RIIO-ED2 Engineering Justification Paper (EJP)

Ashton Park 33kV Circuits

Investment Reference No: 54/SEPD/LRE/ASHP

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1 Executive Summary

Our proposed investment at Ashton Park 33/11kV primary substation in the SEPD licence area will deliver P2/7 compliance for investment of £2.628m during RIIO-ED2.

The primary investment driver for this scheme is load related P2/7 compliance issue for 33kV supply to Ashton Park primary substation. The P2/7 compliance issue is apparent under four scenarios (System Transformation, Consumer Transformation, Leading the way, and Steady Progression) for investment in ED2 due to forecast demand growth from our Stakeholder supported Distribution Future Energy Scenario (DFES). The 2019/20 peak demand at Ashton Park primary substation was 21.6MW and the existing network assets have limited headroom for demand growth before 2023/24.

This project is required under our accelerating progress towards net zero priority, as the primary substation has approx. 22% of uptake in low carbon technologies (LCT), such as heat pumps and EVs. This will significantly impact our ability to meet the minimum level of security of supply to consumers, as we move towards a Net Zero network in RIIO-ED2.

The EJP considers an exhaustive range of options to address the P2/7 compliance issue, setting out the options that have been considered and rejected prior to the CBA analysis, and the short list of those options included within the analysis, with a clear rationale for including or excluding each option. We also considered the Local Area Energy Plans through our stakeholder engagement activities in the option analysis.

The Cost Benefit Analysis results shown in Table 1 below demonstrate that the most cost-effective solution, that delivers the best value for consumers in terms of the 45 years Net Present Value (£m), is option 4 'Flexible solution followed by reinforcement of existing assets'. The reinforcement in this preferred option involves uprating the existing 33kV OHL and cable sections from Norrington 132/33kV BSP to Ashton Park primary substation. Flexible solution is utilised to defer the reinforcement from 2023/24 to 2025/26 in accordance with our deliverability requirements.

Options	Net Present Value (NPV) After 45 Years (£k)	Investment (£k)
Option 2– Reinforcement of Existing Assets	-1,776	2,521.0
Option 3 – Reinforcement by Network Extension	-2,547	3,823.8
Option 4 – Flexible Solution followed by Reinforcement of Existing Assets	-1,753	2,628.2

Table 1: CBA and investment cost of viable options

Following the optioneering and detailed analysis, as set out in this paper, the proposed scope of works and cost breakdown for Option 2 are detailed in Table 2:

Assets & Services	Volume	Costs (£k)
33kV UG Cable (Non-Pressurised) (km)	4.79	[redacted]
33kV OHL (Pole Line) Conductor (km)	16.18	[redacted]
33 kV OHL Pole (no.)	23	[redacted]
HDD River Crossing (no.)	1	[redacted]
Agricultural Compensation (no.)	1	[redacted]
Flexibility Solution (years)	2	107.0
Total		**2,628**

Table 2: Proposed scope of works and cost breakdown of the preferred option

This scheme delivers the following outputs and benefits:

- Facilitates 33kV supply to Ashton Park primary substation to be compliance with P2/7.
- Uplifts additional network capacity of approx. 6.5MVA to meet the needs of our customers.
- Facilitates the continued uptake of low carbon technology (LCT) within Ashton Park Road Primary and helps support the climate change targets of Wiltshire Council.
- Facilitates the efficient, economic, and co-ordinated development of our Distribution Network for Net Zero.

The cost to deliver the preferred solution is £2.628m including availability and utilisation cost of £0.107m for flexible generation and £2.438m for reinforcement of existing assets. The reinforcement works are planned to be completed in 2026. This EJP investment sits within our Net Zero Totex ask shown in Figure 1.

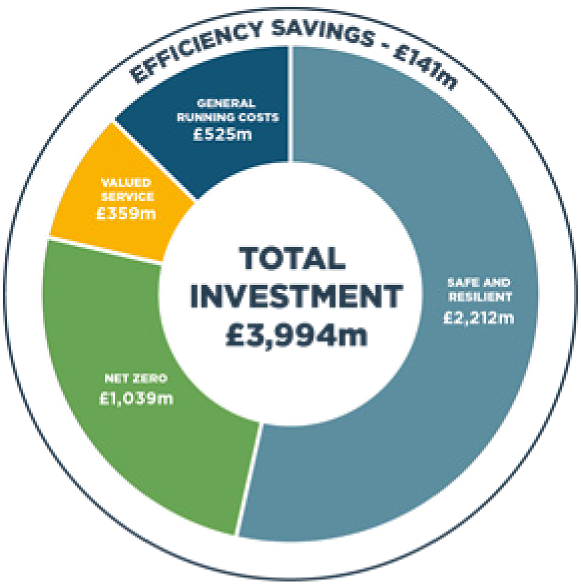


Figure 1: SSEN total investment cost within RIIO ED2

2 Investment Summary Table

Table 3 below provides a high-level summary of this Engineering Justification Paper (EJP) and the Cost and Volume (CV) impacts within our Business Plan Data Templates.

<table>
<tr><td>Name of Scheme</td><td colspan="3">Ashton Park 33kV Circuits</td></tr>
<tr><td>Primary Investment Driver</td><td colspan="3">Load – P2/7 Compliance (Demand Driven Security of Supply)</td></tr>
<tr><td>Scheme Reference</td><td colspan="3">54/SEPD/LRE/ASHP</td></tr>
<tr><td>Output References/Type</td><td colspan="3">33kV UG Cable (Non-Pressurised)
33kV OHL Pole
33kV OHL (Pole Line) Conductor
HDD – River Crossing
Agricultural Compensation
Flexibility</td></tr>
<tr><td>Cost</td><td colspan="3">£2.628m</td></tr>
<tr><td>Delivery Year</td><td colspan="3">2025/26</td></tr>
<tr><td>Reporting Table</td><td colspan="3">CV1: Primary Reinforcement</td></tr>
<tr><td>Outputs included in RIIO-ED1 Business Plan</td><td colspan="3">No</td></tr>
<tr><td rowspan="2">Spend Apportionment</td><td>ED1</td><td>ED2</td><td>ED3+</td></tr>
<tr><td>0</td><td>£2.628m</td><td>0</td></tr>
</table>

Table 3: Investment Summary

3 Introduction

Our ***Load Related Plan Build and Strategy (Annex 10.1)***[1] sets out our methodology for assessing load-related expenditure and describes how we use the Distribution Future Energy Scenarios (DFES) 2020 as the basis for our proposals. We have established a baseline view of demand, providing a robust projection of the drivers of load-related expenditure for the ED2 period. Our ex-ante baseline funding request is based on the minimum investment required under all credible scenarios and is strongly supported by our stakeholders. Our plan will create smart, flexible, local energy networks that facilitate the accelerated progress towards net zero – with an increased focus on collaboration and whole-systems approaches.

This investment is a component of our strategic goal of 'Accelerating progress towards a net zero world'.

Section 4 of this Engineering Justification Paper (EJP) describes our proposed load related investment plan for the reinforcement of supply to Ashton Park Primary Substation in RIIO-ED2. The primary driver considered within this paper is load related P2/7 compliance issue at Ashton Park primary substation due to forecast demand growth from our Stakeholder supported Distribution Future Energy Scenario (DFES).

[1] ***SECTION D: (Chapter 10), Responding to the net zero Opportunity, (Annex 10.1), Load Related Plan Build and Strategy***

This EJP provides high-level background information for this proposed scheme explaining the existing network arranges, the load growth forecasts through the Distribution Future Energy Scenarios (DFES) and setting out the need for this project. The Detailed Analysis section of the EJP describes the network studies undertaken, detailing the results which further justify the need of the proposed investment.

Section 5 provides an exhaustive list of the options considered through the optioneering process to establish the most economic and efficient solution. Each option is described in detail, with the EJP setting out the justification for those options which are deemed unviable solutions, and therefore not taken forward to the Cost Benefit Analysis.

Section 6, Cost Benefit Analysis (CBA) Summary, provides the comparative results of all the options considered within the CBA and sets out the rationale and justification for the preferred solution. This section also describes how we have established the cost efficiency of the plan with reference to the unit costs that have been chosen.

Finally, **Section 7** of this EJP also sets out the deliverability of the plan for RIIO-ED2 and this proposed investment.

4 Background Information and Analysis

Ashton Park Primary is located within the Wiltshire region of the SEPD licence area on the East side of Trowbridge. The substation is supplied from Norrington BSP and currently supplies 13570 customers via the 11kV network. The 2019/20 peak demand was 21.6MVA and there is currently 4MW of generation connected.

4.1 Existing Network Arrangements

Ashton Park 33/11kV primary substation is currently fed by 2 no. 33kV circuits from Norrington - Trowbridge 33kV network. Staverton Dairy 33/11kV primary substation and several solar generation sites are also connected into the same network. The two 33/11kV transformers at Ashton Park primary substation are rated at 30MVA with the incoming 33kV circuits having a winter rating of 30.6MVA.

The demand forecast and detailed network analysis (in Section 4.3) for Ashton Park Primary shows that under the DFES CT scenario, with a First Circuit Outage (FCO) condition in winter, the existing 33kV circuit will be overloaded in 2024 and the transformers will be overloaded in 2028 therefore, not in compliance with Engineering Recommendation P2/7 in 2024.

This scenario modelling confirms the certainty of this investment in RIIO-ED2. The existing 33KV circuit will also be overloaded in LW and ST scenario within ED2 period, however, the primary transformers will be overloaded only in CT and LW scenario at the end of ED2 period. Therefore, the need for transformer reinforcement is considered as uncertainty and would not be included in our baseline investment.

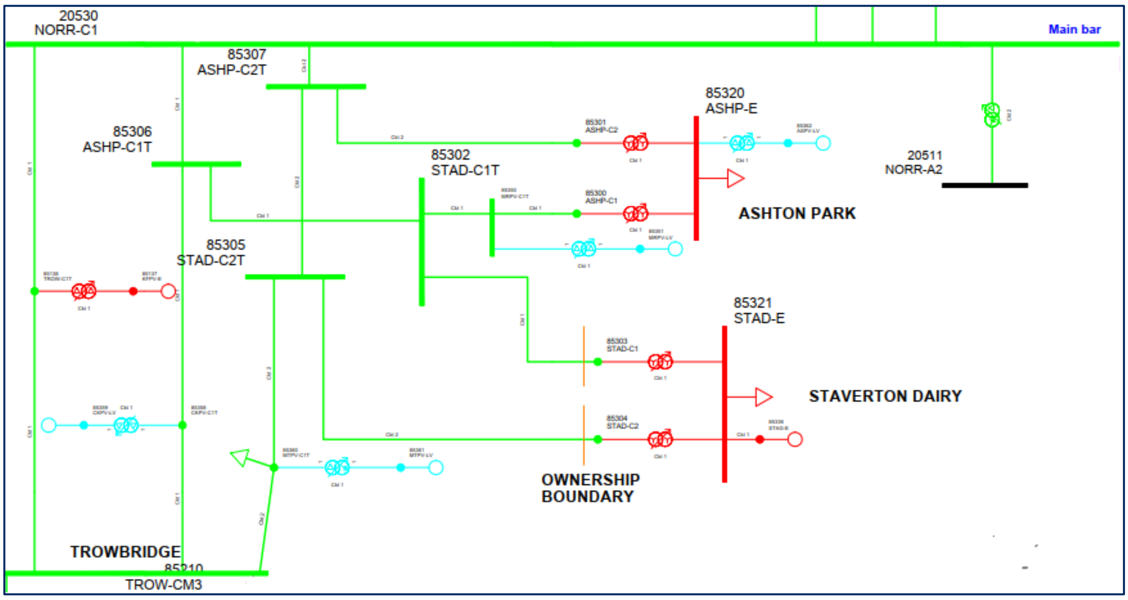


Figure 2: Ashton Park 33kV Network Arrangement SLD

Figure 3: Ashton Park Primary Substation

4.2 Local Energy Plan

In November 2019, Wiltshire Council declared a climate emergency with the aim to become carbon neutral by 2030 and setting up a Global Warming & Climate Emergency Task Group. The first report from the task group has been completed and a summary of key points and the council executive's responses are below.

1. The council aims to commission an energy and heat study to establish an evidence base which will enable the development of robust planning policies, a delivery plan for the new ***Climate Resilience Strategy***

(Annex 7.3). This will look at the return on investment of utilising the council own assets for renewable energy generation compared to existing investments.

2. Pro-actively engages with Wiltshire's community energy groups to explore the following, including, but not limited to:
   a. Preparing a Community Energy Strategy for Wiltshire;
   b. Putting a Community Energy Agreement in place that outlines how Wiltshire Council will support community energy groups and provides the confidence these groups need to raise funding and develop projects;
   c. Supporting Community Energy projects by helping to de-risk and finance them via appropriate funding mechanisms, potentially including contingent loans;
   d. The delivery of Community Energy projects on non-allocated council land, including, in particular, council farms;
   e. Supporting Community Energy groups to install solar PV panels on Wiltshire schools;
   f. Supporting Community Energy groups in integrating EV charging with local renewable energy generation.
3. Investment in vehicle charging infrastructure to enable the switch to EV and to demonstrate leadership in the transition to zero-carbon transport. This will be achieved through increased parking and charging capacity for electric vehicle in council car parks and undertaking a study to identify suitable sites for investment to facilitate the installation of EV charging infrastructure.

Wiltshire Council's climate strategy, especially the investment on charging infrastructure, is expected to have a significant impact on demand growth within the area. This impacts visible within the SEPD DFES projections and directly contributes to the need for investment discussed within this paper.

4.3 Demand Forecast

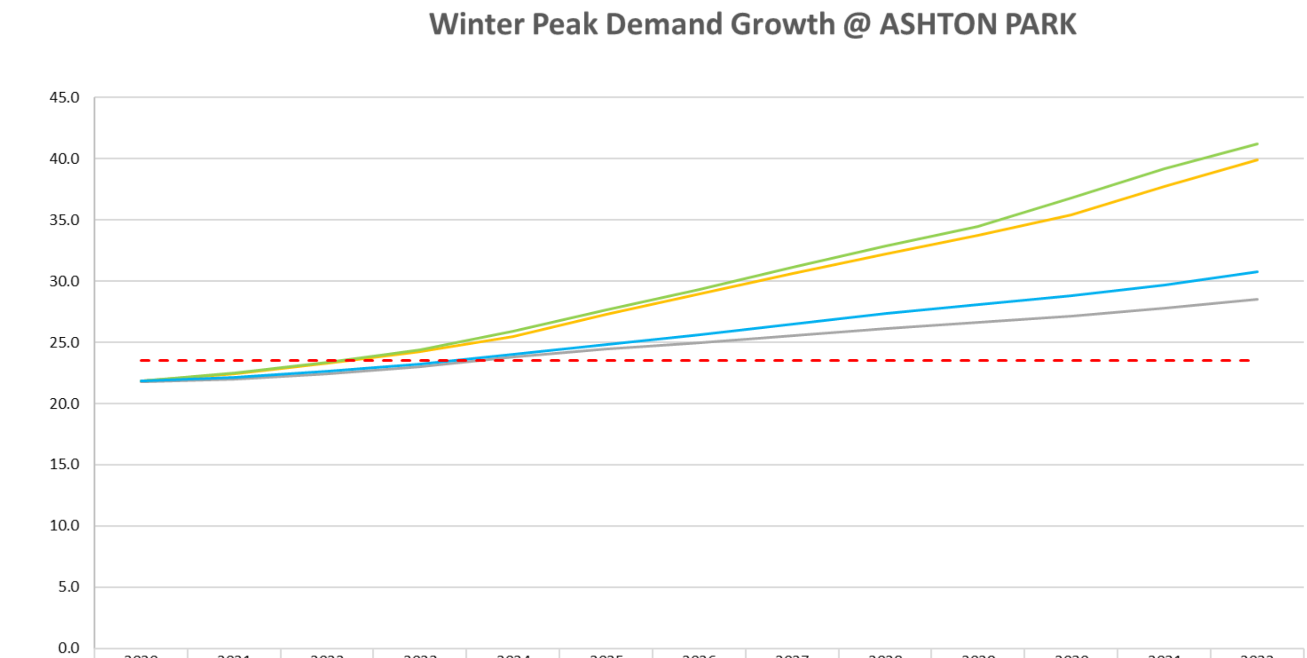
We have carried out extensive scenario studies – the Distribution Future Energy Scenarios (DFES). The basis for this work is National Grid's Future Energy Scenarios (FES) 2020. This framework comprises four potential pathways for the future of energy based on how much energy may be needed and where it might come from. The variables for the four scenarios are driven by government policy, economics and consumer attitudes related to the speed of decarbonisation and the level of decentralisation of the energy industry. We have worked closely with our partner Regen to develop the forecasts between 2020 and 2050 through enhanced engagement with the local authorities, local enterprise partnerships (LEPs), devolved governments, community energy groups and other stakeholders.

Based on the enhanced stakeholder engagement feedback, we have chosen Consumer Transformation as the baseline scenario for our investment. We are protecting customers from the impact of forecasting uncertainties through our baseline funding only including load related investment required in the first two years in the RIIO-ED2 period, unless it is also required by other net zero scenarios. Full details on our DFES methodology, stakeholder input and regulatory treatments of load related investment can be found in the ***Load related Plan Build and Strategy (Annex 10.1)***[2].

Figure 4 below shows the demand projections and the first circuit outage (FCO) limit for this substation for all FES scenarios for winter. In this case, the FCO limit is exceeded under the System Transformation (ST – by 2024/25), Steady Progression (SP-by 2024/25), Consumer Transformation (CT – by 2023/24) and Leading the Way (LW – by 2023/24) scenarios during ED2. This scenario modelling confirms the certainty of this investment in RIIO-ED2.

[2] Link to ***Load Related Plan Build and Strategy, (Annex 10.1)***

Network interventions are required to address this issue as not doing anything would result in a licence condition breach, hindering the LCT deployment and potentially a wide-spread blackout in the areas supplied by Ashton Park.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
SP	21.8	22.0	22.4	23.0	23.8	24.5	25.0	25.6	26.1	26.6	27.2	27.8	28.5
CT	21.9	22.4	23.3	24.2	25.5	27.3	29.0	30.6	32.2	33.8	35.4	37.7	39.9
LW	21.9	22.5	23.4	24.4	25.9	27.6	29.4	31.1	32.8	34.5	36.8	39.2	41.2
ST	21.8	22.1	22.6	23.3	24.1	24.8	25.6	26.5	27.3	28.1	28.8	29.7	30.8
FCO	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5

Figure 4: Ashton Park winter peak demand growth

Peak demand is expected to increase at Ashton Park Primary by approximately 9MVA from 2019/20 to 2027/28 when following the CT scenario. The projected primary demand of 30.6MVA is split below by demand type. The chart shows the largest impact on demand in the area is from EVs and Heat pumps, both equating to 11% of the overall projected demand.

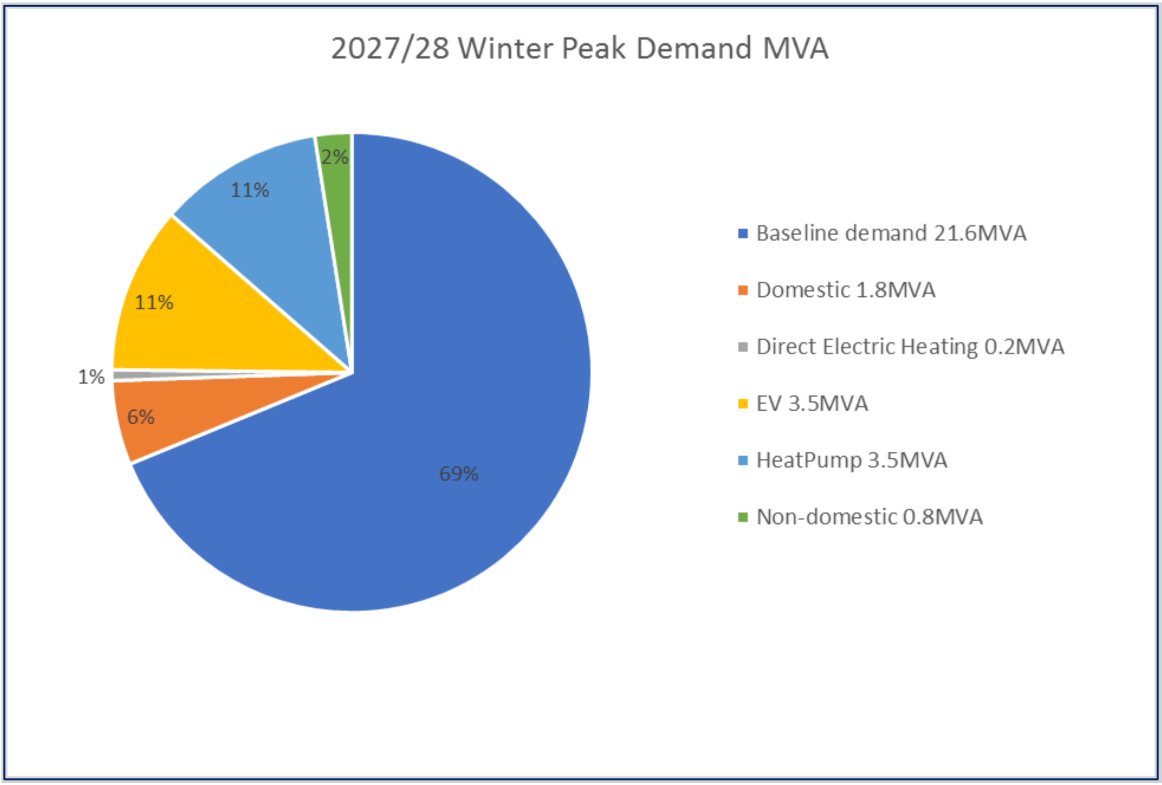


Figure 5: Ashton Park Primary winter peak demand split by 2027/28 – CT scenario

4.4 Existing Asset Condition

Both transformers at Ashton Park are currently with a health index of HI4 and will move into HI5 in the future. There is currently no non-load investment proposed to replace these assets.

4.5 Thermal Flow Analysis

Ashton Park is connected to two of the three 33kV circuits between Norrington BSP and Trowbridge 33kV Switching Substation. Due to the protection and operational arrangement on the circuits, for a fault on a circuit or a transformer at Ashton Park the whole of the affected circuit from Norrington to Trowbridge is taken out of service.

Year	Demand Group	Season	Group Class	Contingency	Loaded Circuit / Transformer	FCO Demand to be Met	FCO Available Capacity
2024	Ashton Park Primary T1 & T2	Winter	C	Fault on Ashton Park Primary T2	Ashton Park Primary T1	24.2MVA	**30MVA**
					Norrington to Ashton Park T1 33kV circuit	24.2MVA	**23.5MVA**

Table 4 First Circuit Outage (FCO) Analysis in 2023/24 under CT Scenario

Under an FCO event on one of the transformers at Ashton Park and its associate 33kV circuit from Norrington, the following 33kV circuits as shown in Figure 2 are thermally overloaded During RIIO-ED2 period.

- NORR-C1 to ASHP-C1T to STAD-C1T to ASHP-C1
- NORR-C1 to ASHP-C2T to ASHP-C2

Therefore, reinforcement of the network is required due to non P2/7 compliance under FCO conditions.

4.6 Voltage Level Assessment

Voltages at the 33kV and 11kV busbars remain within statutory limits as shown in Appendix 2. Reinforcement is not required as voltage compliance is met.

4.7 Fault Level Assessment

There is no fault level issue unless the network has significant changes on the conductor sizes. The results of this analysis are shown in Appendix 2.

4.8 Network Analysis Summary

The analysis above has shown that intervention to reinforce 33kV circuits feeding Ashton Park primary station will be required within RIIO-ED2. The DFES forecasted increase in demand, and in turn the increased reliance on the network will impact a larger number of customers and more severely considering the LCT uptake. Also, the thermal overloading issue identified will slow both our own and stakeholder ambitions for a Net Zero network.

5 Optioneering

This section of the report sets out the investment options that were considered when resolving overload issue on 33kV circuits feeding Ashton Park primary substation. As described below, a holistic approach is taken to ensure investment options represent best value for money for network customers are identified.

5.1 Whole System Considerations

We have additionally considered the potential for using Whole System solutions (involving collaboration with third parties) to deliver this investment programme. We set out our assessment in Appendix 4. This follows our standardised approach for embedding Whole System considerations into our load and non-load investment decisions (in line with Ofgem's ED2 business plan guidance), as described in our ***Whole System (Annex 12.1).***

Our assessment enables us to take a proportionate consideration of Whole System options, based on the feasibility of such options existing and materiality of the costs involved.

In this case, our Whole Systems assessment finds that this programme is not expected to have any wider Whole System interactions and there are no feasible Whole Systems solutions.

5.2 Summary of Options

Table 4 below provides a high-level summary of the four investment options under consideration along with the advantages and disadvantages associated with each. A more detailed description of each option is then provided within the proceeding sub-sections.

Option	Description	Advantages	Disadvantages	Result
1. Do Minimum	It is normally done by carrying out demand transfer from the overloaded demand group to another.	Minimum cost and workload; Small impact to existing network; Short delivery time.	Does not increase network capacity, further reinforcement may still be required.	Considered but not progressed to CBA

2. Reinforcement of existing assets	The replacement of the full overloaded equipment including: • 20.97 km of 33kV circuits	Allow latest and most efficient technology to be installed; Increase network resilience; Reduce environmental impact.	Can incur long outages if replacement cannot be built offline; Some non-overloaded assets may also need to be replaced in-line with the new equipment. In this case, oil filled cable should be replaced with XLPE cable.	Progressed to CBA Analysis (Preferred conventional option)
3. Reinforcement by network extension (adding additional new assets)	When overloaded equipment is already reached maximum rating, new equipment will be added into existing network. This involves: • a new 33/11kV transformer at Ashton Park • a new 8.8 km 33kV circuit from Norrington to Ashton Park • one 33KV circuit breaker and one isolator • two 11kV circuit breakers	Increase network resilience; Shorter outage time; Long term benefit.	Can incur large civil costs; Required new control strategy.	Progressed to CBA Analysis
4. Flexibility Solution followed by conventional reinforcement	Flexible service contracts to reduce peak demand and defer capital investment	Relatively low cost Creates option value to monitor load growth closely	Amount of flexibility depends on location-specific resources and interests. CAPEX may still be required.	Progressed to CBA Analysis (Preferred Option)

Table 5: Summary of Investment Options

5.3 Detailed Option Analysis

5.3.1 Option 1: Do-Minimum

Estimated Cost: £N/A

Ashton Park is located on the East side of Trowbridge with Trowbridge Town Primary substation situated on the west side. Trowbridge Town primary will only have c5MW available capacity by the end of ED2 following the CT projection. To mitigate the P2/7 compliance issue at and around Ashton Park, approx. 7MW will need to be transferred across. Therefore, any option to transfer load would not mitigate the issue as Trowbridge Town won't have all the available capacity and there is not enough capacity on the existing HV interconnectors between the two substations.

As this option does not resolve the P2/7 non-compliance and would result in poorer guaranteed standard performance and customer interruptions, it is rejected and is not progressed to the CBA analysis.

5.3.2 Option 2: Reinforcement of existing assets

Estimated Cost: £2,521k.

The overloaded assets are the following 33kV circuits connected to Ashton Park Primary Substation as highlighted in Figure 6, which require replacement.

- Norrington/Ashton Park Tee1 (5.38km):
  - 0.05km cable rated 49.5/43.8MVA
  - 5.33km V O/H rated 44.4/42.1MVA
- Norrington/Ashton Park Tee 2 (4.67km):
  - 4.67km V O/H rated 44.4/42.1MVA
- Ashton Park Tee/Ashton Park 2 (4.10km):
  - 0.73km cable rated 32.4/28.7MVA
  - 1.72km M O/H rated 30.7/28.5MVA
  - 1.65km cable rated 30.6/27.1MVA
- Ashton Park Tee/Stad Tee 1 (0.75km):
  - 0.75km M O/H rated 30.7/28.5MVA
- Ashton Park Tee/Stad Tee 2 (0.90km):
  - 0.90km M O/H rated 30.7/28.5MVA
- Stad Tee/Ashton Park Tee 1 (6.07km):
  - 1.00km M O/H rated 30.7/28.5MVA
  - 1.66km cable rated 30.6/27.1MVA
  - 2.71km M O/H rated 30.7/28.5MVA
  - 0.70km cable rated 32.4/28.7MVA

The combined total of 33kV circuit requiring reinforcement is 16.18km of Overhead Line and 4.79km of underground cable. The overhead circuits are wood pole circuits across farmland crossing a railway line and some small rivers/canals.

The underground cable sections of the circuit are located between Ashton Park Substation and the termination tower of the 33kV overhead lines. The cable runs through residential areas on the outskirts of the town and as such, disruption from any works should be easily mitigated with minimum disruption to the public.

Based on loading condition over the whole 33 kV circuits from Norrington BSP to Ashton Park under N-1 outage condition, up-rating OHL and cable sections for Norrington/Ashton Park Tees 33 kV circuits to 50 MVA or above and up-rating OHL and cable sections for Ashton Park Tees/Ashton Park 33 kV circuits to 40 MVA or above would be required. It has been identified that the 23 rotter poles along the route from Ashton Park to Norrington BSP should be replaced with H poles as well when uprating the associated 33 kV OHL sections.

Uprating of the existing 33kV OHL sections and replacement of the existing 33kV cable sections from Norrington to Ashton Park primary substation would enable 33kV network to Ashton Park primary substation to have adequate capacity to meet the demand forecast at Ashton Park in RIIO ED2.

Ofgem's RIIO-ED2 standard CBA template was used to assess costs and benefits of the conventional Options 2 and 3. As a result of the CBA assessment, Option 2 came out as the preferred conventional investment option which is used to feed into the Common Evaluation Methodology (CEM)[3] Flexibility CBA to determine if there are economic benefits in deferring this capital investment.

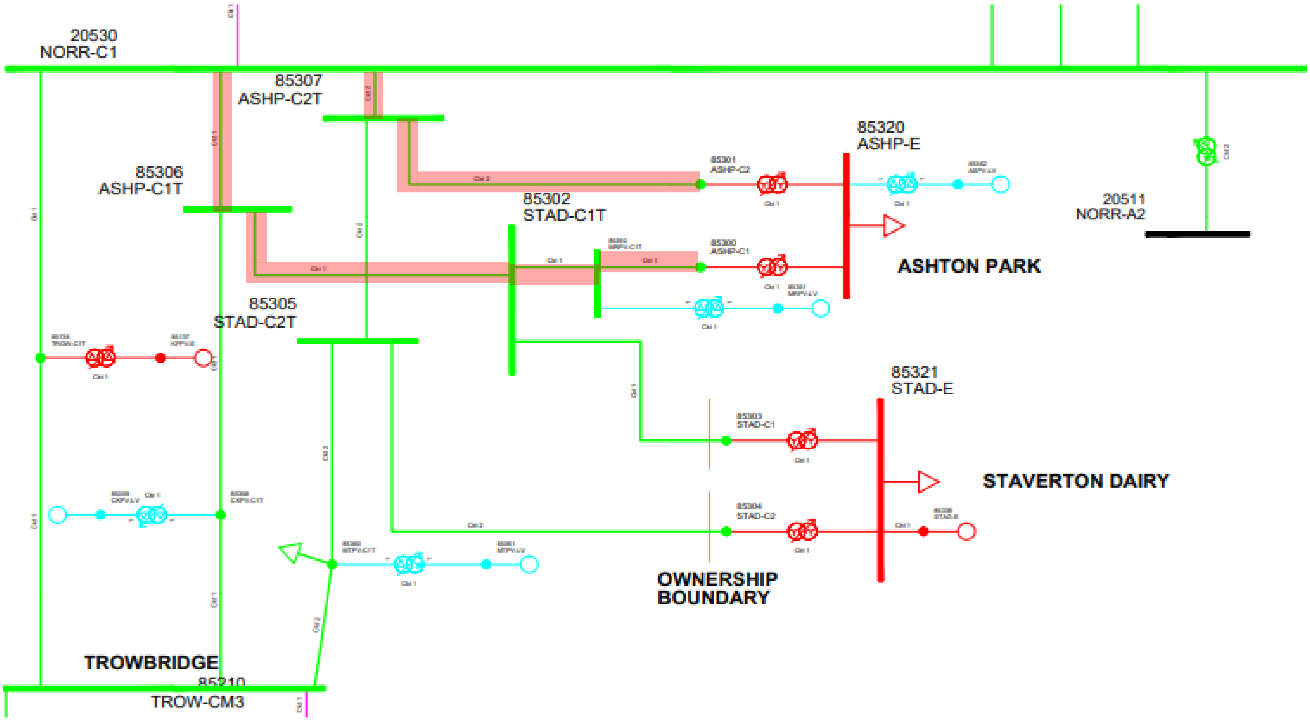


Figure 6. Option 2: Network arrangement SLD with proposed asset replacement highlighted

5.3.3 Option 3: Reinforcement by network extension (adding additional new assets)

Estimated Cost: £3,823.8k

In order to provide suitable new assets to support the forecasted load growth a new 33kV circuit would be required from Norrington to Ashton Park. There appear to be sufficient space for the installation of a new transformer at Ashton Park. The 11kV switchboard and the 11kV switch house building at Ashton Park would also require extension to facilitate the connection.

A new 33kV cable circuit with length approximately 8.8 km in total will be required between Ashton Park and Norrington BSP. The route would look to follow part of the existing 33kV overhead line route over mainly arable land with a single railway crossing and a river crossing. The final section of the circuit would follow the existing cable route, which goes through the outskirts of Trowbridge to reach Ashton Park Substation as shown in Figure 7. A 33kV new circuit breaker is needs to connect the new 33kV circuit to Norrington BSP 33kV busbars. The proposed plan to add new assets are indicated in Figure 8.

Addition of the new 33kV transformer feeder from Norrington to Ashton Park would enable 33kV network to have adequate capacity to meet the demand forecast at Ashton Park in RIIO ED2.

The expenditure for this option is highest among all the options and It might be challenging to gain consent from the landowners for the proposed cable route, therefore it is rejected.

[3] https://www.energynetworks.org/assets/images/Resource%20library/ON20-WS1A-P1%20Common%20Evaluation%20Methodology-PUBLISHED.23.12.20.pdf

Figure 7: Proposed new cable route between Ashton Park and Norrington

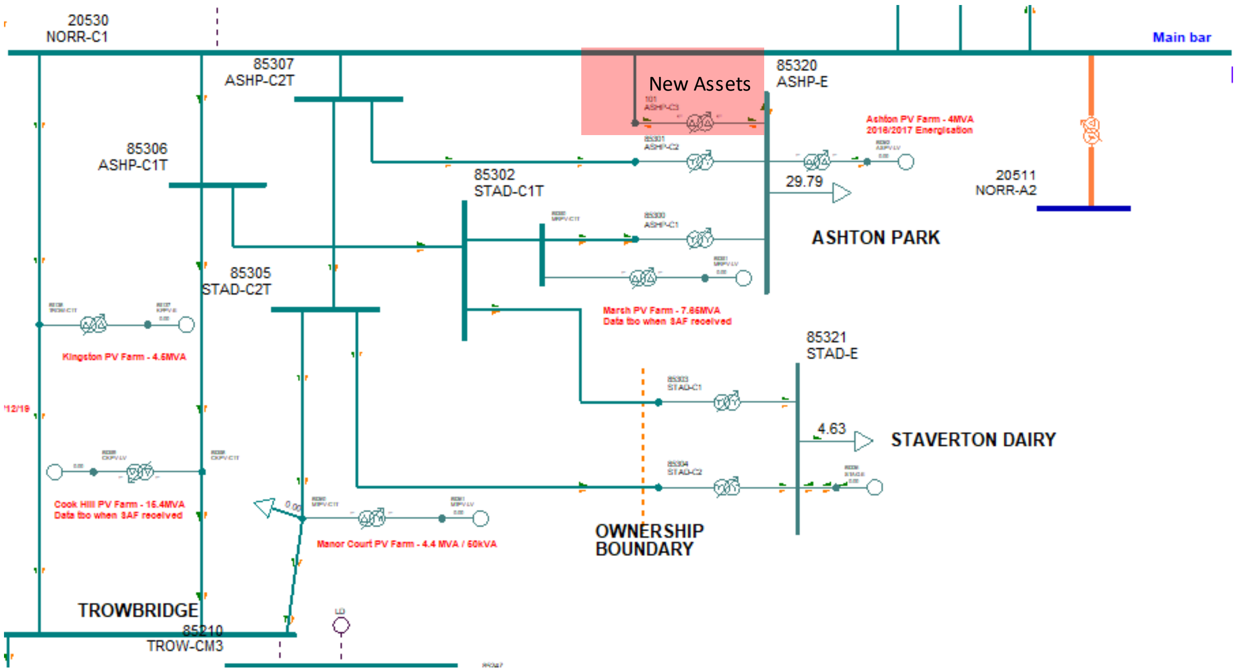


Figure 8: Network arrangement SLD with new assets highlighted

The Ofgem CBA results show this is not the option which should be further considered due to its higher investment cost and poorer NPV of £0.248m over 45 years as compared with the best option.

5.3.4 Option 4: Flexible Solution followed by Reinforcement of Existing Assets

Estimated Cost: £2,628.2k

This option considers utilising customer generation capacity to actively manage the peak power flow on existing assets. This will allow SEPD to utilise the existing network effectively and may defer or remove the need for reinforcement action proposed in Option 2.

Figure 9 below shows that the peak demand at Ashton Park 33/11kV primary substation in the DFES CT scenario in 2027/28 exceeds the FCO capacity for approximately 6.5 hours over the winter months with a requirement of flexible generation between 0.0 – 7.1MW. It shall be noted that the peak demand appears mainly in a period from 15:30 pm to 21:30 pm of the day.

The Common Evaluation Method (CEM) CBA model [4] has been also used to assess if there is any benefit in deferring the reinforcement. The most economically viable conventional solution was obtained from the CBA and input into the Common Evaluation Methodology (CEM) Flexibility CBA to determine if there are economic benefits in deferring the capital investment.

The CEM framework evaluates options around timing of network investments, in particular taking into account:

- the range of different options available (e.g., reinforcing the network, using flexibility, or doing nothing);
- the time periods in which actions can be taken; and
- the existence of uncertainty, and the impact of incremental information which becomes available over time.

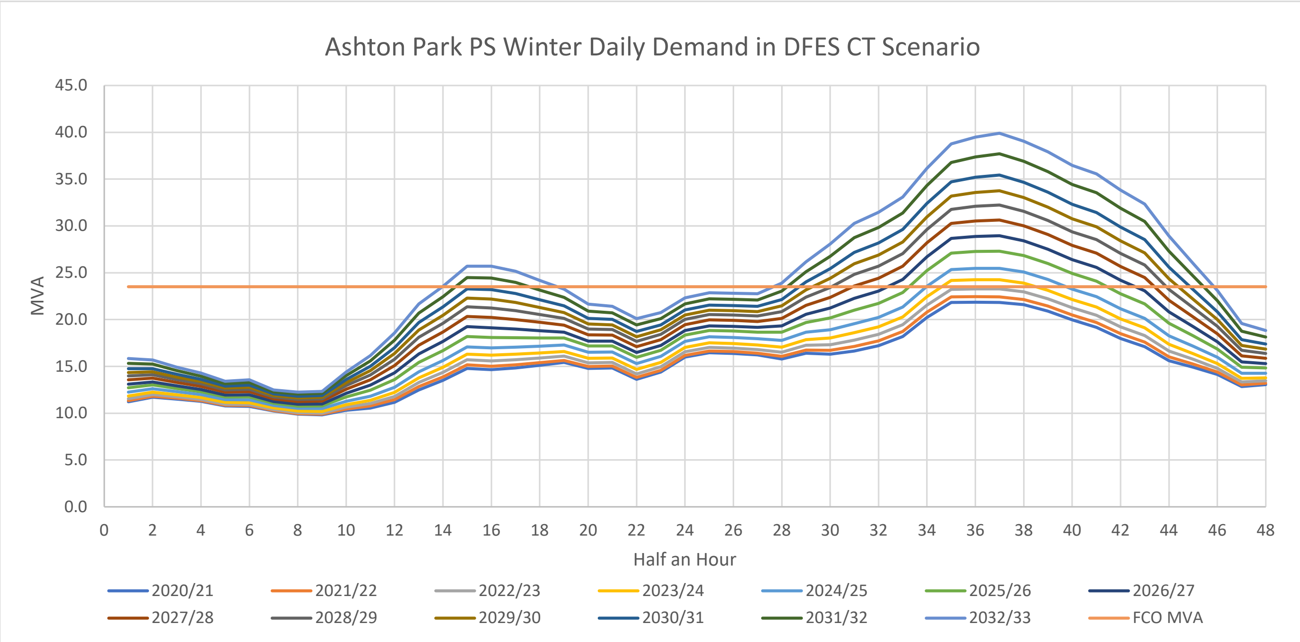


Figure 9: Ashton Park primary substation winter daily demand without flexibility services.

The MW exceedance, the daily availability and utilisation hours, the annual available and utilisation days (Table 5 below), and the flexibility unit costs of £150 per MW per hour and £150 per MWh were used as input parameters in the CEM CBA model (full details of the flexibility methodology can be found in the ***Load related Plan Build and Strategy (Annex 10.1***).

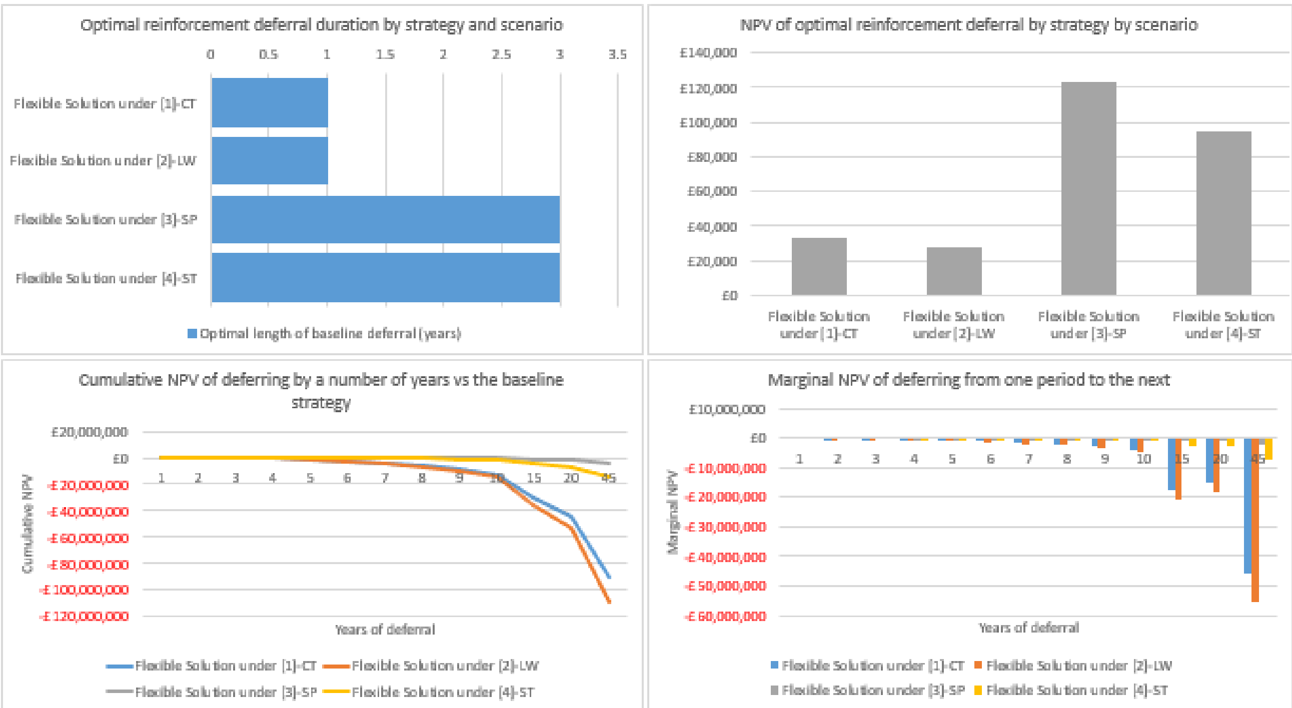
[4] https://www.energynetworks.org/assets/images/Resource%20library/ON20-WS1A-P1%20Common%20Evaluation%20Methodology-PUBLISHED.23.12.20.pdf

Input to the CEM CBA	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Availability capacity (MW)	0.0	0.0	0.0	0.7	2.0	1.4	2.9	4.5
Hrs/day of availability	0	0	0	2.0	3.0	2.0	3.7	4.5
Days/a year required	0	0	0	64	64	192	192	192
Utilisation (MWh)	0.0	0.0	0.0	47.7	189.9	264.5	1018	1924

Table 6: Estimated availability and utilisation requirements for flexibility solution.

The CEM model outcome in Figure 10 shows that there is benefit for deferring the reinforcement proposed on Ashton Park 33kV circuits in Option 2 for one year with the DFES CT and LW scenarios, three years with the DFES SP scenario, and three years with the DFES ST scenario.

This indicates that flexibility gives us the opportunity - if the load doesn't grow to the level as forecasted in the CT scenario, we may be able to defer the reinforcement even further. If the load is greater than the forecasted in the ST scenario, we can increase utilisation of flexibility while gearing up for the reinforcement. As a result, flexibility is considered as an economically viable solution and could be utilised to defer the reinforcement.



Cumulative benefit of deferral (excluding benefit from further deferral, but including multi-year discount)	Baseline	1 Defer by 1 year(s) to 2025	2 Defer by 2 year(s) to 2026	3 Defer by 3 year(s) to 2027	4 Defer by 4 year(s) to 2028	5 Defer by 5 year(s) to 2029	6 Defer by 6 year(s) to 2030
Flexible Solution under [1]-CT	£0	£32,891	£995	-£62,541	-£437,566	-£1,165,654	-£2,318,623
Flexible Solution under [2]-LW	£0	£28,383	-£39,023	-£127,976	-£580,240	-£1,455,070	-£2,812,627
Flexible Solution under [3]-SP	£0	£54,733	£100,937	£123,723	£121,804	£86,906	£41,863
Flexible Solution under [4]-ST	£0	£54,733	£91,046	£94,750	£57,044	-£33,708	-£47,822

Figure 10: Net benefit of deferring reinforcement for the four DFES scenarios

Our detailed deliverability plan for Load suggests it is best to deliver the capital scheme in 2025/26. According to the CEM model we still see a positive benefit from deferring the capital scheme for 2 years under the CT scenario. Coupled with the longer deferral period under SP and ST we propose to defer the reinforcement proposed in Option 2 to 2025/26 using flexible services. In this case, £2.628m investment would be needed in RIIO-ED2 including availability and utilisation cost of £0.107m for flexible generation and £2.521m for replacement of existing assets in Option 2. Feeding this option into the Ofgem CBA results in a better NPV value as compared with the other conventional options (Table 6). This option is, therefore, the preferred option for Ashton Park primary.

In line with our Flexibility First Approach, this project is technically compatible with a Flexibility Solution. We will carry out Flexibility market tests to establish the cost, location and technical capabilities of the available flexibility.

If the market test is successful, a Flexibility Solution will be employed offering value to SSEN and our customers in terms of investment deferral and optionality. Should the market test fail or only partially succeed in identifying the required Flexibility, SSEN will use the CEM Framework to assess the optimal secondary solution for this location, be that a further market test for full Flexibility, accelerating the Conventional solution or a Hybrid Scheme. SSEN will also assess the opportunity to extend the Flexible solution beyond three years should the scheme be successful and demand growth is lower than currently forecasted.

Further detail of our Flexibility First approach and assessment methodology can be found in our ***DSO Strategy (Annex 11.1) Appendix F - Delivering Value through Flexibility.***

6 Cost Benefit Analysis (CBA)

This section provides an overview of the results from the Cost Benefit Analysis (CBA). This detailed exercise has been undertaken to support the investment strategies discussed within this EJP.

6.1 CBA of investment options

Ofgem's RIIO-ED2 standard CBA template was used to assess costs and benefits of the conventional options for each circuit individually. Capital reinforcement costs, CI/CML penalties, network losses and other societal benefits are the key parameters used in the CBAs of the three options progressed. The customer interruptions / customer minutes lost (CI/CML) for the considered options were calculated based on the potential overloads and the probability of failure, and the CI and CML values are shown in Appendix 1.

The network losses (MWh) in Option 2 and Option 3 were calculated as the MWh difference after and before the proposed reinforcement taking into consideration the yearly average loading condition of 33kV circuits feeding Ashton Park primary transformers. Further information on our Cost Benefit Analysis (CBA) approach is set out within our ***Cost Benefit Analysis Process (Annex 15.8)***.

The CBA results in Table 6 below demonstrate that the most cost-effective solution is option 4 'Flexible Solution', as it has the best NPV against the required investment. It is clear that the investment would remove the CI and CML for supply to Ashton Park primary substation immediately within RIIO-ED2, while providing efficient and enduring long-term security of supply as we move towards a Net Zero network. Therefore, based on the CBA results option 4 is the preferred solution to address the P2/7 compliance issue at Ashton Park primary substation.

Options	Net Present Value (NPV) After 45 Years (£k)	Investment (£k)
Option 2– Reinforcement of Existing Assets	-1,776	2,521.0
Option 3 – Reinforcement by Network Extension	-2,547	3,823.8
Option 4 – Flexible Solution followed by Reinforcement of Existing Assets	-1,753	2,628.2

Table 7: Summary of CBA results

Options	Unit	2024	2025	2026	2027	2028	ED3	Total
Option 2– Reinforcement of Existing Assets	£k	2,521.0	0	0	0	0	0	2,521.0
Option 3 – Reinforcement by Network Extension	£k	3,823.8	0	0	0	0	0	3,823.8
Option 4 – Option 4 – Flexible Solution followed by Reinforcement of Existing Assets	£k	21.5	85.5	2,521.0				2,628.2

Table 8: Summary of capital costs in the options

6.1 Options Summary

Option 1 has the lowest capital costs and may appear to be the attractive option. However, this option is unable to resolve the P2/7 compliance issue entirely and would result in poorer guaranteed standard performance and customer interruptions. Option 1 is not considered as a cost effective, long term enduring solution.

Option 2 is technically feasible to resolve the P2/7 issue in the RIIO ED2 and is regarded as the preferred conventional solution. Due to our deliverability requirement and its poorer NPV over 45 years as compared with the best option, option 2 is not considered as a cost effective, long term enduring solution.

Option 3 is technically feasible to resolve the P2/7 issue in the RIIO ED2. Due to its higher capital costs and the poorer NPV over 45 years as compared with the best option, option 3 is not considered as a cost effective, long term enduring solution.

Option 4 has the benefit to defer the proposed solution in Option 2 for two years. Due to its better NPV over 45 years as compared with the other options, Option 4 is the best and the preferred option. In accordance with our deliverability requirements, flexible solution will be utilised in 2023/24 and 2024/25 before the reinforcement works are completed in 2025/26.

6.2 Costing Approach

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

It provides a high level of cost confidence in our Business Plan cost forecast for RIIO ED2. Through our benchmarking analysis, we recognised that not all Non-Load related RIIO-ED1 actual unit costs sit within the upper quartile efficiency band. Where this is the case, we have applied a catch-up efficiency to those cost categories.

Further detail on our unit cost approach, cost efficiency and cost confidence for RIIO-ED2 can be found within our ***Cost Efficiency (Annex 15.1)***. Following our draft Business Plan, we have continued to develop project scopes and costs, utilising valuable stakeholder feedback. We have included developments of our Commercial Strategy within the updated project scope and delivery strategy.

Given the unit costs, Table 8 shows the cost breakdown for reinforcement in the final preferred Option 4 taking into consideration unique and site-specific costs. Through our detailed bottom-up project assessment, no other additional costs were identified in this reinforcement scheme.

Category	Sub-category	Unit Cost (£k)	Unit	Asset Count	Predominant Costing Approach	Cost £k
Cable	33kV UG Cable (Non-Pressurised)	[redacted]	km	4.79	ED1 6yr average actual unit rates	[redacted]
Overhead Pole Line	33kV Pole	[redacted]	#	23	ED1 6yr average actual unit rates	[redacted]
Overhead Pole Line	33kV OHL (Pole Line) Conductor	[redacted]	#	16.18	ED1 6yr average actual unit rates	[redacted]
					Project Sub Total	[redacted]
Category	**Regional Variations and Site-Specific Factors Driving Costs**				**Predominant Costing Approach**	**Impact Cost £k**
Civil Works Driven Costs	- Uprating of the existing 33kV circuits between Ashton Park and Norrington BSP needs river crossing works to be done, which incurs extra cost.				[redacted]	[redacted]
Civil Works Driven Costs	- Uprating of the existing 33kV circuits between Ashton Park and Norrington BSP is likely to damage crops and plants along the circuit route and some kind of agricultural compensation is needed.				[redacted]	[redacted]
Flexible solution	- Availability and utilisation cost for flexible generation is needed in order to remove and mitigate the overloads under an FCO condition in 2024 and 2025.				Flexibility unit costs of £150 per MW per hour and £150 per MWh were used in the CEM CBA model	[redacted]
					Total Project Cost	**2,628.3**

Table 9: Cost breakdown for the preferred option

7 Deliverability and Risk

Between our draft and final Business Plans we have carried out a more detailed deliverability assessment of our overall plan as a package and its component investments. Using our draft Business Plan investment and phasing as a baseline we have followed our deliverability assessment methodology. We have assessed any potential delivery constraints to our plan based on:

- In-house workforce capacity and skills constraints based on our planned recruitment and training profile and planned sourcing mix as well as the efficiencies we have built into our Business Plan ***(detailed in our Workforce Resilience Strategy in (Annex 16.3)*** and ***Cost Efficiency (Annex 15.1)***.

- Assessment of the specific lead and delivery timelines for the asset classes in our planned schemes.
- We have evaluated our sourcing mix where there were known delivery constraints to assess opportunities to alleviate any constraints through outsourcing.
- We have engaged our supply chain ***Supply Chain Strategy (Annex 16.2)*** to explore how the supply chain could support us to efficiently deliver greater volumes of work and how we could implement a range of alternative contracting strategies to deliver this.
- We have also engaged with the supply chain on the delivery of work volumes that sit within Uncertainty Mechanisms to ensure we have plans in place to deliver this work if and when the need arises
- Specific to load schemes: We have carried out flexibility assessments at all voltage levels in order to understand when we can defer reinforcement through paying for flexibility services, therefore ensuring our investment profile is deliverable and at the lowest cost to consumers ***see Flexibility within Load Related Plan Build and Strategy (Annex 10.1***)
- We have assessed the synergies between our planned load, non-load and environmental investments to most efficiently plan the scheduling of work and minimise disruption to consumers
- Based on our assessment of delivery constraints and potential solutions to resolve them, we have revised our investment phasing accordingly to ensure our Business Plan is deliverable, meets our consumers' needs and is most cost efficient for our consumers

Table 9 below sets out the revised investment phasing based on the outcome of our deliverability assessment for reinforcement on Ashton Park 33kV circuits. The CEM model results show that there is benefit on deferring the reinforcement for at least one year depending upon the demand forecast in the DFES scenarios. In accordance with our deliverability capability, our draft plan is to complete the reinforcement work in 2025/26. The CBA results concluded that Option 4 is the best option, and that we will utilise flexible solution in 2023/24 and 2024/25 followed by Asset Replacement in 2025/26.

	2023/24	2024/25	2025/26	2026/27	2027/28
Revised Investment Phasing			X		

Table 10: Revised investment phasing of deliverability

This investment scheme is part of the wider load-related investment portfolio in RIIO-ED2. SSEN have developed a strategy to deliver a much larger volume of work in comparison with the level of investment in ED1. Our deliverability testing has identified a major strategic opportunity which is relevant to all EJPs.

- In ED2 SSEN will change the way Capital Expenditure is delivered, maximising synergies within the network to minimise disruptions for our customers. This is particularly relevant for a Price Control period where volumes of work are increasing across all work types.
- The principle is to develop and deliver Programmes of work, manage risk and complexity at Programme level and to develop strategic relationships with our Suppliers and Partners to enable efficiency realisation.
- The Commercial strategy will explore the creation of Work Banks (WB) and identify key constraints. The Load work will be the primary diver for a WB, supplemented by Non-Load work at a given Primary Substation. This approach will capitalise on synergies between the Load and Non-Load work, whereby the associated downstream work from a Primary Substation will maximise outage utilisation, enabling the programme to touch the network in a controlled manner with the objective of touching the network once. Where there is no Primary Load scheme to support the Non-Load work, these will be considered and packaged separately, either insourced or outsourced dependant on volume, size and complexity.

- Transparency with the Supplier in terms of constraints, challenges, outage planning and engineering standards will capitalise on efficiencies, supported by a robust contracting strategy.

The specific considerations for deliverability based on the scope of this EJP are detailed below:

- This investment scheme is part of the wider load-related investment portfolio in RIIO-ED2. SSEN have developed a strategy to deliver a much larger volume of work in comparison with the level of investment in ED1. We have engaged with our supply chain to negotiate the most effective unit costs. We have carefully planned the future workforce with the right skills and competencies to deliver capital projects in ED2.
- In ED1, we have delivered a number of 33kV cable and overhead line replacement projects in house. The experience and skills acquired from these projects lay the foundation for the delivery of Ashton Park 33kV circuit upgrade.
- The cables and overhead line of existing 33kV circuit route is required replacement. The overhead lines run across farmland crossing a railway line and some small rivers/canals. There may be difficulty in agreeing line upgrades with landowners with the need to divert circuits. The cable runs through residential areas on the outskirts of the town and as such, disruption from any works should be easily mitigated with minimum disruption to the public. Therefore, there is low risk on cable/OHL replacement.
- Utilising the flexibility service can potentially defer the reinforcement for 2 years based on the output of the CEM CBA model under the CT scenario. The amount of operation cost for flexibility, however, depends on location-specific resources and interests. Therefore, we will monitor the demand development of the surrounding network and review the reinforcement option annually. The Uncertainty Mechanism might be used if the demand development and flexibility service procurement doesn't go as predicted in this EJP.

8 Conclusion

This EJP has raised the need for load related investment on 33kV circuits to Ashton Park primary substation within the ED2 price control period. This need for investment is driven by the compliance with P2/7 under an FCO condition. Given the increase of forecasted demand at Ashton Park primary substation and significant impact on customers, reinforcement is required to remove this non-compliance in RIIO-ED2.

Four investment options have been considered and the preferred solution is Option 4, which involves applying flexible solution to remove the peak demand at Ashton Park primary substation in 2024 and 2025 followed by uprating the existing 33kV OHL and cable circuits to Ashton Park in 2026. All options are supported by a Cost Benefit Analysis (CBA) which provides further breakdown of economic viability over a 45-year period.

The proposed ED2 investment with the combined scheme total of £2.628m. In accordance with our deliverability plan, it is proposed that all reinforcement works are carried out in the 2025/26 financial year after applying the flexible solution for two years in 2023/24 and 2024/25 first. The reinforcement works will minimise the risk of thermal overload and network non-compliance in RIIO ED2.

Appendix 1: Assumptions

CI/CML Tables

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CT	21.9	22.4	23.3	24.2	25.5	27.3	29.0	30.6	32.2	33.8
Firm Capacity	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Difference	0.0	0.0	0.0	0.7	2.0	3.8	5.5	7.1	8.7	10.3
Customer No. 1% Growth	13570	13706	13843	13981	14121	14262	14405	14549	14694	14841
MW per customer	0.001610	0.001638	0.001681	0.001734	0.001804	0.001915	0.002010	0.002105	0.002193	0.002274
No. Faults per Year	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Final Input										
CI	0	0	0	-384	-979	-1777	-2422	-3024	-3553	-4026
CML	0	0	0	-69104	-176201	-319862	-435963	-544291	-639565	-724671

Table 11: CI/CML for Do Minimum Option

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
CT	21.9	22.4	23.3	24.2	25.5	27.3	29.0	30.6	32.2	33.8
Firm Capacity	23.5	23.5	23.5	30	30	30	30	30	30	30
Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Customer No. 1% Growth	13570	13706	13843	13981	14121	14262	14405	14549	14694	14841
MW per customer	0.001610	0.001638	0.001681	0.001734	0.001804	0.001915	0.002010	0.002105	0.002193	0.002274
No. Faults per Year	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Final Input										
CI	0	0	0	0	0	0	0	0	0	0
CML	0	0	0	0	0	0	0	0	0	0

Table 12: CI/CML for Assets Replacement Option

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
CT	21.9	22.4	23.3	24.2	25.5	27.3	29.0	30.6	32.2	33.8
Firm Capacity	23.5	23.5	23.5	47	47	47	47	47	47	47
Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Customer No.	13570	13706	13843	13981	14121	14262	14405	14549	14694	14841

1% Growth										
MW per customer	0.001610	0.001638	0.001681	0.001734	0.001804	0.001915	0.002010	0.002105	0.002193	0.002274
No. Faults per Year	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Final Input										
CI	0	0	0	0	0	0	0	0	0	0
CML	0	0	0	0	0	0	0	0	0	0

Table 13: CI/CML for Add New Assets Option

Appendix 2: Network Analysis Results

Voltage Level Assessment

SYSTEM VOLTAGE LEVELS_Ashton Park Primary						
Season	**Norrington 33kV voltage**	**Ashton Park Demand**	**Generation**	**Study Scenario**	**Ashton Park 11kV Voltage**	**Busbar Name**
[-]	[p.u.]	[MVA]	[MVA]	[-]	[p.u.]	[-]
Winter maximum	1.032	24.2 MVA	0	Intact	1.026	ASHP-E
Winter maximum	1.017	24.2 MVA	0	Fault on Ashton Park T2	0.927	ASHP-E
The Voltage levels are in the limit of + 10% on 132KV. + 6% on 33KV or 22kV under intact condition.						

Table 14 Voltage Level Assessment Results

Fault Level Assessment

Bus Number	Bus Name	Nominal Voltage (kV)	Pre-fault Voltage (p.u)	X/R ratio	Ik''- Initial Sym. (kA)	Ip- Peak Make (kA)	RMS Sym. Break (kA)	DC Component (kA)	RMS Asym. Break (kA)	Circuit Breaker Break Rating	Circuit Breaker Make Rating	Circuit Breaker Fault Level Index
3 Phase Fault Level Results at the End of ED2 2027/2028												
20530	NORR-C1	33.	1.028	12.3	10.9	27.88	8.44	8.11	11.7	17.5	44.6	FLI1
85320	ASHP-E	11.	1.033	7.2	8.52	20.3	7.17	2.79	7.69	13.1	33.4	FLI1
Single Phase to Ground Fault Level Results at the End of ED2 2027/2028												
20530	NORR-C1	33.	1.028	4.8	2.06	5.38	2.03	2.59	3.29	17.5	44.6	FLI1
85320	ASHP-E	11.	1.033	0.2	1.2	1.73	1.2	0	1.2	13.1	33.4	FLI1

Table 15 Fault Level Assessment Results

Appendix 3: Relevant Policy, Standards, and Operational Restrictions

The policies, manuals and standards and operational restrictions relevant to the content of this paper.

Policy Number	Policy Name / Description
TG-NET-OHL-010	Load Ratings of Overhead Lines – Data Sheet
TG-NET-OHL-012	Short Circuit Ratings of Overhead Lines – Data Sheet
TG-NET-OHL-104	Electrical Constants for Overhead Lines- Data Sheet
TG-NET-CAB-009	Load Ratings of LV to 33kV Underground Cables – Design Data
TG-NET-CAB-010	Electrical Constants for LV to 33kV Underground Cables- Data Sheet
TG-NET-CAB-011	Short Circuit Ratings of 6.6kV to 33kV Underground Cables – Design Data

Table 16: Relevant documents

Appendix 4: Whole Systems Consideration

In augmenting our decision-making processes to consider Whole System solutions, we have introduced an assessment to identify where a Whole Systems CBA would be a useful decision-making tool for ED2 load and non-load schemes. While our work with the ENA to undertake Whole Systems CBAs is ongoing, we have introduced the 'Whole Systems CBA test' to identify where a scheme may be suitable for a Whole Systems CBA to be conducted. Where a Whole Systems CBA is determined to be a useful decision-making tool, these would be conducted in addition to the standard Ofgem CBA and/or SSEN's flexibility CBA. We have introduced this test in line with Ofgem's expectations for "proportionality when submitting a Whole System CBA. For example, smaller or simple projects following the standard CBA template, whereas larger or more complex projects requiring bespoke analytical approaches" (Ofgem BPG, section 4.28, p.34).

The 'Whole Systems CBA test' involves assessing each investment scheme of over £2m (the threshold to develop an EJP for load and non-load investments) against 5 tests. These 5 tests help determine whether a Whole Systems CBA is a useful decision-making tool based on the characteristics of the scheme, including whether it will have wider cross sector or societal impacts.

Details on each of the tests are provided in case study 6 in ***Whole Systems (Annex 12.1)***. Tests 1-3 are aligned with the ENA's guidance for Whole System CBA tests. We have added Tests 4 and 5 to clarify whether a Whole Systems CBA is required based on the materiality / proportionality of the investment (Test 4) and whether a flexibility CBA only is sufficient (Test 5). Table 17 below outlines our Whole Systems CBA test for Ashton Park 33/11kV Primary Substation Transformers and 33kV Circuits.

Scheme	**Test 1: Are there Whole Systems interactions, or is there potential for it?**	**Test 2: Could a Whole Systems CBA drive you to make a different decision?**	**Test 3: Is a Whole Systems CBA reasonable?**	**Test 4 – Is the project valued at over £2m?**	**Test 5 – Is the investment plan related to procuring flexible solutions only?**
Ashton Park 33/11kV Primary Substation Transformers and 33kV Circuits	No – We consider there to be limited potential for Whole Systems interactions with third parties to deliver this investment programme, and accordingly we do not consider there to be potential for Whole Systems solution(s).	No – As noted under Test 1 we do not consider there to be potential for Whole Systems solution(s) in this case.	No – As noted under Test 1 we do not consider there to be potential for Whole Systems solution(s) in this case.	Yes	No

Table 17: Whole Systems CBA test for Ashton Park 33/11kV Primary Substation Transformers and 33kV Circuits

As the result of tests 1, 2 and 3 above is "No", a Whole Systems CBA is not required for this investment. It is not expected to have any wider Whole System interactions or potential Whole Systems solutions.

Appendix 5: BPDT Information

Asset & Services	Volume	Costs (£k)	BPDT	Delivery Year
33kV UG Cable (Non-Pressurised) (km)	4.79	[redacted]	CV1	2026
33kV OHL (Pole Line) Conductor (km)	16.18	[redacted]	CV1	2026
33 kV OHL Pole (no.)	23	[redacted]	CV1	2026
HDD River Crossing (no.)	1	[redacted]	CV1	2026
Agricultural Compensation (no.)	1	[redacted]	CV1	2026
Flexibility Solution (years)	2	107.0	CV1	2024, 2025
Total		**2,628.3**		

Table 18: BPDT Information

Appendix 6: Acronym Table

Acronym	Definition
AIS	Air-insulated Switchgear
ASCR	Aluminium Conductor Steel Reinforced
BSP	Bulk Supply Point
CBA	Cost Benefit Analysis
CBRM	Condition Based Risk Management
CEM	Common Evaluation Methodology
CI	Customer Interruptions
CML	Customer Minutes Lost
CT	Consumer Transformation
DFES	Distribution Future Energy Scenarios
DNO	Distribution Network Operator
EJP	Engineering Justification Paper
ESA	Electricity Supply Area
EV	Electric Vehicle
.0FCO	First Circuit Outage
FES	Future Energy Scenarios
GIS	Geographic Information System
GM	Ground Mounted
GSP	Grid Supply Point
HI	Health Index
IDP	Investment Decision Pack
LCT	Low Carbon Technology
LEP	Local Enterprise Partnership
LI	Load Index
LRE	Load Related Expenditure
LW	Leading the Way
NPV	Net Present Value
OHL	Overhead Line
PM	Pole Mounted
PV	Photovoltaics
RSN	Relevant Section of Network
SCO	Second Circuit Outage
SSEN	Scottish and Southern Electricity Network
SP	Steady Progression
ST	System Transformation
XLPE	Cross-linked Polyethylene