingency arrangements	Generator-days, hire, fuel, mobilisation and welfare costs avoided	23
Protection of distributed generation and flexibility availability	MW-hours of DER availability protected; avoided replacement reserve cost	17

Source: SSEN, Baringa analysis

6.2.4 Avoided or more efficient transmission and distribution investment

How benefits are realised

We have identified three potential opportunities for the ED3 Plan to support more efficient transmission and distribution investment in the long-term:

1. *The ED3 Plan can avoid later, repeated or reactive intervention.* Where growth is well evidenced, intervening once at an appropriate scale is cheaper over the whole life than a sequence of incremental reinforcements, each carrying its own design, consenting, mobilisation, excavation, outage and reinstatement costs. Reactive intervention under compressed timescales also attracts cost premia, and connection-driven works undertaken piecemeal frequently strand or duplicate earlier expenditure. The benefit is the difference in whole-life cost between a single, correctly timed intervention and the sequence of interventions the counterfactual would require.
2. *Coordinated delivery and "touch the network once".* Aligning reinforcement, asset replacement, unlooping, connections and third-party works, including local authority highways, water, telecommunications and transport schemes, reduces total excavation, traffic management, reinstatement and outage costs, and reduces disruption to customers and communities. Coordination with SSEN Transmission, National Grid Electricity Transmission and with RESP-informed regional planning extends the same principle across the transmission-distribution boundary, avoiding cases where a distribution scheme is delivered and then modified shortly afterwards to accommodate a transmission development, or vice versa.
3. *Better sizing through improved planning and forecasting.* Probabilistic forecasting, LV visibility, improved knowledge of flexible demand and enhanced optioneering tools reduce both over-sizing, which imposes unnecessary cost on customers, and under-sizing, which triggers early repeat intervention. The benefit is the reduction in expected whole-life cost across the distribution of possible demand outcomes, rather than as a saving against a single deterministic forecast.

Quantification approach

We estimate the present value of expenditure between the ED3 Plan and the counterfactual, applying Green Book appraisal conventions, for the first two opportunities above. The benefits of improved planning and forecasting on future investment costs are not monetised. Where the counterfactual involves repeated intervention, the benefit is the difference between the present value of the single intervention and the present value of the sequence, including the associated fixed and mobilisation costs of each visit.

For the coordinated delivery case, the benefit is the avoided duplication of civil, traffic-management, reinstatement and outage costs across schemes that would otherwise be delivered separately. Aggregation is performed by scaling scheme-level results to portfolio level using a representative sample of schemes, rather than by assuming a uniform percentage saving across the programme, and the basis of that scaling is reported transparently.

Estimated benefits

Table 23 Estimated benefits - avoided or more efficient transmission and distribution investment

Mechanism	Gross benefit (£m PV)	Net benefit vs "as-is" (£m PV)
Avoided later, repeated or reactive intervention	2,370	1,723
Coordinated delivery and "touch the network once" efficiencies	145	27

Source: SSEN, Baringa analysis

As, in cash terms, the ED3 Plan spends more than the counterfactual in the near term, the benefit is a reduction in whole-life, present-value cost, but attributed to the ED3 Plan.

Across the ED3 Plan, flexibility and reinforcement have been assessed on a consistent and symmetrical basis, as Ofgem's Business Plan Guidance requires using the "build and flex" framework, so that the Plan can evidence both where flexibility has displaced build and where build has been shown to be the more economical solution.

6.3 Distribution of benefits across customers

The benefits quantified in this section are expressed as estimated totals across the SSEN licence areas and, in section 6.1, as averages across the households that adopt low-carbon technologies. The extent to which a household benefits from the ED3 Plan, and when, depends on its circumstances. For example, whether the household owns a car and has access to off-street parking, whether it owns or rents its home, and the type, age and energy efficiency of the property. Whether it is connected to the gas grid, and its income and capacity to invest to obtain benefits that accrue over several years are also important. Consistent with the Green Book's emphasis on distributional impacts, and with Ofgem's expectation that all consumers, including those who are vulnerable or less able to participate, should have the opportunity to benefit from the energy transition, Table 24 sets out how the consumer benefits described in this report are likely to accrue across five illustrative household "archetypes".

The archetypes have been selected for this assessment and are informed by published consumer segmentation research, including the consumer archetypes developed for Ofgem by the Centre for Sustainable Energy, and by national statistics on car access, housing tenure and fuel poverty. For each archetype, the table describes the main pathways through which households may benefit. These range from direct savings from electric vehicles, heat pumps and solar PV, and improved reliability, to more indirect and longer-term benefits, such as lower wholesale electricity prices as more renewable output is used and the avoidance of costly reactive reinforcement. The table also gives an indicative view of how likely each archetype is to realise these benefits within ED3 or beyond. The matrix is descriptive. It does not apportion, and is not additive to, the monetised consumer benefits reported in Table ES.1. All customers contribute to network costs through their bills, but some archetypes depend more on indirect and longer-term benefit pathways. The matrix is presented in this section given the distributional dimension of the impacts estimated

in this section. Environmental and wider economy impacts of the Plan, discussed in the following sections, are expected to be distributed widely with more limited archetype specific considerations.

Table 24 Description of benefits supported for household archetypes

Customer archetype and definition	How these households may benefit	Likelihood and timeframe
A: Higher-income homeowners with access to parking They are on the gas grid, their homes are mostly rated EPC C–D, and they have one or more cars. Many are in suburban SEPD areas. About two-thirds of UK households have a driveway or dedicated parking space.	**Direct**: Home EV charging gives the largest per-household saving. Rooftop solar uptake could add to this, with the ED3 Plan meaning fewer export limits. These households are also best placed to use smart tariffs, home batteries and vehicle-to-grid flexibility. A heat pump is close to cost-neutral against a gas boiler on average, but performs better on a smart tariff. Reinforcement and unlooping mean they are less likely to face managed or restricted connections. **Indirect**: As homes electrify, the value of avoided interruptions rises. They also benefit from the system-wide pathways described below. More renewable output used and less curtailment can push down wholesale prices. Avoided reactive reinforcement lowers future network costs. Air quality improvements from electrified buses and fleets, and local jobs and apprenticeships can also contribute to positive customer outcomes.	These customers are highly likely to realise benefits in ED3. The additional benefit is concentrated in grid supply point (GSP) areas that would be constrained in the counterfactual. Heat pump benefits are moderately likely in ED3 and more likely in ED4.
B: Middle-income households without off-street parking These may be homeowners or private renters in terraced houses, converted flats and older urban homes. They are mostly on gas, usually have one car, and depend on on-street or public charging. Around 8 million households in Great Britain outside London have no off-street parking.	**Direct:** EV savings depend on affordable local charging (on-street, local hubs or a workplace), which relies on low-voltage network capacity. Savings are lower than with home charging, especially for drivers who rely on rapid chargers. A growing used EV market is expected to lower the cost of switching. Heat pumps are harder to fit due to space and freeholder or landlord consent requirements, so shared or heat network options are more likely later. **Indirect:** Reliability gains and the system-wide pathways below.	Moderately likely to benefit in ED3, mainly later in the period. This depends on local authority charge point rollout and used EV prices. More likely to benefit in ED4 and beyond.
C: Rural and island households off the gas grid These are often older homeowners in detached, older solid-wall homes heated by oil, LPG or electric storage heaters. They depend heavily on their cars with high mileage. They are often supplied by long overhead lines. About two-thirds of rural Scottish homes are off the gas grid. Fuel poverty	**Direct:** These households are likely to gain most from fewer and shorter interruptions. The net reliability benefits expected under the ED3 Plan are weighted towards long interruptions and rural, island and worst-served customers. Heat pumps may save more against oil, LPG or direct electric heating than compared to networked gas. They also reduce exposure to heating oil prices, which aren't price-capped. Drivers covering high mileage could save more than the average with an EV, where they can charge at home. **Indirect:** Improvements in resilience to storms and extreme weather.	Highly likely to benefit from improved reliability in ED3. Low-carbon technology benefits are moderately likely in ED3, depending on grants and retrofit capacity but are more likely in ED4 and beyond.

averages about 31% in Scotland and reaches 40–51% in some island council areas.		
D: Low-income and fuel-poor renters, often without a car Social and private renters in flats and smaller terraces with lower incomes. Many private rented homes are rated EPC D or below, and many households use prepayment meters. Almost half (44%) of the lowest-income households have no car. This group includes many Priority Services Register (PSR) and other vulnerable customers.	**Direct:** Direct benefits in ED3 are more limited and are likely to be dependent on landlord actions, for example social housing retrofit or proposed tighter minimum energy standards for private rentals. PSR customers benefit from fewer and shorter interruptions. **Indirect:** This group depends most on longer-term, system-wide benefits.	Unlikely to realise significant direct LCT benefits in ED3. Moderately likely to benefit from reliability in ED3. Indirect bill benefits are more likely in ED4 and beyond.
E: Households moving into new-build homes Households across all income levels moving into new housing developments connected during ED3. These homes are built to higher efficiency standards, with low-carbon heating increasingly the default.	**Direct:** In the ED3 Plan more homes (including social housing) can be built and occupied without connection delays. Households then benefit from lower running costs (thermally efficient building fabric, heat pumps and solar) and can benefit from EVs, subject to parking access.	This group is highly likely to benefit in ED3 where developments are in GSP areas where the Plan supports growth in demand connections. This will also depend on planning approvals and housebuilding rates.

Source: Baringa analysis, Ofgem

7 Assessing the value: emissions and environmental benefits

7. Assessing the value: emissions and environmental benefits

The ED3 Plan is a key enabler of a greener energy system. Without the network capacity, connection-readiness and operational capability the ED3 Plan delivers, technologies such as onshore wind, battery storage, heat pumps or electric vehicles cannot be deployed at the desired pace to support the clean energy transition. This section describes the environmental value the ED3 Plan enables, across three areas.

The first is **decarbonisation:** The Plan brings forward emissions reductions through three routes:

1. Connecting more low-carbon generation to the distribution network and allowing more of its output to be used rather than curtailed;
2. Providing the capacity and connection-readiness that allow households and businesses to switch from petrol, diesel, gas and oil to electricity for transport, heat and industrial process energy; and
3. Improving the efficiency with which energy is delivered, principally through reduced technical losses and better voltage management.

Against these reductions there are short-term emissions increases driven by the embodied carbon of the assets built, construction and delivery activity, and enabled growth, which are considered alongside the savings to establish net emissions effect.

The second is **biodiversity and habitat**: SSEN Distribution manages a large land and vegetation footprint through its operations across the north of Scotland and central southern England, spanning overhead line corridors, substation sites, cable routes and an extensive tree-cutting programme. How that estate is managed, and how new works are designed, sited and reinstated, has a material effect on habitat extent and condition. The ED3 Plan increases the scale of physical works relative to the counterfactual, which creates additional disturbance risk, while also creating the opportunity to deliver measurable net gain across a larger area of land than a lower-investment pathway would impact, and to embed better practice into the way that land and sites are managed.

The third is **climate adaptation and environmental resilience**: The Climate Change Committee's assessment that UK infrastructure was built for a climate that no longer exists is especially relevant to a distribution network with long-lived assets exposed to storms, flooding, extreme heat and wildfire across highly varied terrain[27]. The ED3 Plan invests to make the network resilient to the climate now expected over the operational lives of the assets being installed, rather than the climate in which they were originally specified. It also reduces the environmental consequences of network operations, including pollution risk from oil-filled plant, disturbance from repeated intervention, and the higher resource intensity of more reactive repair.

Each subsection below sets out the mechanisms by which the economic benefit arises, the assessment approach and the evidence available on expected outcomes. Biodiversity, habitat and climate-resilience impacts are reported primarily through gross physical outputs, commitments and alignment with applicable standards; net benefits are reported only where a supported counterfactual is available.

[27] CCC, A Well-Adapted UK - The Fourth Independent Assessment of UK Climate Risk, 2026

7.1 Decarbonisation

The physical drivers of emissions change such as additional renewable output utilised, low-carbon technologies (LCTs) enabled, connections accelerated, losses reduced and assets built, are largely quantified in the customer outcomes, system security and wider economy sections. This section converts those outputs into a carbon account for the ED3 Plan, expressed in tCO_2e and monetised using Green Book carbon values.

Three considerations govern the approach:

1. The first is **attribution**: Beyond the emissions impact of its own activities, as SSEN Distribution does not build renewable generation or purchase LCTs, it cannot claim sole credit for the resulting emissions impacts. Equally, without the network investment those reductions would not be possible. The benefit is therefore articulated as emissions reductions that the ED3 Plan *enables*, rather than emissions reductions solely attributed to SSEN Distribution.
2. The second is **timing:** The counterfactual is not one of permanently higher emissions but of delayed decarbonisation, and the benefit of the Plan is the acceleration of emissions reductions. The emissions benefit is the area between the two emissions trajectories, rather than a difference in the endpoint. A catch-up assumption is applied to the counterfactual and the sensitivity of the result to that assumption is described.
3. The third is **symmetry**: The value assessment reports emissions increases as well as reductions. The ED3 Plan involves materially more construction activity than the counterfactual and facilitates new demand, both of which drive emissions.

The primary focus of this study, and therefore the scope of the impact quantification, is the decarbonisation impact associated with delivery of the ED3 Plan. This captures emissions reductions enabled by the electrification of demand and the declining carbon intensity of electricity supplied through the network, alongside the most material embodied emissions associated with delivering the infrastructure upgrades included in the ED3 Plan.

In addition to the impacts quantified in this study, SSE Group will continue to deliver wider emissions reductions in parallel with the implementation of ED3. During the ED3 period, SSE will continue to implement its Net Zero Transition Plan, which sets out actions across generation, operations and the value chain to achieve its wider decarbonisation targets. These include reducing absolute Scope 1 and 2 GHG emissions by 72.5% by 2030 from a 2017/18 baseline, alongside its longer-term targets of achieving Net-zero Scope 1 and 2 emissions by 2040 and remaining Scope 3 emissions by 2050.[28,29]

7.1.1 Emissions reductions enabled and increases arising from the Plan

Emissions reductions enabled

Renewable output additionally utilised. Each MWh of additional renewable generation delivered, through reduced curtailment, accelerated connection of distribution-connected generation, or transmission-

[28] SSE plc (2025), From targets to action: SSE's Net Zero Transition Plan, Version 2.0, June 2025.

[29] Scope 1: Direct emissions from SSE's activities, including electricity generation, operational vehicles and fixed generation, sulphur hexafluoride (SF_6) and gas consumption in buildings. Scope 2: Indirect emissions from purchased electricity, including electricity consumption in operational and non-operational buildings and SSEN Distribution network losses. Scope 3: Other indirect value-chain emissions, including gas sold, joint venture investments, fuel and energy-related emissions, SSEN Transmission network losses, contractor vessels and business travel.

connected output consumed within the licence areas, displaces generation that would otherwise have been produced elsewhere on the system. Emissions saved are calculated as additional MWh multiplied by the marginal emissions factor of the displaced generation, using a declining trajectory consistent with NESO's Future Energy Scenarios and Clean Power 2030. We use the marginal emissions factor, rather than the average grid factor, as the relevant question is what generation is displaced at the margin at the times the additional renewable output is delivered.

Electrification of transport. Households and businesses enabled to connect electric vehicle charging earlier, or at all, displace petrol and diesel consumption. Emissions saved are calculated per vehicle-year as annual mileage multiplied by the difference between internal combustion engine and EV emissions per mile, with the EV factor tracking the decarbonising grid. Switching from an internal combustion vehicle to an EV reduces emissions by approximately two thirds on current factors, and by a rising proportion as the grid decarbonises further.

Electrification of heat and industrial process energy. The ED3 Plan enables households and businesses to install heat pumps which displace gas, oil and LPG, reducing heating emissions by around 70% on current factors. The same logic applies at larger scale to commercial heating and hot water and, importantly, to industrial process energy, where electrification of drying, curing, heating and other thermal processes displaces direct fossil fuel combustion. This is likely to be a material category in the industrial clusters within SEPD and in off-gas-grid areas of SHEPD, where the displaced fuel is oil or LPG and the emissions saving per property is larger than for gas.

Displaced diesel and onsite generation. Where a stronger connection removes the need for diesel standby or private generation operated because the grid is constrained, the avoided fuel combustion is a direct and readily evidenced emissions saving. This is particularly relevant on island and remote networks, where diesel embedded generation remains a material component of local supply.

Reduced technical losses, and lower-carbon operation. Losses avoided are generation that need not be produced, valued at the marginal grid emissions factor on the same basis as avoided curtailment. In addition, fewer emergency mobilisations, less temporary generation, fewer repeat excavations and less remobilisation can reduce fuel use and embodied carbon in materials.

Case Study 2: Supporting the Outer Hebrides

Stronger subsea connections can provide island communities with a more resilient and lower-carbon electricity supply while creating capacity for additional local renewable generation.

Investment: The Outer Hebrides depend on subsea cables connecting the islands to the mainland. Local diesel generation is required when faults occur or winter demand exceeds available cable capacity. DFES also projects increasing demand from the electrification of heat, transport and industrial processes, alongside potential growth in wind and tidal generation.

In its ED3 Plan, SSEN Distribution proposes two 66 kV and two 33 kV submarine circuits, adding approximately 224 MVA of capacity in 2032/33. The preferred configuration was selected from options providing different levels of headroom and reliance on flexibility and network switching, balancing expected need against uncertainty over longer-term growth. Estimated expenditure is £309 million in ED3 and £18 million in ED4, in 2025/26 prices.

Value enabled: The reinforcement is intended to strengthen security of supply from the current N-1 position towards N-2 capability**, reduce reliance on diesel generators** during cable outages and winter

peaks, and accommodate additional renewable generation**.** Diesel generation in the area emitted approximately 2,238 tCO_2e in 2022/23, indicating the emissions that could be reduced as reliance on that generation falls. The scale of realised benefits will depend on demand growth, renewable deployment and the subsequent operating requirements of the island system.

The investment demonstrates how the Plan can deliver value across the decarbonisation and environmental benefits element by reducing reliance on diesel generation and creating capacity for greater use of local renewable resources. At the same time, stronger subsea connections support system security and customer outcomes.

Emissions increases arising from the ED3 Plan

The ED3 Plan may give rise to some offsetting emissions increases due to factors including:

- **Embodied carbon of network assets.** The Plan installs substantially more cable, switchgear, transformers, poles and civil works than the counterfactual. Embodied carbon is estimated using asset-level carbon factors applied to ED3 asset volumes, covering raw material extraction, manufacture, transport and installation.[30]
- **Construction, delivery and fleet emissions.** Additional excavation, plant operation, site traffic and workforce travel associated with a larger programme.
- **Enabled growth of demand.** The ED3 Plan supports greater levels of economic activity than the counterfactual due to the new connections that can be delivered. This economic activity will lead to additional emissions through the enabled energy demand via the electricity system and other sources.
- **Losses associated with additional throughput.** Additional electricity delivered brings additional losses, partially offsetting the loss reductions described above.

7.1.2 Quantification approach

Emissions are calculated for each impact category based on the outputs from the relevant quantification section multiplied by the applicable emissions factor. We take the difference between the ED3 Plan and the counterfactual and sum across ED3 years. The resulting value is monetised by applying the relevant Green Book carbon value for each year and discounting to present value using the following assumptions:

- **Emissions factors** are taken from the DESNZ Greenhouse Gas Conversion Factors,[31] with grid factors following a marginal rather than average trajectory consistent with FES scenarios.
- **Carbon values** are taken from Green Book supplementary guidance[32] and DESNZ carbon valuation, applying the appropriate traded and non-traded series, using central values in a 2025/26 real price base.
- **Discounting** uses the Green Book social time preference rate, consistent with the treatment of avoided investment elsewhere in this framework.
- The **counterfactual pathway** eventually delivers most of the same reductions, although later.

[30] A partially offsetting consideration is that single, coordinated interventions may carry lower total embodied and construction carbon than the sequence of reactive interventions the counterfactual would require, so a portion of the apparent embodied carbon increase reflects timing rather than a genuine addition to lifetime emissions.
[31] DESNZ, Greenhouse gas reporting: conversion factors, 2026
[32] DESNZ, Valuation of greenhouse gas emissions: for policy appraisal and evaluation, 2021

7.1.3 Summary of estimated emissions impacts

The table below consolidates the emissions impact arising from each quantification section. Values are net of the counterfactual unless stated otherwise.

Table 25 Consolidated emissions impacts of the ED3 Plan by quantification section

Impact category	Basis of quantification	Direction	Net Estimated impact ($MtCO_2e$)	Monetised (£m PV)
EV adoption enabled or accelerated (domestic)	Vehicle-years × mileage × (ICE factor − EV factor)	Reduction	1.89	719
Heat pump adoption enabled or accelerated (domestic)	Installation-years × annual saving	Reduction	0.35	133
Solar PV enabled	Generation (MWh) × marginal grid factor	Reduction	0.11	42
Non-domestic fleet electrification enabled	Vehicle-years by class × factor differential	Reduction	0.72	274
Commercial heat and industrial process electrification enabled	Fuel displaced (kWh) × fuel factor, net of electricity	Reduction	0.20	76
Displaced onsite diesel and standby generation	Litres or kWh displaced × diesel factor	Reduction	0.01	4
Reduced curtailment of distribution-connected renewables	Additional MWh × marginal grid factor	Reduction	0.15	57
Accelerated renewable connections	MW-years × load factor × marginal grid factor	Reduction	0.35	133
Reduced technical losses	Net GWh × marginal grid factor	Reduction	0.05	19
Avoided emergency response, temporary generation and consequential replacement	Mobilisations and generator-days avoided × factors	Reduction	0.02	8
Construction, plant, fleet and delivery emissions	Additional activity × marginal factor	Increase	0.08	30
Additional losses from increased throughput	Additional GWh × loss rate × marginal factor	Increase	0.04	15
Net emissions impact of the ED3 Plan	Sum of the above, net of counterfactual	**Net reduction**	3.97	1,208

Source: SSEN, NESO, Baringa analysis

The demand-side categories contribute 82% of the overall savings because the licence areas contain a large number of households and businesses whose heat and transport emissions are currently met directly from fossil fuels, and because these emissions are displaced almost entirely rather than partially through electrification. The value per tonne rises over time under Green Book carbon values.

The table above summarises net impacts compared to the counterfactual, totalling an estimated 3.97 $MtCO_2e$ emissions reduction, or £1.2bn when monetised. The estimated gross contribution of all the

decarbonisation activities enabled in the ED3 Plan (i.e. all new EVs connected during ED3) to emissions reductions is estimated to be 15.7 $MtCO_2e$.

The case for carbon reductions is strongest where it is linked to particular locational constraints: island diesel displacement, constrained generation-rich zones in SHEPD and demand electrification in SEPD are all high-confidence cases that can be described concretely and supported by identifiable evidence.

7.2 Biodiversity and habitat

7.2.1 Mechanisms by which benefits are realised

We consider four mechanisms for the biodiversity and habitat impacts:

A larger works programme creates additional disturbance: the ED3 Plan involves more excavation, additional substation and line infrastructure and more construction access than the counterfactual, and absent mitigation this represents a biodiversity cost that this assessment must recognise. The benefit arises because that activity is planned, designed and mitigated rather than reactive and compressed.

Design, siting and mitigation of new works: Proactive, longer-horizon planning allows route and site selection to avoid designated sites, ancient woodland, peatland and priority habitats. Works can also be timed around breeding and spawning seasons, and mitigation and reinstatement can be designed with more consideration. Works undertaken reactively and under compressed timescales have less scope for this.

Enhancement of the existing estate: Substation sites, line corridors, depots and land holdings collectively represent a significant area that can be actively managed for biodiversity through species-rich grassland in place of amenity mowing, native planting, pollinator corridors, wetland features and peatland restoration. The larger the programme, the more sites are involved and the greater the opportunity to convert routine works into enhancement.

Vegetation management as habitat management: The tree-cutting programme is one of the largest recurring vegetation interventions in the SSEN footprint. Managed conventionally it is a cost to habitat, however through selective and staged cutting, retention of deadwood and standing habitat, replacement planting with native species away from the corridor, coppicing regimes and establishment of low-growing species, it can improve habitat condition while simultaneously reducing the long-term fault risk addressed in Section 6.

7.2.2 Assessment approach

The assessment considers the scale and nature of the biodiversity and habitat outcomes that SSEN Distribution expects to deliver through the ED3 Plan. It draws on the evidence and delivery approaches set out in SSEN Distribution's environmental Engineering Justification Papers, supporting costing methodologies, biodiversity baseline and Natural Asset Platform, rather than applying a separate programme-wide ecological model.

The assessment focuses on three complementary types of evidence:

1. **Compliance with statutory and planning requirements:** For relevant projects in England, biodiversity impacts and gains are assessed using the statutory biodiversity metric and the applicable Biodiversity Net Gain requirements. In Scotland, projects are assessed against the biodiversity enhancement requirements established through National Planning Framework 4. These requirements provide the principal standards against which the biodiversity performance of capital projects are assessed. SSEN Distribution's supporting EJP applies a programme-level costing methodology using forecast ED3 land

impacts, SSEN Distribution's biodiversity baseline, a 10% statutory biodiversity uplift and the minimum statutory biodiversity credit price.

2. **Physical outputs and programme commitments:** Where evidence is available, the assessment reports tangible outputs such as hectares of habitat created or restored, Biodiversity Units required or delivered, sites and projects covered, and the types of habitat supported. The assessment reports these outputs on a gross basis, reflecting the total activity proposed through the ED3 Plan. It does not estimate a net benefit against the counterfactual, as the available evidence does not provide a sufficiently consistent basis for estimating the biodiversity outcomes that would have occurred under that alternative pathway.

3. **Contribution to wider biodiversity and natural-capital outcomes:** Our assessment considers how ED3 investment supports habitat creation and enhancement, improved management of SSEN Distribution's estate, and nature-based projects providing carbon-removal and wider ecosystem-service benefits. These wider outcomes are described using the evidence available from the relevant programmes. They are not converted into a single monetary natural-capital value unless supported by scheme-specific appraisal.

SSEN Distribution has developed a Natural Asset Platform that applies biodiversity metrics to provide a desk-based baseline of habitats around its assets across the SEPD and SHEPD licence areas, including average Biodiversity Units per hectare. This provides a basis for monitoring biodiversity impacts and informing the selection and design of interventions. However, the specific habitat impact, Biodiversity Unit requirement and delivery route for an individual project can only be established through project optioneering, ecological assessment and detailed design. Delivery through purchased Biodiversity Units is expected to be an additional route where on-site enhancement is constrained by land ownership, operational requirements or long-term management considerations.

Our assessment therefore gives greatest weight to physical outputs, scheme-specific biodiversity calculations and compliance with established standards. Where evidence is incomplete, benefits are described qualitatively rather than extrapolated or monetised. This avoids presenting a level of precision that is not supported by the underlying evidence.

7.2.3 Summary of benefits

SSEN Distribution's ED3 Plan supports biodiversity and habitat outcomes through two related programmes:

- **Biodiversity requirements associated with capital delivery:** Forecast land impacts from the ED3 investment programme are used alongside SSEN Distribution's biodiversity baseline and applicable statutory requirements to provide for Biodiversity Net Gain and biodiversity enhancement obligations. This supports the timely securing of planning consent and helps integrate biodiversity considerations into project optioneering and design from the outset.
- **Nature-based solutions for carbon removals and ecosystem services:** SSEN Distribution's preferred programme would support the creation or restoration of 1,294 hectares of woodland, peatland and seagrass habitat across its licence areas by 2033. The programme is intended to compensate for a quarter of residual emissions until 2045 while also delivering wider ecosystem-service benefits. Delivery is expected through a diversified portfolio of projects and habitat types, supported by competitive selection, monitoring and adaptive management.

Table 26 Summary of assessed benefits and expected outcomes - biodiversity and habitat

Impact category	Evidence and metric	Gross ED3 outcome or assessment
Biodiversity requirements associated with ED3 capital projects	Forecast land impact; Biodiversity Units; statutory biodiversity metric; project ecological assessments	Delivery of applicable BNG and biodiversity-enhancement requirements across relevant ED3 projects
Statutory Biodiversity Net Gain in England	Biodiversity Units and percentage gain established through the statutory metric	At least the applicable statutory uplift, including the 10% minimum used in programme-level costing
Biodiversity enhancement in Scotland	Evidence of positive effects for biodiversity through project assessments and design	Alignment with National Planning Framework 4 requirements
Habitat creation and restoration through nature-based solutions	Hectares by habitat and licence area	1,294 hectares of woodland, peatland and seagrass created or restored by 2033
Biodiversity baseline and monitoring	Habitat extent; habitat type; average Biodiversity Units per hectare; project-level pre- and post-intervention assessment where available	Use of the Natural Asset Platform and biodiversity baseline to inform project design, delivery and monitoring
On-site habitat enhancement	Hectares, sites and Biodiversity Units delivered on land controlled by SSEN Distribution	Outputs to be reported as projects are developed and delivered
Off-site Biodiversity Units	Biodiversity Units purchased; location and habitat type	Procurement and delivery to be reported against project-specific statutory requirements
Wider ecosystem services	Carbon removals and qualitative or scheme-specific evidence on water, flood, soil, air-quality and amenity outcomes	To be reported alongside the 1,294-hectare nature-based-solutions programme and monetised only where supported
Habitat disturbance and mitigation	Land affected; habitat type; mitigation hierarchy applied	Gross disturbance and mitigation to be reported transparently alongside positive outputs, where project evidence is available

Source: SSEN, Baringa analysis

7.3 Climate adaptation and environmental resilience

This section quantifies the value of adapting the network to a changing climate, and of reducing the environmental consequences of network operation. It is distinct from the reliability and resilience aspects of the system security, efficiency and affordability element. That element asks what the ED3 Plan saves in fault, repair, contingency and asset-risk cost under broadly current conditions. This section asks what the Plan saves by ensuring the network remains fit for purpose as the climate itself changes over the operational lives of assets being installed now.

7.3.1 How benefits are realised

- **Designing to future rather than historic climate conditions.** Assets installed during ED3 will operate into the 2060s and beyond. Specifying materials, flood protection requirements, thermal ratings and structural loadings against projected rather than historic conditions avoids the higher cost of retrofitting or prematurely replacing assets that prove inadequate. As retrofit is typically several multiples of the incremental cost of building to a higher standard at the outset, this is expected to be one of the highest-return categories in the Plan.
- **Flood and water resilience.** Raising, relocating or protecting substations and other plant in areas of increasing flood risk. This protects both the network and the surrounding environment, since flooding of oil-filled plant carries pollution risk.
- **Storm and wind resilience.** Recent named storms demonstrated the consequences of extreme wind events for overhead networks, particularly in exposed terrain in SHEPD. Measures include selective undergrounding, structural strengthening, corridor widening, staged vegetation management and improved resilience of assets serving the communities that are hardest to restore.
- **Heat, drought and wildfire resilience.** Rising summer temperatures reduce equipment ratings, accelerate ageing and increase failure rates in transformers, cables and switchgear, while drier conditions increase wildfire risk in moorland and forestry areas adjacent to overhead lines. Both are increasing risks in GB distribution planning.
- **Coastal and geotechnical resilience.** Coastal erosion, sea level rise, landslip and ground instability affect assets in both licence areas, with particular exposure on Scottish island and coastal routes and on parts of the south coast.
- **Wider societal resilience.** As heat, transport, water, telecommunications and health services electrify, the consequences of a prolonged distribution outage extend well beyond electricity customers. Adaptation investment therefore protects a widening set of dependent services, and this cross-sector consideration is central to the case for investing ahead of climate impacts rather than after them.

7.3.2 Assessment approach

We assess the extent to which the proposed ED3 interventions strengthen the network's ability to withstand, respond to and recover from climate-related hazards, drawing on SSEN Distribution's Climate Resilience Strategy and supporting Engineering Justification Papers. The available evidence does not support a single, programme-wide calculation of expected damages avoided across all climate hazards. The assessment uses four evidence lenses:

1. **Risk and needs evidence:** The assessment identifies the climate hazards addressed by the Plan, the exposed assets or operational capabilities, and the consequences that the interventions are intended to mitigate. Relevant hazards include flooding, storms and high winds, extreme heat, wildfire, coastal and geotechnical risks, and the operational consequences of severe-weather events.

2. **Defined interventions and physical outputs:** The assessment reports the volume and type of measures planned, including assets or sites protected, overhead-line sections made more storm-resilient, restoration equipment installed, and monitoring capability deployed. This allows the Plan's resilience contribution to be described using evidence that is directly linked to its delivery commitments.

3. **Expected resilience outcomes:** Where supported by the relevant EJP, the assessment reports expected operational outcomes such as reduced exposure to storm-related faults, improved restoration capability, lower Customer Interruptions and Customer Minutes Lost, improved protection of critical or high-consequence sites, and better information for future adaptation decisions. These are reported as expected or supported outcomes, rather than converted into a single monetary value.

4. **Alignment with recognised standards and strategies**: Investments are assessed against applicable engineering and resilience standards and SSEN Distribution's Climate Resilience Strategy. Flood mitigation is assessed against ETR 138, including the Flood Risk Assessments required to identify at-risk sites and specify proportionate mitigation. SSEN Distribution's climate evidence identifies fluvial, pluvial and sea flooding affecting substations as a severe current risk that remains severe in the 2050 assessment and increases further by 2100.

The proposed interventions are prioritised using current asset, fault, route-condition, flood-risk and customer-consequence evidence. Several programmes also provide for annual or site-level reprioritisation as evidence develops, allowing delivery to remain adaptive without changing the overall purpose of the investment. For example, the storm-resilience programme prioritises higher-risk locations and updates prioritisation using the latest fault, route-condition and customer-vulnerability information. The monitoring programme proposes deployment at 60 sites per year across SHEPD and SEPD, creating a multi-year evidence base for more targeted heat-resilience interventions from ED4 onwards.

Benefits are presented on a gross basis, describing the resilience delivered or supported by the ED3 interventions. No net benefit is reported against the counterfactual because the supporting evidence does not establish a consistent alternative investment and risk trajectory across the portfolio.

7.3.3 Summary of estimated benefits

The ED3 climate-resilience programme provides a portfolio of targeted interventions addressing both current operational vulnerabilities and the increasing exposure expected from climate change. The available evidence supports a strong needs case and provides several quantified delivery outputs. It does not, however, support aggregation into a single monetary estimate of expected damages avoided. The evidence indicates that many interventions are justified by current service and operational risks, with climate change increasing the future significance of those risks. SSEN Distribution's ED3 Plan activities address some identified vulnerabilities now and also devote resources to monitoring, operational capability and adaptive capacity to support longer-term resilience.

Table 27 Summary of assessed benefits and expected outcomes – climate adaptation and environmental resilience

Impact category	Evidence and assessment basis	ED3 target outcome
Flood resilience at grid and primary substations	Site-specific Flood Risk Assessments and compliance with ETR 138	Delivery of mitigation required to achieve the prescribed resilience levels at identified sites
Enhanced flood-response capability	Climate strategy ambitions (e.g. Climate Resilience Strategy), fluvial, pluvial and sea-flood risk, portable and deployable measures	Improved ability to respond to concurrent or widespread flood events and protect high-consequence sites
Storm resilience of overhead lines	Fault and cost evidence, route condition, environmental exposure and customer vulnerability	Targeted interventions at the highest-risk locations, with annual reprioritisation as evidence develops
Restoration capability	Switching and customer-consequence studies	100 LV pillars in each licence area**,** subject to site selection, to strengthen

		operational flexibility and restoration capability
Extreme-temperature monitoring	Existing ED2 monitoring and OTN deployment, and need for a multi-year evidence base	Environmental monitoring at 60 sites per year across SHEPD and SEPD**,** supporting targeted heat-resilience action and future ED4 decisions
Asset and operational response to heat, wildfire and other climate hazards	Climate-risk evidence and relevant low- and medium-materiality investment papers	Targeted, risk-based measures and improved information for future investment decisions
Protection of customers and essential services	Customer consequence, vulnerability, CI and CML evidence	Reduced exposure to prolonged interruptions and improved restoration capability, particularly at high-consequence locations
Workforce and storm-response resilience	Workplace requirements and progress in relation to Climate Resilience Strategy ambitions[33]	Suitable welfare and operational facilities to support sustained response during severe-weather events
Adaptive planning and organisational capability	Progress against Climate Resilience Strategy ambitions, monitoring and annual reprioritisation	Improved capability to identify, prioritise and manage climate risks over the life of long-lived network assets

Source: SSEN, Ofgem, Baringa analysis

7.4 Distribution of benefits across customers

The environmental benefits assessed in this chapter are expected to be widely distributed across SSEN customers and wider society, rather than accruing only to customers who, for example, directly adopt low-carbon technologies. Earlier emissions reductions, greater use of renewable generation and lower technical losses contribute to national decarbonisation and energy-security objectives, while biodiversity enhancement and more climate-resilient infrastructure can benefit communities across both licence areas. The incidence of some impacts will nevertheless vary by place: the most immediate decarbonisation benefits are likely to arise in generation-rich and network-constrained areas, locations with greater potential for heat and transport electrification, and island or remote communities where network investment can displace diesel generation. Biodiversity outcomes will be concentrated around the sites and habitats affected by ED3 works, while climate-adaptation measures will provide the greatest protection to communities, essential services and environments most exposed to flooding, storms, heat, wildfire and coastal risks. While these differences affect where benefits are first experienced, we expect the resulting reductions in emissions and environmental risk will be shared broadly across society.

[33] https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-climate-resilience-strategy-progress-report-2023.pdf

8 Assessing the value: wider economy benefits

8. Assessing the value: wider economy benefits

This section assesses how ED3 investment supports wider economic growth by enabling new and expanded connections, while also creating value through supply-chain expenditure. It first quantifies the economic activity enabled by additional network capacity, before assessing the GVA, employment and skills benefits generated through delivery of the ED3 Plan.

8.1 Enabling growth

Access to timely electricity network capacity is an important enabling condition for many forms of economic development. New housing, factory expansion, hospitals, data centres, electrified ports and other developments in SSEN Distribution's licence areas can all require new or expanded electricity connections.

Where sufficient network capacity is not available when required, developments may face later connection dates, constrained capacity or additional costs. The economic consequence depends on how developers and businesses respond: investment may be delayed, scaled back, accommodated through an alternative solution or, in some circumstances, relocated. Our assessment considers these outcomes and estimates the economic activity associated with demand that the ED3 Plan is expected to accommodate.

This section quantifies the enabled economic activity by the ED3 Business Plan by setting out:

- The categories of growth that network investment enables, including a comparison against a constrained counterfactual
- The estimated growth in demand enabled, and how that demand converts into economic impact
- The resulting economic benefits enabled by the ED3 Business Plan, and
- The "no-growth zones" that the counterfactual could create and that the ED3 Plan may avoid

8.1.1 The categories of growth enabled by network investment

Growth-related demand in the SSEN Distribution licence areas arises from sectors with distinct power demand intensities, economic footprints, and sensitivities to connection delays. The economic value of a MW of capacity therefore varies depending on the source of demand.

Table 28 Categories of growth enabled by distribution

Demand category	Growth enabled	Constrained network sensitivity
1. Housing and residential development	New homes require both new connections and reinforcement of the upstream network and increasingly connect with a materially higher per-property load than historic design assumptions, reflecting heat pumps and EV charging. Projected housing growth is concentrated in the SEPD area across Hampshire, Berkshire, Oxfordshire, Wiltshire, Dorset and the west London boroughs, and is directly linked to national housing targets and to local plans.	Extended connection timescales and higher developer contributions, delaying phases of larger sites and, at the margin, rendering some new housing schemes unviable.
2. Commercial development including offices, retail, hospitality and other services	Office development combines moderate power intensity with high economic intensity, a square metre of office space supports substantially more GVA per year than a square metre of any other	Commercial investment decisions are mobile and time-sensitive, and a multi-year connection date is

	building type, which means that even modest volumes of commercial connection capacity carry disproportionate economic importance. Retail, restaurant, hotel and leisure development follow the same logic, albeit with lower economic intensity.	more likely to result in relocation than to be deferred
3. Industry, manufacturing, logistics and ports	Factory and warehouse floorspace represents a large volume of projected new demand across both licence areas, on top of industrial electrification adding to load growth at existing sites as process heat, drying, kilns and materials handling switch from gas, oil and diesel to electricity. The Port of Southampton Case Study below illustrates how port expansion, electrification and decarbonisation can depend on timely network capacity.	Consequences of inability to increase electricity demand for industrial customers may mean choosing amongst several alternatives such as cancelling or delaying investments, investing in behind-the-meter generation at higher cost, operating across multiple sites, or investing in other, less constrained GB areas or overseas.
4. Data centres and digital infrastructure	Data centres are highly concentrated geographically. In SSEN Distribution's case they are currently almost entirely within SEPD, and within that predominantly in the Slough, West London and Thames Valley corridor. The projected growth is material with distribution-connected data centre demand in SEPD projected to rise from approximately 1.3 GW in 2028 to approximately 2.8 GW by 2050 in the Holistic Transition scenario. SSEN Distribution plans to deliver new connection capacity for the data centre sector during the ED3 period, aligned with Ofgem's connections reform and NESO's strategic energy needs assessment. In the counterfactual, this is the category most likely to be lost outright rather than delayed.	Data centre connections are highly time-sensitive due to rapidly accelerating demand. A data centre operator that cannot secure a connection date will most likely relocate elsewhere, including overseas.
5. Public services and social infrastructure	Health, education, sport and leisure facilities generate lower economic intensity per unit of floorspace but carry social value that is not fully captured in a GVA metric, and are frequently co-dependent with housing growth as new communities require new schools and health facilities.	Under the counterfactual, delay to these connections carries a distributional consequence, since it falls on public bodies with limited ability to pay for accelerated or bespoke connection solutions.

The importance of timely network capacity for industrial, logistics and port-related growth is illustrated by the proposed reinforcement serving the Port of Southampton, where expansion and decarbonisation depend on additional electrical capacity being available when required.

Case Study 3: Creating capacity for the Port of Southampton

The Port of Southampton requires additional network capacity to expand and electrify its operations. Timely reinforcement can therefore support economic activity while enabling lower-carbon port operations.

Investment: SSEN Distribution proposes a new Bulk Supply Point and reinforcement of the local 33 kV network, releasing around 257 MVA of additional capacity. Delivery is expected out to the end of ED3, and potentially beyond, and would be sequenced with emerging demand, using flexibility where appropriate to manage uncertainty. Total expenditure is estimated at £54 million in 2025/26 prices across ED2 and ED3.

Contracted connections and DFES projections indicate demand growth at the Port and across the Southampton area that the existing network cannot accommodate without reinforcement, with thermal overloading potentially arising within the next year.

Value enabled: The Port currently supports approximately 45,600 jobs, contributes around £2.5 billion annually to the UK economy, and handles exports worth about £40 billion each year. Additional capacity can support port and logistics expansion and associated private investment, although the resulting economic benefits depend on those developments proceeding. The network reinforcement can also support shore power, electrification of port equipment, and vessel and equipment charging. These measures can reduce emissions and local air pollution by allowing berthed vessels to switch off auxiliary engines and by replacing fossil-fuelled port activity with electricity supply.

This is an example of how providing electricity capacity at the right time can support port expansion, associated logistics activity and private investment, enabling growth that could otherwise be delayed or constrained. It also contributes to decarbonisation by creating the capacity needed for shore power and the electrification of vessels and port equipment.

8.1.2 Methodology for quantifying demand growth

Across these five demand categories the scale of demand growth enabled by the ED3 Plan depends on proportion of projected demand for power which can be serviced in SSEN's licence areas, disaggregated at Grid Supply Point (GSP) level. Results can be aggregated to licence area and compared directly against the spatially disaggregated counterfactual constructed in Section 4.

Step 1: Estimate growth in demand

We estimate growth in demand for each demand category using the Distribution Future Energy Scenarios (DFES) "new developments" projections at the local authority level in the Holistic Transition scenario. The growth modelled under DFES by LA can subsequently be apportioned to GSPs under SSEN's licenced areas.

To ensure estimated growth is additional, demand growth is net of demand growth arising from fuel switching. Demand increases stemming from switching energy requirements from gas, oil, diesel or petrol into electricity do not represent additional economic activity. A factory that replaces a gas furnace with an industrial heat pump increases its electricity demand substantially, but the associated economic output already existed and is already counted in national accounts. Treating that additional MWh as "enabled growth" would overstate the benefit materially and would double-count against the customer and system

benefits quantified elsewhere in this framework, where the value of that fuel switch is captured as an avoided energy cost. Only the incremental demand associated with new or expanded economic activity is carried forward into this element of the value framework.

Step 2: Estimate the gross economic impact per unit of demand.

We convert projected demand into economic output by applying sector-specific economic intensity coefficients, the GVA associated with each unit of demand, per year. These coefficients are derived from ONS outputs and floorspace data and, for data centres, from sector benchmarks. Table 29 sets out the coefficients applied.

Table 29 Economic intensity coefficients applied to new development demand, by sector

Sector	Demand unit	GVA per unit of demand, per year
Data centres	MW	£2,937,500
Domestic	Dwelling	£17,590
Office	m^2	£7,083
Retail	m^2	£2,647
Restaurant	m^2	£2,333
Other	m^2	£2,000
Factory and warehouse	m^2	£1,455
Medical	m^2	£1,375
Hotel	m^2	£1,200
School and college	m^2	£1,111
Sport and leisure	m^2	£692

Source: ONS, Baringa analysis

Step 3: Estimate the gross economic impact from enabled demand growth.

The product of projected demand (Step 1) and economic intensity (Step 2) gives the **gross associated GVA**.

This gross economic impact describes the gross benefits from the availability of a network connection. They are therefore useful for conveying the scale of the network's role in the regional economy but are not presented as additional to what would have taken place in the counterfactual. *See Step 4.*

Step 4: Estimate net economic impact from enabled demand growth.

The net benefit is the difference between the growth accommodated by the ED3 Plan and the growth that could be accommodated in the counterfactual. Following the method set out in Section 4, we allocate the counterfactual's reduced load-related expenditure across GSPs in order of projected constraint severity, establish which GSPs fall outside that reduced budget, and treat new connections in those areas as delayed beyond the ED3 period into ED4 or later.

This benefit is the foregone economic output associated with the demand over the period of delay, adjusted for the following:

- Additionality and displacement: Where a delayed development proceeds later at the same location, only the value over the period of the delay is foregone. Where it relocates within Great Britain, the

national economic loss would be small even though the regional loss is significant.[34] Where it relocates outside Great Britain or does not proceed, the loss is full. The treatment differs by sector: data centres and mobile industrial investment are more likely to be "lost" whereas housing and public infrastructure are more likely to be "delayed".

- Deadweight: A share of projected development would proceed regardless of the connection date, for example by accepting a constrained connection, or by investing in behind-the-meter generation or storage.
- Mitigation through flexibility and connection management: Not all constrained demand is unserved demand. Flexible connection agreements, timed connections, curtailable capacity and demand-side response allow a proportion of projected growth to be accommodated within a constrained network, albeit at a cost to the customer and with reduced operational freedom. An adjustment factor is applied to reflect this.
- Attribution across the network hierarchy: Where the binding constraint is at transmission rather than distribution level, distribution investment cannot unlock the growth on its own, and the benefit is treated as complementary rather than attributable.

The result is a net, additional benefit estimate that is significantly smaller than the gross figure, and that is reported alongside it so that the relationship between the two is transparent.

8.1.3 Estimated benefits for the ED3 Business Plan

Total gross associated GVA compared to 2026 is approximately £23 billion per year higher in 2028, rising to £55.7 billion in 2033, and £91.8 billion in 2050. Table 30 summarises the gross associated GVA arising from new development demand across the SSEN Distribution licence areas, aligned with the Holistic Transition scenario.

Table 30 Gross associated annual GVA from new development demand in SSEN GSPs, by demand category, compared to 2026 (£m per year)

Demand category	2028	2033	2050	Share of total, 2050
Housing and residential development	1,402	6,385	13,793	15%
Commercial development including offices, retail, hospitality and other services	14,104	31,361	51,991	57%
Industry, manufacturing, logistics and ports	2,685	6,951	12,680	14%
Data centres and digital infrastructure	3,685	7,890	8,043	9%
Public services and social infrastructure and other	1,176	3,117	5,294	6%
Total	**23,052**	**55,703**	**91,800**	

Source: SSEN, NESO, Baringa analysis

[34] If all DNOs are investing in line with the counterfactual, then relocation options are limited due to the expectation of widespread constraints. Potential for relocation therefore assumes there are sufficient unconstrained GSPs around the country.

The largest contributor is office development, reflecting the commercial floorspace pipeline in the Thames Valley, West London and the major SEPD urban centres. Overall, the results indicate that network capacity will support a broad base of economic activity, with demand increasingly concentrated in commercial development over time. The data centre benefit is geographically concentrated and highly time-sensitive. It arises almost entirely within SEPD and is the category for which a delayed connection is most likely to mean a permanent loss of investment rather than a deferred one. Its relatively modest share of total GVA understates its strategic significance, because it anchors wider digital-economy activity.

These are gross figures and do not represent the value added solely by the ED3 Plan. The majority of this economic activity would occur in some form in the counterfactual investment profile. The net benefit attributable to the Plan is the difference in the *timing* and *location* of that activity between the Plan and the counterfactual. Furthermore, associated investments by businesses are required to fully capture this GVA: building homes, investing in plant and equipment and training staff etc.

Table 31 below includes the estimated gross GVA associated with new demand connections and additional GVA compared to the counterfactual.

Table 31 Enabling growth — summary of gross and additional

Benefit formulation	Basis	Estimate
Gross	Total GVA associated with new development demand served across both licence areas	£32.7bn per year in 2033, £71.5bn over ED3 period
Additional (vs counterfactual)	GVA associated with demand growth delayed beyond ED3 in GSPs falling outside the counterfactual budget, over the period of delay	£4.9bn per year in 2033, £10.2bn over ED3 period
Private investment unlocked	Capital investment enabled by new and expanded connections during ED3	£12.5bn over the ED3 period

Source: SSEN, NESO, Baringa analysis

8.1.4 "No-growth zones": the geography of foregone growth

In a lower-investment pathway there is potential for the emergence of discrete geographic areas in which the network is effectively closed to new load, "no-growth zones". This can lead to:

- Regional inequality in economic benefits, concentrating the cost of under-investment onto specific communities
- Compounded under-investment, as once an area acquires a reputation for long connection timescales, developers and investors stop enquiring, demand ceases to appear in the connections queue, and the apparent case for investment weakens further

In a constrained spending envelope, load-related expenditure is prioritised towards the most severely constrained GSPs. GSPs that fall below the funding cut-off do not receive the reinforcement required to accommodate projected growth, and new connections in those areas are delayed beyond ED3. In the illustrative Botley Wood example, approximately 33% of the GSP area is projected to experience capacity shortfalls of around 10 MVA over the ED3 period; the GSP ranks 26th of 33 assessed, placing it well outside priorities in a reduced spending case. The consequence is a defined area, spanning parts of Southampton, Eastleigh, Fareham and Winchester, in which new load connections would be materially constrained through ED3 and into ED4.

International and domestic experience demonstrates the emergence of these no-growth zones. In the Netherlands, over 14,000 businesses were awaiting grid connections by late 2025, with parts of the country effectively closed to new industrial and commercial load.[35] In Great Britain, Ofgem has reported that contracted offers in the demand connections queue rose from 41 GW in November 2024 to 125 GW by June 2025, of which 29 GW sits on distribution networks, a volume exceeding even ambitious demand forecasts, and an indication of the latent demand that a constrained network would be unable to serve.[36]

Our modelling indicates that the additional capacity proposed in the ED3 Plan would reduce the risk of such constraints emerging in areas where projected demand growth coincides with forecast network capacity shortfalls. This enables economic benefits from servicing the demand growth, as well the broader economic benefits from activity associated with that demand growth best characterised on a regional level. The table below summarises the potential impact for the Fleet and Farnborough economic corridor, a GSP within SSEN's network area. Without timely ED3 reinforcement, parts of the Fleet GSP would face increasing network constraints during the 2030s, delaying housing delivery, business expansion and electrification.

By releasing around 150 MVA of network capacity, ED3 investment can enable around 10,000 homes, support approximately 6,000 jobs and unlock an estimated £1.2 billion of economic activity across an important growth corridor for the South East.

Table 32 Summary of potential foregone growth in the Fleet GSP area

Topic	Summary
Area	Fleet GSP (focused on Hart, Rushmoor, Farnborough, Fleet and surrounding growth corridor)
Projected constraint under the counterfactual	Several assets are forecast to require intervention during 2030-2034. Delaying ED3 reinforcement therefore risks a period of constrained demand growth across significant parts of the Fleet supply area. The comparison to the counterfactual can be estimated as 100-200 MVA of demand growth deferred during the latter part of ED3 and early ED4.
Demand growth at risk	We estimate 8,000-12,000 homes, 150,000-250,000 m² commercial floorspace, and 50-150 MW of new large-demand connections (data centres, technology facilities, advanced manufacturing, logistics and defence-related facilities) could be delayed beyond ED3.
Economic activity at risk	Applying our UK productivity benchmarks suggests delayed development of this scale could place £0.8bn-£1.8bn GVA at risk over the period of delay
Jobs foregone	4,000-8,000 jobs could be foregone over the ED3 period.
Housing and development impact	There are significant development plans in Bracknell and substantial housing growth requirements across authorities within the Fleet area. Delayed reinforcement would risk slower delivery of housing allocations, commercial developments and EV charging infrastructure.

[35] NedZero, Broad coalition warns: 'A place on the electricity grid waiting list must not become a commodity', accessed 2026

[36] Ofgem acts to free up grid capacity by tackling speculative data centre projects, 2026

What the ED3 Plan delivers instead	ED3 Plan activity creates network capacity for expected demand, so as not to constrain demand growth. It enables new customer connections, supports heat and transport electrification, and reduces the risk of connection delays.
Wider significance	Fleet lies within an important South East economic corridor, with proximity to the M3, Farnborough aerospace cluster, Blackwater Valley growth area, defence establishments, advanced manufacturing, technology businesses and commuter links into Greater London. Reinforcement supports both national decarbonisation objectives and regional economic growth.

Source: SSEN, Baringa analysis

8.2 Supply chain benefits

The ED3 Business Plan is a substantial economic intervention. Delivering it requires engineering and design services, the manufacture of cables, transformers, switchgear and control equipment, civil and construction works, digital systems and infrastructure, and a workforce to maintain and operate the network. Each pound of that expenditure supports economic activity: directly, in the workforce commissioned to deliver the work; indirectly, through purchased goods and services from suppliers; and through induced effects, as the wages earned across that supply chain are spent in the economy.

The £8.7 billion of planned ED3 expenditure, of which approximately 60% is linked to construction and manufacturing, will have a sizable impact on demand for industrial activities that the Modern Industrial Strategy[37] and the Electricity Networks Sector Growth Plan[38] identify as priorities including advanced manufacturing, engineering, construction and digital services.

A clear, credible, multi-year forward pipeline allows suppliers to invest in manufacturing capacity, recruit and train apprentices, standardise products and commit capital with confidence. A pathway that defers investment may dampen the ability for the supply chain to respond once investment spikes at a later period. A "spiky" demand signal for supply chain services leads to lower levels of investment in the near term and therefore limits suppliers' ability to respond to acute demand in the future. This results in extended lead times, price rises and delivery risk increases. Under those conditions, expenditure is more likely to be serviced by imported products, and less likely to translate into national jobs and skills building, because there is insufficient visibility to justify training pipelines that take three to four years to mature.

Greater certainty can support long-term supply chain investment, and the opportunity to increase UK content and build skills, which determines how much of the economic value created is retained domestically in the longer term. This section quantifies the GVA and employment impact of the ED3 Plan, sets out the estimated gross and net impacts against the counterfactual, and addresses UK content and supply chain development, including aspects that are quantifiable but not readily monetised.

8.2.1 GVA and jobs quantification approach

The quantification is implemented through Baringa's UK Input-Output Model (BIOM) and calibrated to SSEN Distribution's Business Plan Financial Model (BPFM) expenditure categories. The method proceeds in six steps, summarised below.

[37] Department for Business and Trade, The UK's Modern Industrial Strategy, 2025
[38] ENA and BEAMA, Electricity Networks Sector Growth Plan, 2026

Table 33 GVA and jobs quantification — methodology steps and outputs

Step	Description	Output
1. Establish the expenditure base	Take planned ED3 Totex by BPFM expenditure category, split by licence area (SHEPD and SEPD), and allocate estimated activity delivered by SSEN's own workforce and that which is procured.	ED3 expenditure by category and licence area, £m
2. Assign expenditure archetypes	Assign each expenditure line to an activity archetypes, each representing a distinct way in which expenditure translates into economic activity, carrying either a fixed split across development/engineering, manufacturing and construction, or a single sector classification where appropriate.	Expenditure disaggregated into design, manufacturing and delivery components
3. Map to economic sectors	Map each archetype component to the UK Input-Output industry classification (SIC) that best characterises the activity.	Expenditure by SIC code, £m
4. Apply input-output coefficients	Apply direct, indirect and induced GVA and employment coefficients from the input-output model to expenditure in each sector.	Gross direct, indirect and induced GVA (£m) and employment (FTE job-years)
5. Allocate regionally	Distribute indirect and induced impacts using the model's regional assumptions; calibrate direct impacts to reflect where ED3 expenditure is geographically focused across the two licence areas.	GVA and employment by UK region
6. Adjust gross to net	Apply Green Book adjustments for deadweight, leakage, displacement and substitution, and net against the counterfactual.	Net GVA and employment attributable to the ED3 Plan

Source: SSEN Distribution, ONS, Baringa analysis

8.2.2 Gross GVA and supply chain estimated impacts

Applying the archetypes and SIC mapping to the £8.7 billion ED3 Plan produces a sectoral distribution of expenditure. Construction is the largest single destination for ED3 expenditure, followed by manufacturing, and then by the electricity transmission and distribution sector itself, the latter reflecting self-delivered operational activity, faults, repair and maintenance.

From the total £8.7bn expenditure planned, close to 84% is projected to be spent on UK goods and services. This is a relatively high UK content figure which is driven by the weighting of expenditure in sectors which have a high proportion of UK content. This assumption also factors in SSE's target to increase UK content in switchgear, transformers and cable by 10% from current levels.

Based on this expenditure, Table 34 sets out the gross GVA and employment impact of the ED3 Plan. Planned expenditure of £8,713 million supports approximately £7,209 million of gross GVA and 100,330 FTE job-years across Great Britain over the ED3 period — an average of approximately 20,066 jobs supported in each year of the price control.

Table 34 Gross GVA and employment supported by ED3 expenditure, by licence area[39],[40]

Measure	SSEN (total)	SEPD	SHEPD
Expenditure (£m)	**8,713**	**5,666**	**3,046**
Total GVA (£m)	**7,209**	**5,078**	**2,132**
— Direct GVA	3,289	2,044	1,245
— Indirect GVA	2,747	2,202	545
— Induced GVA	1,174	832	342
Total jobs (FTE job-years)	**100,330**	**70,703**	**29,627**
— Direct jobs	48,891	31,125	17,766
— Indirect jobs	35,894	28,165	7,729
— Induced jobs	15,545	11,413	4,132
Average jobs per year	**20,066**	**14,141**	**5,925**

Source: SSEN Distribution, ONS, Baringa analysis

The table below disaggregates the impact by the economic sector through which the benefit will be realised.

[39] The implied effects are a Type I GVA multiplier of approximately 0.73 and a Type II multiplier of approximately 0.87 of GVA per pound of expenditure, and 9.8 and 11.7 FTE job-years per £ million of expenditure respectively. These estimates appear conservative relative to comparable published analysis: KPMG's economic impact assessment for SSE for FY25/26 implies Type I and Type II GVA effects of 0.96 and 1.31, and employment effects of 10.7 and 13.7 FTE per £ million. Part of the difference reflects scope, the KPMG assessment covers a broader corporate footprint including SSE's own operations, and part reflects the deliberately cautious treatment of imported manufactured content in the analysis above.

[40] Direct impacts capture employment supported by ED3 planned expenditure across SSE's own operations and the direct procurement of goods and services required to deliver the plan. The FTEs quantified therefore include both SSE employees and employment within its direct supply chain. SSEN Distribution's ED3 Workforce Annex (ED3-S18) projects that SSEN Distribution's own employed workforce will grow to reach almost 7,000 during ED3.

Table 35 Gross GVA by expenditure category and gross employment by sector, SSEN Distribution

Economic sector	Gross GVA (£m)	Gross jobs (FTE job-years)	**Gross jobs (average jobs over ED3)**
Construction	2,701	38,754	7,751
Manufacturing	1,285	15,317	3,063
Architectural, scientific and technical activities	973	20,804	4,161
Electricity transmission and distribution	1,095	7,954	1,591
Business support activities	612	10,321	2,064
Information and communication	543	7,181	1,436
Total	**7,209**	**100,330**	**20,066**

Source: SSEN Distribution, ONS, Baringa analysis

The employment supported by the ED3 Plan is high-skilled and technical: linespersons, jointers, protection engineers, substation fitters, planners, control engineers, data and systems specialists, and the manufacturing and construction trades that supply them.

Table 36 Occupations supported by ED3 Plan by sector

Economic sector (FTE job years supported)	Occupation group	Description of jobs supported
Construction (**38,754**)	**Construction trades & site labour**	Mostly electricians and jointers connecting and terminating cable, other site trades (bricklayers, carpenters) on civils-heavy work, general construction operatives and labourers, with a smaller share of site supervisors and construction managers.
Manufacturing **(15,317)**	**Electrical equipment manufacturing operatives**	Mostly production-line assembly and test roles, with a smaller share of electrical engineers specifying and quality-checking the kit.
	Electronics/computer hardware manufacturing	Assembly and test operatives, alongside electronics engineers and equipment installers/servicers.
	Vehicle/plant manufacturing operatives	Production-line jobs at the vehicle and plant manufacturers supplying SSEN's fleet and small tools.
	Metal fabrication trades	Welders and fabrication-line operatives producing steelwork for civils-driven asset replacement.
Architectural, Scientific and Technical	**Engineering design & project management professionals**	Civil and electrical engineers producing the reinforcement and connection designs, engineering technicians running load studies, and project managers and quantity surveyors programming and costing the works.

(20,804)	**Environmental & compliance professionals**	Environment professionals and compliance staff preparing statutory environmental and regulatory reporting.
	Fleet drivers & vehicle technicians	Drivers moving plant, cable drums and crews between depots and sites, and vehicle technicians servicing the operational fleet.
	Vegetation management / arboriculture trades	Tree surgeons and ground crew clearing vegetation encroaching on overhead lines, both the routine tree-cutting programme and one-off clearance projects.
Electricity transmission and distribution **(7,954)**	**Network operations & field engineering workforce**	Field jointers and linespersons and substation operatives doing planned maintenance and dismantling, engineering technicians carrying out inspections, and network engineers planning outage and switching programmes.
Business Support **(10,321)**	**Corporate business support professionals**	HR, finance and general administrative staff running back-office functions.
	Property & land professionals	Chartered surveyors negotiating land rights and wayleave agreements, and property/estate managers running the non-operational property portfolio.
Information and Communication **(7,181)**	**IT & digital professionals**	Software developers building and configuring control-room and telecoms systems, IT and cyber security professionals hardening and maintaining the network, and IT project managers and business analysts scoping the work.

Source: SSEN Distribution, ONS, Baringa analysis

Given the high-skilled, and in some case shortage, of employees fulfilling these roles, wages will command a wage premium relative to the regional average, particularly in the more rural parts of SHEPD where the alternative employment mix is weighted towards lower-paid sectors. Quantifying that premium provides an indicator of job quality that a headline FTE count does not capture.

Table 37 Occupations supported by ED3 Plan by sector

Economic sector (FTE job years supported)	Occupation group	Employment - weighted average annual wage	Wage premium by occupation group
UK median **annual** wage, **all sectors**	All	£32,900	0
Construction (**38,754**)	Construction trades & site labour	£39,800	+21%
Manufacturing **(15,317)**	Electrical equipment manufacturing operatives	£42,800	+30%
	Electronics/computer hardware manufacturing	£38,500	+17%
	Vehicle/plant manufacturing operatives	£30,900	−6%
	Metal fabrication trades	£38,800	+18%
Architectural, Scientific and Technical **(20,804)**	Engineering design & project management professionals	£50,000	+52%
	Environmental & compliance professionals	£50,700	+54%
	Fleet drivers & vehicle technicians	£35,900	+9%
	Vegetation management / arboriculture trades	£27,300	−17%
Electricity transmission and distribution **(7,954)**	Network operations & field engineering workforce	£49,700	+51%
Business Support **(10,321)**	Corporate business support professionals	£41,100	+25%
	Property & land professionals	£42,800	+30%
Information and Communication **(7,181)**	IT & digital professionals	£56,200	+71%

Source: ONS (2025) Earnings and hours worked, occupation by four-digit SOC: ASHE Table 14.
Note: The UK median wage is used as the benchmark because it provides a more representative measure of typical earnings across the UK workforce than the mean, which can be disproportionately influenced by a relatively small number of high earners. Wage premiums therefore indicate whether the employment supported by ED3 is associated with earnings above or below those of a typical UK employee.

Across the thirteen occupation groups, ED3 expenditure supports a wage premium over the UK all-employee median (£32,900) in eleven of them, supporting an overall employment-weighted premium of approximately 30%.

Jobs supported in construction account for **40%** of FTEs supported by the ED3 Plan, and on average wages in these occupations are **21%** higher than national median wage. This group is primarily driven by electricians and jointers connecting and terminating cable for reinforcement activities, and general construction operatives and labourers on asset replacement and civils-driven work. Whilst there is some variation within this occupation group (managers vs. labourers), overall there is a wage-premia given the high-skills requirements.

Manufacturing, accounting for 15% of total FTEs, can support jobs with wages up to 30% higher than the national median. The +30% figure applies to the electrical equipment supply chain supporting jobs for electricians and fitters. Skills England's August 2025 assessment of priority skills to 2030 names electricians and electrical engineers among the occupations expected to see the fastest growth over the next five years[41], and a November 2025 Apprenticeship Gap Report[42] (DART Tool Group, using DfE, ONS and Reed data) found the electrical trade has the largest shortfall of any UK trade sector, around 9,600 unfilled positions against available apprenticeship supply. Tight supply against rising demand is a standard driver of an above-average wage.

Other occupations that command a wage-premia within the Architectural, scientific and technical activities category, accounting for 21% of FTEs, include engineering professions, surveyors and IT and digital professionals. Engineering design and project management professionals, the civil and electrical engineers, technicians, project managers and quantity surveyors delivering design work, show a premium of 52%. Chartered surveyors and property professionals managing wayleaves and the non-operational property portfolio show a 30% premium. IT and digital professionals, covering software development, cyber security and network roles behind Operational IT & Telecoms and Cyber Resilience, show the highest premium in the Plan at 71%.

Regionally, there may be even higher wage premia across these occupations driven by scarcity of labour supply and lower regional average wages. Skills shortages in trades such as electricians, welders and engineering technicians, already a known constraint across the utilities sector, could widen this further. Industry reporting on distribution network operator workforces has flagged a wave of retirements among craft, technical and engineering staff over the RIIO-2/RIIO-3 period, alongside a persistent shortfall between the number of qualified engineers entering the workforce each year and the number needed. This will likely be more acute in rural or remote areas. CITB's regional skills analysis[43] of the Scottish construction sector specifically identifies the Highlands and Islands, the core of the SHEPD licence area, as one of the two regions (alongside the South East of Scotland) with the sharpest shortfall between labour demand and local supply, a gap CITB attributes partly to the difficulty of designing a workforce strategy for a rural, dispersed geography.

8.2.3 Additionality analysis to quantify net impacts

Moving from gross to net economic impacts requires four adjustments to support compatibility with a Green Book approach:

- Deadweight: the share of GVA/FTE that would have occurred anyway absent SSEN's ED3 expenditure, defined by our counterfactual case.
- Displacement: activity or employment drawn from elsewhere in the target economy (e.g. contractors and labour pulled from other Scottish/southern England infrastructure projects rather than net-new activity)

[41] Skills England, Assessment of priority skills to 2030, published 12 August 2025
[42] DART Tool Group, The Apprenticeship Gap: The UK Skills Crisis – The State of Apprenticeships in 2025
[43] CITB, Local Skills Scotland: 2023 update, July 2023

- Substitution: firms or workers that reclassify or reallocate activity they were already going to undertake as ED3-attributable because ED3 funding now exists as a mechanism to pay for it, without any genuine change in overall resource deployment, output, or headcount.
- Leakage: benefits accruing outside the defined study area which in this case is the UK as a whole.

The table below lays out how this study addresses each of these four components in turn.

Table 38 Additionality analysis approach

Additionality component	Materiality for ED3 impact additionality	Analysis approach
Deadweight	High. In the absence of ED3 Planned expenditure, SSEN deploy a business plan with lower levels of expenditure reflected in the counterfactual.	Quantify the GVA and FTE impacts that would have taken place in the Counterfactual with ED2 levels of expenditure and calculate the difference. *See below*
Displacement	Medium. There are material skills and supply chain shortages relevant to the ED3 supply chain. As such it is likely that there may be some displacement within the supply chain to service ED3 demand for goods and services.	Qualitatively assess the extent to which the ED3 Plan includes measures to mitigate displacement through: • long-term increase in investment certainty • investment in skills and value chain development
Substitution	Not applicable. Given substitution refers to changes in behaviour to benefit from grants or subsidies this is not applicable to ED3 expenditure.	N/A
Leakage	Medium. Leakage in the context of this study refers to the degree to which planned expenditure may be linked to a lower proportion of UK content than assumed in the modelling of GVA and FTE job year impacts.	The quantification of impacts takes into account the share of imports across the economic activity supported by ED3 Planned expenditure. The sensitivity of our analysis to these assumptions is highlighted later in this section.

Source: SSEN Distribution, ONS, Baringa analysis

Deadweight

Table 39 compares ED3 Plan benefits against the counterfactual of a continuation of ED2 levels of expenditure to account for additionality.

Table 39 Supply chain value - gross and net impacts compared with the counterfactual

Measure	ED3 Plan	Counterfactual	Net impact of the Plan
Expenditure (£m)	**8,713**	**6,780**	**1,932**
Gross GVA (£m)	**7,209**	**5,662**	**1,547**
— Direct	3,289	2,598	690
— Indirect	2,747	2,138	609
— Induced	1,174	926	248
Employment supported (FTE job-years)	**100,330**	**78,261**	**22,068**
Average jobs supported per year	**20,066**	**15,652**	**4,414**

Source: SSEN Distribution, ONS, Baringa analysis

The counterfactual figures are derived by estimating and applying ED3 counterfactual GVA and employment ratios to ED2 levels of expenditure. They reflect the different mix of expenditure in the counterfactual: load-related capex accounted for approximately 20% of ED2 expenditure against 30% in the ED3 Plan, so a rollover counterfactual is weighted more heavily towards operational activity and asset replacement, with a correspondingly different sectoral profile. On balance this reduces the counterfactual's construction and manufacturing intensity and therefore its GVA and employment yield per pound, which increases the net benefit shown above.

Displacement

Supply chain investment decisions are made against forward demand visibility, not against current-year revenue. A supplier considering a new UK transformer or switchgear line, a new cable manufacturing facility, or a multi-year apprenticeship intake needs confidence that demand will be there when the capacity comes on stream, typically three to five years later, and beyond the horizon of a single price control.

A counterfactual pathway that defers investment and then attempts to catch up in ED4 and ED5 leads to an outcome where, in the near term, demand is insufficient to justify capacity investment, and existing UK capacity may be lost as manufacturers rationalise. In the later period, demand arrives abruptly (and simultaneously across all GB network operators), at which point capacity is scarce, lead times extend, prices rise, and the shortfall is met disproportionately from imports because domestic capacity cannot be created or ramped up quickly enough. Customers face higher unit costs during the catch-up period, and also face the delivery risk, delay and constraint costs that arise when equipment cannot be procured on the timescales required. Investment in supply chain capacity and in skills does not respond instantaneously to a demand signal. Manufacturing capacity takes years to build and commission, and a competent linesperson or protection engineer takes three to four years to train. A pathway that defers the demand signal may mean an effective delay to delivery capability that is substantially longer than the delay to expenditure.

Standardisation and long-term commitments can enable suppliers to invest. These are efficiencies that flow directly to customers and that a stop-start pathway forfeits. The potential for a stable ED3 investment pipeline to strengthen domestic delivery capability is illustrated by SSEN Distribution's approach to UK supply-chain content, which seeks to balance resilience and wider economic value against achieving competitive costs for customers.

The ED3 Plan supports a larger training and workforce development effort than in ED2. Operational training expenditure, rises from approximately £126 million across ED2 to approximately £177 million in ED3, reflecting both the growth in the operational workforce required to deliver the Plan and a deliberate investment in workforce capability. SSEN's ED3 commitments include an undertaking to:

- Expand training capacity by launching new accelerated competency pathways for critical roles such as LV jointers and protection engineers, each reducing time-to-competence relative to standard routes.
- Recruit and train a defined number of apprentices and skilled operatives by March 2033, with a retention target two years post-qualification. Retention matters as much as recruitment: an apprentice who leaves the sector within two years of qualifying represents a cost incurred without the corresponding capability benefit.
- Build internal delivery capability to a specified level of LV upgrades per year through ED3, which is why a retention commitment alongside a recruitment commitment is the more meaningful measure.

The lower-investment pathway in the counterfactual requires a smaller workforce, supports fewer apprenticeships, and offers less visibility of long-term career progression. As training pipelines take years to build and are quickly lost once broken, the workforce foregone under the counterfactual is not simply deferred, it is substantially harder and more expensive to recreate later.

Leakage

Approximately 16.2% of ED3 expenditure, around £1.4 billion, is estimated to be "leaked" overseas through imported inputs. That leakage is heavily concentrated: manufacturing accounts for £496 million of it, reflecting an import share of 48% of manufacturing inputs, against just 2.5% for construction, and the addressable opportunity is almost entirely in manufactured plant and equipment. This was taken into account in the quantification of UK economic impact in the previous section.

Current UK content share in SSEN Distribution's core equipment categories, while relatively high compared to other DNOs, is approximately 37% for cables, 48% for switchgear and 47% for transformers. Every percentage point by which those shares increase converts leakage into domestic GVA and employment, with an approximate value of £23 million of expenditure retained per percentage point of manufacturing spend reshored. Increasing UK content therefore improves the economic return on the same expenditure.

SSEN ED3 Plan commitments address this by including an undertaking to increase UK manufacturing expenditure across key categories (transformers, switchgear and cable) by 10% by April 2033, compared to ED2 levels, measured against an independently verified procurement register published annually.

The benefits of increased UK content extend beyond the GVA headline impact. Shorter supply chains are more resilient to global disruption and to the lead-time volatility that has affected transformer and switchgear procurement across Europe. They reduce embedded transport emissions and permit more demanding sustainability standards in procurement. They support the "touch the network once" delivery efficiency ambition described earlier in this framework by making equipment availability more predictable. They also align directly with the Electricity Networks Sector Growth Plan, with Ofgem's "Growing GB Supply Chains" call for evidence, and with DESNZ objectives on energy security.

Increasing UK sourcing may carry a unit-cost premium in some categories, so the case to use domestic sources depends on the wider whole-life and social benefits outweighing this additional cost. The justification for accepting such a premium rests on whole-life benefits including resilience, security of delivery, lead-time certainty and the wider economic contribution, rather than on unit cost alone, and requires a cost-assessment process capable of weighing social value alongside price. A sourcing premium can be acceptable where the incremental, additional benefits can be evidenced and are expected to exceed the additional whole-life cost.

This test is most likely to be met for critical or supply-constrained equipment with long replacement lead times and high consequences of delay. For those product categories where the UK is substantially uncompetitive it will remain the most cost-effective route for customers to retain an import procurement route. Demonstrating that this trade-off has been made deliberately and transparently, and that procurement is optimised to balance long-term capacity and skills development against strong cost outcomes for customers, is itself part of the evidence base for the Plan.

8.3 Distribution of benefits across customers

Case Study 4: Supporting local supply chains

Long-term investment visibility and greater use of UK supply chains can strengthen delivery resilience while supporting domestic manufacturing, employment and skills.

Investment: SSEN Distribution proposes to increase UK content in its ED3 equipment and materials procurement, including products manufactured or materially assembled in the UK. This responds to the significant increase in equipment required to deliver ED3 and the associated exposure to constrained global supply chains. SSEN Distribution's evidence indicates that standardisation, credible signalling of multi-year volumes and longer-term supplier commitments can reduce lead times by up to six months and generate cost efficiencies of 5–10%, potentially rising to 15% where commitments enable suppliers to invest in additional capacity.

Value enabled: A more predictable investment pipeline can give manufacturers and contractors greater confidence to invest in UK capacity, workforce and apprenticeships, while reducing exposure to global equipment shortages and delivery delays. Increasing domestic content therefore has the potential to retain additional GVA and employment in Great Britain while improving security of delivery. SSEN Distribution's CBA indicates a positive NPV of up to £40 million by the end of ED3.[44]

The case study illustrates that the supply chain value of the ED3 Plan extends beyond the immediate delivery of network infrastructure. The scale and visibility of long-term investment can help create the conditions for a stronger and more resilient domestic supply chain, meaning that a greater share of the wider economic value associated with the energy transition can be captured within the UK.

The wider-economy benefits assessed in this chapter are also expected to be widely distributed, although their scale and form will differ across sectors and locations. Timely network capacity can enable housing, commercial development, industry, public services and digital infrastructure across the licence areas, with the resulting output, investment and employment supporting customers and communities directly and through wider regional supply chains. Some enabled-growth benefits will be geographically concentrated, particularly in constrained growth corridors and areas hosting large, time-sensitive connections, while the cost of insufficient investment could fall disproportionately on communities that become less attractive to developers or face delays to housing and essential infrastructure. Supply-chain benefits are expected to extend beyond the licence areas through, for example, manufacturing, construction and engineering. The local share will depend on procurement choices, domestic capacity and workforce availability. The Plan should therefore support a broad spread of economic opportunity, while targeted skills, procurement and regional-development measures will be important to ensure that rural areas, lower-growth communities and groups less able to access new employment opportunities can also partake of the benefits.

[44] Drawing on methodology from ENA's economic and supply chain analysis of the Sector Growth Plan.

9 Conclusion

9. Conclusion

We have undertaken an independent assessment of the value of the ED3 Plan

This report provides Baringa's independent assessment of the socio-economic value of SSEN Distribution's ED3 Business Plan for 2028–2033. It identifies how the proposed expenditure supports and enables a range of outcomes for customers, the energy system, the environment and the wider economy, and how much of that value is additional to what would be achieved through a lower-investment pathway.

The assessment has developed and brought together evidence from across the Plan into a coherent account of its anticipated socio-economic impacts. We have analysed the relationship between network expenditure, the capabilities and connections it provides, and the economic and environmental outcomes it enables. By comparing the estimated ED3 Plan outcomes with a continuation of ED2 levels of expenditure our assessment also describes and quantifies the consequences of lower and more reactive investment, including delayed electrification, constrained economic development, reduced reliability and higher future system costs.

Our report provides evidence that can inform scrutiny of the overall needs case and the balance between near-term expenditure and longer-term value. It supports the conclusion that SSEN Distribution's proposed ED3 Plan enables substantial additional benefits relative to the lower-investment counterfactual assessed. This does not imply that every expenditure item is individually justified nor that the Plan is optimal relative to all possible investment pathways. Those judgements are also informed by the engineering, cost-efficiency and project-level evidence considered through the price control process.

The ED3 Plan offers substantial additional benefits for customers, the system and the wider economy

Our assessment identifies approximately £4.4 billion of additional monetised benefits across customer outcomes, system security and efficiency, and the environment. This compares with approximately £11.1 billion of reported gross monetised benefits enabled over ED3. The gross figures convey the overall scale of value enabled and the net figures describe the additional benefits relative to the counterfactual.

The principal sources of additional value are:

- **Customer outcomes**: Approximately £1.15 billion, comprising £508 million from domestic low-carbon technology uptake and £639 million from reduced interruptions and outage duration. Electric vehicles account for most of the quantified household technology energy cost savings, while reliability improvements protect customers from the increasing consequences of interruptions as reliance on electricity grows.
- **System security and efficiency:** £2.05bn, including £1.75bn from well-timed, coordinated investment that keeps costs down for consumers over the long term. Delayed or piecemeal investment leads to duplication and inefficiency, raising overall costs and making customer outcomes less affordable.
- **Decarbonisation**: An additional emissions reduction of approximately 3.97 $MtCO_2e$, valued at around £1.21 billion. This reflects the earlier electrification and greater utilisation of renewable generation that the Plan enables relative to the counterfactual.

The wider economic impacts are also significant. £10.2 billion of GVA over ED3 is associated with development that would otherwise be delayed or lost, within an overall gross estimate of £71.5 billion associated with new development demand served by the ED3 Plan.

Delivery of the Plan itself supports £1.5 billion of GVA (£7.2 billion gross) including SSEN Distribution's own activities and those of its supply chain and around 4,400 additional annual FTE jobs.

These findings show how SSEN Distribution's ED3 Plan enables material additional value for customers, our energy system and the environment relative to the counterfactual of delayed, repeated or reactive investment. This value of the Plan arises from supporting a more reliable and resilient network and enabling electrification and growth. Together, they evidence how the value of the Plan should consider the costs of investment alongside the costs and opportunities that customers and the wider economy may forgo through delay.

Our estimates reflect the Plan as assessed

These estimates depend on the level, composition, location and timing of expenditure proposed at the point of assessment (ED3 Business Plan submission in November 2026). The assessment reflects an ED3 expenditure envelope of approximately £8.7 billion, compared with £6.8 billion in the counterfactual, both in 2025/26 prices. This excludes the impact of any reopeners and uncertainty mechanisms yet to be assessed which would add to the overall socio-economic impact. Different expenditure categories contribute to different benefits and changes to balance or sequencing of activities may therefore alter outcomes even where total expenditure remains similar.

SSEN Distribution's ED3 Plan remains subject to review and change through Ofgem's assessment, draft and final determinations, and the operation of relevant uncertainty mechanisms. Demand forecasts, evolving regional plans and progress of relevant projects, for example at the transmission level, may also affect the programme. The socio-economic impact estimates in this report should consequently be read as an assessment of SSEN Distribution's ED3 Plan and assumptions presented, not as benefits to be realised in any subsequent Ofgem settlement.

Where Ofgem makes changes to SSEN Distribution's ED3 Plan, this will likely alter socio-economic impacts. Ofgem, therefore – in line with its new Growth duty – should incorporate these effects in its assessment of the impact of its interventions.

Realisation of benefits depends on effective delivery and the wider transition

Realising these socio-economic benefits requires SSEN Distribution to turn expenditure into timely, efficient and effective delivery. Its management case is therefore a critical counterpart to the economic assessment. Effective governance, programme sequencing, procurement, workforce and supply-chain capability, risk management and benefits monitoring must support delivery of the required network outputs and operational capabilities. The value identified here does not assess the status of these requirements for delivery.

The benefits also depend on developments beyond SSEN Distribution's control. Network capacity is a necessary but not sufficient condition for households to adopt low-carbon technologies, businesses to invest, or renewable projects to proceed. The scale, location and timing of energy demand will depend on wider policy commitments and their implementation, consumer and business incentives, movements in relative energy prices, technology costs, planning decisions and market developments.

Slower demand growth could reduce or defer benefits and leave capacity under-utilised, and faster growth could increase the value of timely investment and mean that consequences of delay are more costly. Our overall conclusion, while conditional, is that there is strong evidence to support the case that the assessed ED3 Plan enables substantial additional value relative to a lower-investment pathway, provided that it is delivered effectively and is responsive to the evolution of demand and the wider clean energy transition.

Appendix



Appendix 1: Glossary

Term	Description
Additionality	The extent to which an outcome occurs because of an intervention rather than happening anyway. In this report, net benefits are assessed against a counterfactual to identify additionality.
ADMS	**Advanced Distribution Management System**. Digital systems used to monitor, control and optimise operation of an electricity distribution network.
ANM	**Active Network Management**. Automated management of generation and demand to operate within network constraints and make more effective use of existing capacity.
Biodiversity Net Gain (BNG)	An approach to development that seeks to leave biodiversity in a measurably better state than before development.
BIOM	**Baringa Input-Output Model**. Baringa's UK economic model used in this report to estimate GVA and employment impacts from ED3 expenditure.
BM	**Balancing Mechanism**. The mechanism used by NESO to balance electricity supply and demand close to real time.
BPFM	**Business Plan Financial Model**. The financial model and expenditure categorisation supporting SSEN Distribution's ED3 Business Plan.
Build and flex	Ofgem's approach under which networks consider efficient use of existing capacity and flexibility alongside, or before, conventional network reinforcement.
Bulk Supply Point (BSP)	A point on the electricity network where power is transferred, typically from the higher-voltage distribution network to lower-voltage networks.
CBA	**Cost Benefit Analysis**. A structured assessment comparing the costs and benefits of an intervention or investment.
Carbon intensity	Greenhouse-gas emissions per unit of electricity generated or consumed, commonly expressed as gCO_2e/kWh.
Carbon value	A monetary value assigned to greenhouse-gas emissions or emissions reductions for economic appraisal.
CCC	**Climate Change Committee**. The UK's independent statutory adviser on climate change.

CER	**Consumer Energy Resources**. Energy assets located at consumers' premises, such as solar PV, batteries and electric vehicles, that can interact with the electricity system.
CHP	**Combined Heat and Power**. Technology that produces useful heat and electricity from the same energy source.
CI	**Customer Interruptions**. A reliability measure describing the frequency of electricity-supply interruptions experienced by customers.
CIBSE	**Chartered Institution of Building Services Engineers**. Professional body whose energy benchmarks are used in the report.
CML	**Customer Minutes Lost**. A measure of the average duration of electricity-supply interruptions experienced by customers.
Constraint	A physical or operational network limitation, such as thermal, voltage, fault-level or stability limits, that prevents electricity flowing as it otherwise would.
Counterfactual	The alternative case against which an intervention is assessed. The report's principal**"as-is" counterfactual** assumes broadly a continuation of ED2 expenditure levels into ED3 with more limited and reactive investment.
CRID	**Cyber Resilience Investment Document**. Documentation supporting and justifying proposed cyber-resilience investment under the price-control framework.
Curtailment	A reduction in electricity generation, particularly renewable output, because it cannot be accommodated or used by the system at that time.
Deadweight	Economic activity or benefits that would have occurred without the intervention and should therefore not be attributed to it.
Decarbonisation	The process of reducing greenhouse-gas emissions, including through renewable generation, energy efficiency and switching from fossil fuels to low-carbon electricity.
DER	**Distributed Energy Resources**. Smaller-scale generation, storage, flexible demand and other energy resources connected to distribution networks.
DESNZ	**Department for Energy Security and Net Zero**. UK government department responsible for energy and net-zero policy.
DFES	**Distribution Future Energy Scenarios**. Localised projections of future energy demand, generation and technology uptake used for distribution-network planning.

Digitalisation	Increased use of monitoring, communications, data, analytics and automation to operate and plan the electricity network.
Displacement	The extent to which economic activity generated by an intervention replaces activity elsewhere rather than constituting additional activity overall.
DNO	**Distribution Network Operator**. A company licensed to operate a regional electricity distribution network in Great Britain. SSEN Distribution operates the SHEPD and SEPD networks.
DJP	**Digital Justification Paper**. Supporting evidence used to justify proposed digital investment within the ED3 Business Plan.
Do-minimum	The minimum credible intervention required to maintain essential services, comply with obligations or address unavoidable needs.
DSO	**Distribution System Operator**. The functions through which a distribution network actively manages generation, demand, storage and flexibility as the electricity system becomes more decentralised.
Dynamic efficiency	Economic efficiency considered over time, including whether spending now avoids greater costs or lost benefits in future.
ED2	The electricity distribution price-control period preceding ED3, running from **1 April 2023 to 31 March 2028**.
ED3	The electricity distribution price-control period from **1 April 2028 to 31 March 2033**, for which Ofgem will set DNO funding, outputs and incentives.
ED4	The electricity distribution price-control period expected to follow ED3.
EJP	**Engineering Justification Paper**. Evidence explaining the engineering need, options and justification for proposed network expenditure.
ENA	**Energy Networks Association**. Industry body representing UK electricity network operators.
EPC	**Energy Performance Certificate**. A rating of a building's energy efficiency.
ETR 138	Engineering guidance used by electricity networks to assess and manage flood risk to substations.
EV	**Electric Vehicle**. A vehicle powered partly or wholly by electricity; in the report the term principally refers to battery-electric vehicles.

FES	**Future Energy Scenarios**. NESO scenarios describing alternative pathways for the future development of Great Britain's energy system.
Flexibility	The ability of electricity generation, demand or storage to change its behaviour in response to network or system needs.
FTE	**Full-Time Equivalent**. A measure used to express employment on a consistent full-time basis.
FTE job-year	Employment equivalent to one full-time job sustained for one year.
GHG	**Greenhouse Gas**. Gases that contribute to climate change, commonly reported in carbon-dioxide-equivalent terms.
GSP	**Grid Supply Point**. A point at which electricity is transferred from the transmission system into a distribution network.
GVA	**Gross Value Added**. A measure of economic output representing the value generated by economic activity after subtracting intermediate inputs.
GW	**Gigawatt**. A unit of power equal to one billion watts.
GWh	**Gigawatt-hour**. A unit of energy equal to one million kilowatt-hours.
Headroom	Spare network capacity available before an asset or network limit is reached.
HGV	**Heavy Goods Vehicle**. A large goods vehicle; the report considers HGV electrification as part of non-domestic transport electrification.
Holistic Transition	A NESO Future Energy Scenario used as the principal energy-transition pathway underpinning the report's quantified analysis.
HMT	**HM Treasury**. The UK government department responsible for public finance and economic policy and publisher of the Green Book.
Hosting capacity	The amount of additional generation, demand or other connections a network can accommodate within its operational limits.
HV	**High Voltage**. In distribution networks, electricity-network infrastructure operating at higher distribution voltages than the LV network.
ICE	**Internal Combustion Engine**. A conventional petrol- or diesel-powered engine, used as the comparator for EV benefits in the report.
IDP	**Investment Decision Pack**. SSEN Distribution documentation supporting decisions on individual projects or investments.

IIS	**Interruptions Incentive Scheme**. Ofgem incentive mechanism encouraging DNOs to improve the frequency and duration of customer interruptions.
Indirect impact	Economic activity supported through suppliers to organisations directly delivering an investment or programme.
Induced impact	Economic activity generated when employees whose jobs are supported directly or indirectly spend their earnings elsewhere in the economy.
Input-output model	An economic model representing relationships between industries and used to estimate direct, indirect and induced economic effects of spending.
kV	**Kilovolt**. One thousand volts, a unit used to describe electricity-network voltage.
kW / kWp	**Kilowatt / kilowatt-peak**. kW measures power; kWp describes the rated peak output of solar photovoltaic capacity.
kWh	**Kilowatt-hour**. A unit of energy equivalent to one kilowatt of power used for one hour.
LA	**Local Authority**. A local government administrative area used in the report for spatial demand analysis.
LCT	**Low-Carbon Technology**. Technologies such as EVs, heat pumps and solar PV that reduce or enable reductions in greenhouse-gas emissions.
Leakage	Economic benefits that accrue outside the defined study area. In the supply-chain analysis this mainly concerns expenditure on imported goods and services.
LGV	**Light Goods Vehicle**. A light commercial vehicle, such as a van.
Licence area	The geographical area within which a DNO is licensed to operate its electricity distribution network.
Load	Electricity demand placed on the network.
Load-related expenditure	Network investment driven principally by changes in electricity demand or generation requiring additional network capacity.
LPG	**Liquefied Petroleum Gas**. A fossil fuel used for applications including heating, particularly in properties not connected to the gas grid.
LV	**Low Voltage**. The lower-voltage part of the distribution network serving homes and many businesses.

Marginal emissions factor	The emissions associated with the marginal generation that increases or decreases when electricity demand or renewable output changes.
Managed connection	A connection whose import or export is actively limited or controlled to keep the network within operating limits.
$MtCO_2e$	**Million tonnes of carbon dioxide equivalent**. A standard measure that expresses different greenhouse gases on a consistent climate-impact basis.
MVA	**Megavolt-ampere**. A measure of apparent electrical power and a common measure of network equipment and connection capacity.
MVAr	**Megavolt-ampere reactive**. A measure of reactive power used in voltage management.
MW	**Megawatt**. A unit of power equal to one million watts.
MWh	**Megawatt-hour**. A unit of energy equal to one thousand kilowatt-hours.
N-1 / N-2	Network security criteria describing the ability to maintain supply following failure of one, or respectively two, significant network components.
NARM	**Network Asset Risk Metric**. Ofgem methodology used to quantify network-asset risk and the consumer benefits of asset-management interventions.
Natural Asset Platform	SSEN Distribution's platform for establishing and monitoring biodiversity and habitat baselines around network assets.
Natural capital	The stock of natural assets, such as habitats, land and ecosystems, that provides benefits or ecosystem services to society.
NESO	**National Energy System Operator**. The independent organisation responsible for strategic energy-system planning and operation of Great Britain's electricity system.
Net-zero	A state in which greenhouse-gas emissions released into the atmosphere are balanced by removals, after emissions have been reduced as far as practicable.
Network reinforcement	Investment that strengthens or increases the capability or capacity of an electricity network.
Non-firm connection	A connection under which a customer's import or export may be constrained under specified network conditions.

Non-load-related expenditure	Investment principally required to maintain or improve existing assets, safety, reliability, resilience or operational capability rather than accommodate new load.
Ofgem	**Office of Gas and Electricity Markets**. The independent regulator of Great Britain's gas and electricity markets and networks.
ONS	**Office for National Statistics**. The UK's national statistical institute.
Opportunity cost	The value of the best alternative foregone by choosing an action, including benefits lost or extra future costs created by delaying investment.
Option value / optionality	The value of preserving flexibility to respond to uncertainty rather than committing irreversibly to a particular investment path too early.
PSR	**Priority Services Register**. A register of energy customers who may require additional support because of particular circumstances or vulnerabilities.
PV	Depending on context, **Present Value** in economic appraisal or **Photovoltaic** in "solar PV".
Reactive power	Electrical power required to maintain voltage and support operation of alternating-current networks.
Redispatch	Changing the output of electricity generation or flexible resources from the market schedule to maintain system security or manage constraints.
Reinforcement	Works undertaken to increase network capacity, capability, reliability or security.
RESP	**Regional Energy Strategic Plan**. The regional strategic energy-planning framework intended to coordinate the development of local energy systems and network requirements.
RIIO-T3 / T3	The third RIIO price-control period for electricity transmission networks.
Scope 1 emissions	Direct greenhouse-gas emissions from sources owned or controlled by an organisation.
Scope 2 emissions	Indirect emissions associated with electricity or other purchased energy consumed by an organisation.
Scope 3 emissions	Other indirect emissions arising across an organisation's value chain.

SDP	**Strategic Development Plan**. SSEN Distribution planning analysis identifying future network needs and potential interventions across geographic areas.
SEG	**Smart Export Guarantee**. Arrangements under which eligible small-scale low-carbon generators can receive payment for electricity exported to the grid.
SEPD	**Southern Electric Power Distribution**. SSEN Distribution's electricity distribution licence area covering central southern England.
SHEPD	**Scottish Hydro Electric Power Distribution**. SSEN Distribution's electricity distribution licence area covering the north of Scotland and Scottish islands.
SIC	**Standard Industrial Classification**. The UK classification system used to group businesses and economic activities by industry.
Social time preference rate (STPR)	The discount rate used in Green Book appraisal to reflect society's preference for benefits sooner rather than later. The report applies **3% in real terms**.
Social value	Wider social, economic and environmental outcomes associated with an intervention beyond its immediate financial effects.
Solar microgeneration	Small-scale solar electricity generation, principally rooftop solar PV connected at customer premises.
Spatial planning	Planning that considers the geographic location of future demand, generation, network constraints and investment requirements.
SSEN Distribution	**Scottish and Southern Electricity Networks Distribution**. The electricity distribution business operating the SHEPD and SEPD licence areas.
Stranded asset	An asset whose utilisation or economic value is materially lower than anticipated, for example because demand develops more slowly than expected.
Substitution	In additionality analysis, the replacement or relabelling of existing activity as intervention-supported activity without a genuine increase in output or resources.
Supply-chain multiplier	A coefficient estimating the additional indirect or induced economic activity resulting from direct expenditure.
System operation	Actions required to balance and securely operate the electricity system, including balancing, reserve, constraint and voltage management.

Technical losses	Electrical energy lost physically as electricity flows through network equipment, principally through resistance and transformer losses.
Totex	**Total expenditure**. Combined capital and operating expenditure considered within Ofgem's regulatory framework.
tCO_2e	**Tonnes of carbon dioxide equivalent**. A standard measure for combining the climate impact of different greenhouse gases.
TWh	**Terawatt-hour**. A unit of energy equal to one billion kilowatt-hours.
tRESP	**Transitional Regional Energy Strategic Plan**. The transitional arrangements preceding the full RESP framework and used to support place-based planning for ED3.
Type I multiplier	An input-output multiplier capturing **direct and indirect** economic impacts.
Type II multiplier	An input-output multiplier capturing **direct, indirect and induced** economic impacts.
UK ETS	**UK Emissions Trading Scheme**. The UK carbon-pricing system covering emissions from specified energy-intensive sectors.
Uncertainty mechanism	A price-control mechanism that allows expenditure or revenues to adjust where specified uncertain needs or costs become clearer after the main determination.
Unlooping	Works to separate properties that share part of an electricity service cable, often undertaken to facilitate higher loads such as EV chargers and heat pumps.
Value of Lost Load (VoLL)	An estimate of the economic or welfare value customers place on electricity supply that is not delivered during an interruption.
Value for money	Assessment of whether the benefits of an intervention justify its costs, considering additionality and relevant economic, social and environmental impacts.
Vehicle-to-grid (V2G)	Technology allowing an EV battery to export electricity to the grid as well as charge from it.
Voltage management	Active control of network voltage to maintain standards, improve power quality and potentially reduce losses or system costs.
Whole-economy impact	Economic effects extending beyond the immediate organisation or project, including output, employment and supply-chain effects.

Whole-life cost	Total cost over an asset or intervention's life, rather than only its initial capital cost.
Whole-system cost	Costs across the electricity or wider energy system as a whole, rather than only those incurred by the distribution network.
Willingness-to-pay (WTP)	An economic valuation measure estimating how much customers would be willing to pay for an improvement, such as improved network reliability.

Appendix 2: Supply chain benefits methodology

Our supply chain benefits quantification leverages Baringa's Input-Output Model (BIOM) to estimate the Gross Value Added (GVA) and employment supported by the expenditure associated with the Plan. BIOM combines planned TOTEX data with the ONS UK Input-Output Analytical Tables (IOATs), which describe the relationships between industries in the UK economy, including the goods and services that each sector purchases from other sectors to produce its output. The model therefore traces expenditure through the UK economy to estimate three channels of impact:

- **Direct impacts** are the GVA and employment generated by UK businesses delivering the goods and services demanded by the Plan expenditure.
- **Indirect impacts** are generated in the UK supply chains of those businesses as they purchase intermediate goods and services from other UK businesses. These represent the wider supply-chain or Type I effects associated with the initial expenditure.
- **Induced impacts** arise when employees supported through the direct and indirect activity spend a proportion of their earnings on goods and services elsewhere in the UK economy. These represent the additional household-consumption effects captured within Type II impacts.

Results are expressed as GVA and total full-time-equivalent (FTE) job-years. The later is also reported as average annual FTE jobs supported, computed by dividing the total number of FTE job-years supported by the 5 years the Plan encompasses. The following note sets out in detail how we have processed Plan expenditure data as an input into BIOM.

Step 1. Expenditure profiling

We start from planned ED3 TOTEX using BPFM categories used in the Business Plan, split by SEPD and SHEPD profiles. We subsequently map BPFM expenditure lines into UK economic activity sectors (UK Standard Industrial Classification (SIC) code) to use this as an input into BIOM which runs from coefficients that are SIC code specific. To do this we tag BPFM lines against archetypes that carry a split across development and engineering, manufacturing and construction activities which subsequently map onto a specific SIC codes depending on the BPFM line.

Step 2. UK Content assumptions

The modelling distinguishes between total expenditure and the proportion that represents demand for UK-produced goods and services. This is important because expenditure on imported equipment, materials or services does not generate an equivalent direct economic impact within the UK.

1. Identify activity undertaken outside the UK. Expenditure associated with overseas suppliers delivering goods or services outside the UK is excluded from the UK expenditure base.
2. Adjust for specialised imports within UK contracts. A contract with a UK entity is not assumed automatically to represent 100% UK economic activity. Where evidence indicates that significant equipment, materials or specialist services are imported, their value is removed from the UK-content estimate.
3. Account for imports through the Input-Output framework. The remaining UK expenditure is modelled using the ONS Input-Output coefficients, which incorporate industry-average relationships between domestic production, intermediate inputs and imports.

This prevents the analysis from treating the contractual location of the first-tier supplier as equivalent to UK content and reduces the risk of overstating domestic economic impacts.

Step 3. Estimate direct economic impacts

Once expenditure has been mapped to the appropriate economic sectors and adjusted for UK content, BIOM estimates the direct GVA associated with that expenditure. GVA represents the economic value generated through production, broadly comprising compensation of employees and operating surplus once intermediate consumption has been removed.

Employment impacts are estimated alongside GVA and computed as **FTE job-years**. One FTE job-year represents one full-time-equivalent job supported for one year. For reporting purposes, total job-years are subsequently be divided across the Plan delivery period to provide an indication of average annual full-time employment supported.

Step 4: Indirect supply-chain impacts

The Input-Output framework is then used to estimate how the initial expenditure propagates through further UK supply chains. Businesses directly supplying the programme require intermediate inputs from other industries. Construction contractors purchase materials, equipment, transport and professional services; manufacturers purchase metals, components, energy and other inputs; and engineering firms purchase business, digital and technical services.

BIOM uses the inter-industry purchasing relationships contained in the ONS IOATs to trace these transactions across successive tiers of the domestic supply chain. The resulting **indirect impact** captures the additional GVA and employment supported by this demand for UK goods and services. In technical terms, this corresponds to the Type I Multipliers.

Step 5: Induced impacts

BIOM also estimates induced impacts associated with household expenditure supported.

The direct and indirect economic activity generates employee compensation. A proportion of those earnings is spent by households on UK goods and services such as housing, retail, transport, hospitality and recreation. That expenditure therefore generates further output, GVA and employment across the economy. These effects are captured by the Type II Multipliers derived in BIOM.

Total impact = Direct impact + Indirect impact + Induced impact

Interpretation and limitations

Input-Output analysis provides a consistent framework for estimating how expenditure can support economic activity across interconnected UK supply chains. However, the results should be interpreted as the level of activity supported by the anticipated expenditure, rather than a forecast that a specific number of identifiable UK workers will be employed. The model assumes that the economy can supply the additional demand (goods and workers) according to the production relationships represented in the Input-Output tables. Actual impacts will therefore depend on factors including domestic supply-chain capacity, skills availability, procurement decisions and the extent to which UK suppliers can respond to demand.

Input-Output coefficients represent average relationships across economic sectors and will not capture every project-specific procurement decision. Our modelling includes bespoke UK content assumptions and SSEN's commitment to increase UK content by 10% across key manufactured components. However, the realised impact will depend on the availability and final procurement decision for these components.

The socio-economic value of SSEN Distribution's ED3 Business Plan

November 2026

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