VOLUME 1: CHAPTER 2 – PROJECT NEED AND STRATEGY

Appendices (Volume 5 of this EIA Report)

There are no appendices associated with this Chapter

Figures (Volume 3 of this EIA Report)

There are no figures associated with this Chapter

2. PROJECT NEED AND STRATEGY

2.1 Overview

2.1.1 This Chapter explains the need for the Skye Reinforcement Project, and the strategic options considered for the purposes of identifying the optimal design solution to meet the electricity transmission infrastructure requirements that are the drivers for the reinforcement of the existing Skye OHL transmission. The Needs Case is an evidence-based case that sets out the economic justification for the replacement of the existing single circuit 132 kV OHL between Ardmore Substation on the Isle of Skye and Fort Augustus Substation. The Initial Needs Case has been prepared by SSEN Transmission on behalf of the Applicant for submission to the industry regulator, Ofgem, as part of the price control mechanism that is operated by the regulator to provide Transmission Operators with a route to apply for funding for Large Onshore Transmission Investments that may be required to meet decarbonisation and/or transmission system reliability needs. The Needs Case is assessed by the regulator to determine if the proposal by the Applicant represents value for money for present and future consumers, which also involves evaluation of the technical system planning reasons for selecting the proposed design solution.

2.1.2 The discussion in respect of the OHL routeing process, and the detailed consideration of alternatives that has been undertaken in arriving at the final design and routeing of the Skye Reinforcement Project, is provided in **Volume 1: Chapter 4 - The Routeing Process and Alternatives**. The work in relation to the consideration of alternatives for the Proposed Development has followed on from the consideration of viable strategic options that was carried out as part of the preparation of the Initial Needs Case.

2.2 Summary of Project Need

2.2.1 Over recent years, several assessments have been carried out to determine the condition of the existing Skye 132 kV OHL connection and associated electricity infrastructure, including existing substation equipment. These studies have concluded that much of the existing 132 kV OHL requires replacement as it is fast approaching the end of its economic and operational life. Intervention through the replacement of the existing single circuit 132 kV OHL is required for the continued safe operation of the OHL, and to maintain security of supply for homes and businesses on the Isle of Skye and the Western Isles. Separately, at the present time the existing 132 kV OHL is operating under a derogation from the transmission licence planning standards that has been approved by Ofgem, in order to facilitate connection of 137MW of existing renewable generation. However, those renewables generators are subject to output limitations depending on the operating conditions on this part of the network. In addition, more applications are being made by renewable energy developers for connection of their new renewable generation schemes to the national grid, thereby necessitating an increase in the capacity of the existing Skye transmission connection to the mainland GB electricity grid. All of these considerations have required SSEN Transmission to review the Needs Case for the Skye Reinforcement Project and ensure the approach for upgrading and reinforcing the existing transmission network serving Skye and the Western Isles is based on the identification of the best sustainable long-term solution.

2.2.2 The drivers for the Skye Reinforcement Project can be summarised as follows[1]:

- The existing Skye OHL connection, having been constructed over a period mostly from the late 1970's through to the late 1980's, is approaching the end of its economic and operational life. The assessment of the condition of the transmission asset components within the geographical sections between Quoich to Ardmore has been carried out to identify the need for remedial works as part of developing an asset intervention strategy. The studies have identified deterioration on wood poles caused by white rot fungi in the trident wood pole section between Broadford and Ardmore, and loss of galvanisation and extensive surface corrosion in the more exposed areas between Quoich to

1 Further details on project need and consideration of other strategic reinforcement options to deliver the connection requirements are included in the initial needs case, available at https://www.ssen-transmission.co.uk/projects/skye-reinforcement

Broadford in which steel lattice towers are used as the support structures. As a result, the poles and towers themselves, as well as fittings, earth-wires and phase conductors, require upgrade or replacement throughout most of the existing single 132 kV circuit to maintain security of supply to over 32,000 homes and businesses on Skye and the Western Isles[2] (see **Plate 2.1**);

- As the Scottish Government's plan for Net Zero continues to drive increased numbers of renewable energy projects, it has become apparent that the area served by the existing OHL contains opportunity for new renewable generation projects but lacks available additional transmission capacity to connect them to the national grid. The Applicant is already contracted to provide an additional 472 MW of generation on the Skye circuit by 2027, with a further 289 MW in the connection application process (see **Table V2-2.1**). Against that background, SSEN Transmission has updated its generation forecast and in terms of which it is expected that new generation projects will continue to seek connection. It has therefore been concluded that ensuring the proposed replacement of the existing OHL will provide future capacity for new renewable generation projects in the area is necessary; and
- The existing OHL is the sole connection from the mainland GB electricity transmission system to Skye and the Western Isles. The proposed reinforcement works will result in the replacement of the existing single circuit 132 kV OHL with a double circuit transmission connection between Fort Augustus Substation and Edinbane Substation and with a single circuit 132kV OHL of more robust and modern construction type from Edinbane Substation to Ardmore Substation, thereby significantly improving the security of supply. This will reduce the requirement to rely on the diesel generation backup at Stornoway, Loch Carnan and Barra, which is consistent with the policy objectives of both the UK Government and the Scottish Government in relation to Net Zero.

2.2.3 To facilitate this transmission asset replacement and also meet increased capacity requirements, the Proposed Development represents a long-term approach in relation to planning for future transmission infrastructure requirements to and from Skye, particularly having regard to targets fixed by the Scottish and UK Governments to achieve Net Zero by 2045 and 2050 respectively. The policy objective of Net Zero is the reduction of carbon emissions by 100% from 1990 levels in order to avoid the worst impacts of climate change and seeks to limit global warming to 1.5 degrees centigrade. This target also applies to all sectors of the economy, including energy.

2.2.4 The British Energy Security Strategy was published by the UK Government on 7 April 2022 and recognises the growing proportion of electricity demand that is, and requires in the future to be, met by the supply of renewable generation on to the transmission system. The Strategy supports Net Zero through the mid-term policy objective to decarbonise the power system by 2035. The Skye Reinforcement Project would contribute to this objective to facilitate the transmission of new renewable energy from Skye to places where it is required on the mainland GB electricity grid. The approach taken by SSEN Transmission to the identification of the preferred option, in terms of system planning and the recommended investment decision, is consistent with the British Energy Security Strategy in terms of objectives. The Skye Reinforcement Project would support the GB energy system, assist in the achievement of low carbon energy targets and build the best solution for the long term.

2.2.5 As previously explained in the above Overview, SSEN Transmission has submitted its Initial Needs Case[1] to Ofgem, setting out an evidence-based case that supports the economic justification for replacement of the existing OHL between Fort Augustus and Ardmore on the Isle of Skye. That case has now been accepted by Ofgem in their Initial Needs Case Decision document[3] where it has been confirmed that the replacement of the existing OHL with a double circuit 132 kV connection between Fort Augustus and Edinbane Substations, and a

[2] The Fort Augustus to Skye Tee and Quoich to Aberchalder OHLs have been recently constructed, and therefore do not require replacement from an asset health standpoint. However, the recently constructed OHLs still lack the available capacity estimated for future renewable generation projects, and are therefore included for replacement in this project.

[3] Isle of Skye Project – Initial Needs Case Decision on the Projects Initial Needs Case and on its suitability for competition (08/04/22) (Ofgem). Available at: https://www.ofgem.gov.uk/sites/default/files/2022-04/Isle%20of%20Skye%20-%20Initial%20Needs%20Case%20decision.pdf

replacement 132 kV single circuit OHL between Edinbane and Ardmore is justified. Ofgem does not support the refurbishment of the existing 132 kV OHL.

Plate 2.1: Photographs showing the condition of assets on the existing OHL

Steel Tower

Middle phase shackle failure

Shackle showing extreme wear

Wood Pole

Wood pole failure

Wood pole decay

Table V2-2.1: Status of generation requiring connection to the Skye Reinforcement Project

Project*	Capacity (MW)	Connection date	Grid connection status		Transmission/ Distribution connected	Consent status	
			Contracted	Applied		Consented	Scoping
A	40.8	2026	✓		D	✓	
B	2.0	2026	✓		D	✓	
C	25.0	2027	✓		D		✓
D	21.0	2027	✓		D	✓(15.3MW)	
E	49.9	2026	✓		T	✓	
F	45.0	2027	✓		D		✓
G	240.0	2027	✓		T		✓
H	48.6	2030	✓		T		
J	8.0			✓	D		
K	99.8			✓	T		
L	81.6			✓	T		
M	100.0			✓	T		
Total			**472.3MW**	**289.4MW**		**108MW**	**310MW**

* Projects have been anonymised due to confidentiality

2.3 Initial Investigation of Strategic Options

2.3.1 In 2014 the "Fort Augustus to Skye Project" was initiated by the Applicant in order to facilitate the connection of renewable energy generation on the Isle of Skye to the mainland GB electricity grid. As part of this work a development option was publicly consulted on between 2016-2018, that was based upon a design proposing a new 132 kV single circuit OHL of wood pole construction between Fort Augustus Substation and Broadford Substation on the Isle of Skye, with the existing steel lattice OHL that connects the two substations remaining in place. The project also proposed a replacement 132 kV single circuit wood pole OHL between Broadford and Dunvegan as part of the scope.

2.3.2 By late 2018, asset condition studies of the existing infrastructure undertaken as part of the Fort Augustus to Skye Project, together with increased capacity requirements resulting from new applications for renewable generation connections to the grid, triggered the need for a strategic review of the reinforcement strategy for Skye. This review considered both the upgrade and replacement of the existing OHL in its entirety between Fort Augustus and Ardmore in the north of Skye, as well as reinforcement of existing associated substation infrastructure along the existing route. Given the change in both the project need and scope, the previously named Fort Augustus to Skye Project was renamed and replaced by the 'Skye Reinforcement Project' (also interchangeably referred to as "the Proposed Development").

2.4 Skye Reinforcement Strategy

2.4.1 In response to the emergent drivers for reinforcement, further development work and studies were undertaken by System Planning within SSEN Transmission to identify viable options to provide the required capacity to meet current and future requirements. A summary of the work undertaken by SSEN Transmission to assess the electricity transmission infrastructure requirements for the Reinforcement Project is set out below. More detailed information on these aspects is contained within the reinforcement strategy[4] and the Initial Needs

[4] Skye Overhead Line Reinforcement Strategy, Document Reference T2BP-STR-0006 (SSEN Transmission). Available via https://www.ssen-transmission.co.uk/media/3847/skye-overhead-line-reinforcement-strategy.pdf

Case[5] that was submitted to Ofgem on behalf of the Applicant, together with Ofgem's Decision on the Initial Needs Case[6].

Existing Transmission Infrastructure

2.4.2 The existing single circuit 132 kV OHL from Fort Augustus to Ardmore on the Isle of Skye extends over 160 km in length and is the sole connection from the mainland national grid to Skye and onwards, via subsea cable to the Western Isles. The security of supply on Skye and the Western Isles is dependent on this circuit. The existing OHL to Skye is made up of distinct sections, which were constructed at different times over the last 65 - 70 years in response to changing needs. This comprises the following:

1. Fort Augustus Substation to Skye Tee (near Invergarry) – a 9 km section of OHL from Fort Augustus to the Skye Tee point, of trident wood pole construction, and completed in June 2017. This was constructed to provide enhanced security of supply and greater network resilience to the west of Fort Augustus;
2. Aberchalder to Quoich – Recently constructed OHL of trident wood pole construction, approximately 19 km in length. This was constructed as a refurbishment of a part of the Skye Tee (near Invergarry) to Quoich single circuit steel lattice towers noted in bullet point 3 below;
3. Skye Tee (near Invergarry) to Quoich – single circuit steel lattice towers, strung with a single circuit 132 kV OHL constructed in the mid 1950's to connect the Quoich hydroelectric power station to the national grid;
4. Quoich to Broadford – approximately 64 km of double circuit steel lattice towers, strung with a single circuit 132 kV OHL, constructed between 1979 and 1980; and
5. Broadford to Ardmore – approximately 68 km of single circuit trident wood pole, strung with a single circuit 132 kV OHL, constructed in 1989.

2.4.3 At Ardmore Substation, the OHL voltage is stepped down to 33 kV and proceeds to the Western Isles as two 33 kV subsea cables, supplying North and South Uist, the Isle of Barra and the Isle of Harris, where it is converted back to 132 kV and connects to the existing Harris to Stornoway 132 kV single circuit wood pole OHL. Long term network development plans for Skye must therefore be considered against the background of electricity supply requirements to the Western Isles. SSEN Transmission has plans to reinforce the Skye and Western Isles network across three projects as follows:

- The Skye Reinforcement Project (i.e. the Proposed Development assessed in this EIA Report);
- The Harris to Stornoway 132 kV OHL rebuild, and
- The Western Isles High Voltage Direct Current (HVDC) connection between the Isle of Lewis and the Scottish mainland.

2.4.4 **Plate 2.2** shows the overall planned network developments for the Skye and Western Isles region. It also shows the Scottish Hydro Electric Power Distribution (SHEPD) owned 33 kV subsea cable between Ardmore and Harris which failed during October 2020. This was replaced with a new 33 kV cable in September 2021, with electricity supply to Harris and Lewis during the outage met by diesel generation connected at Stornoway.

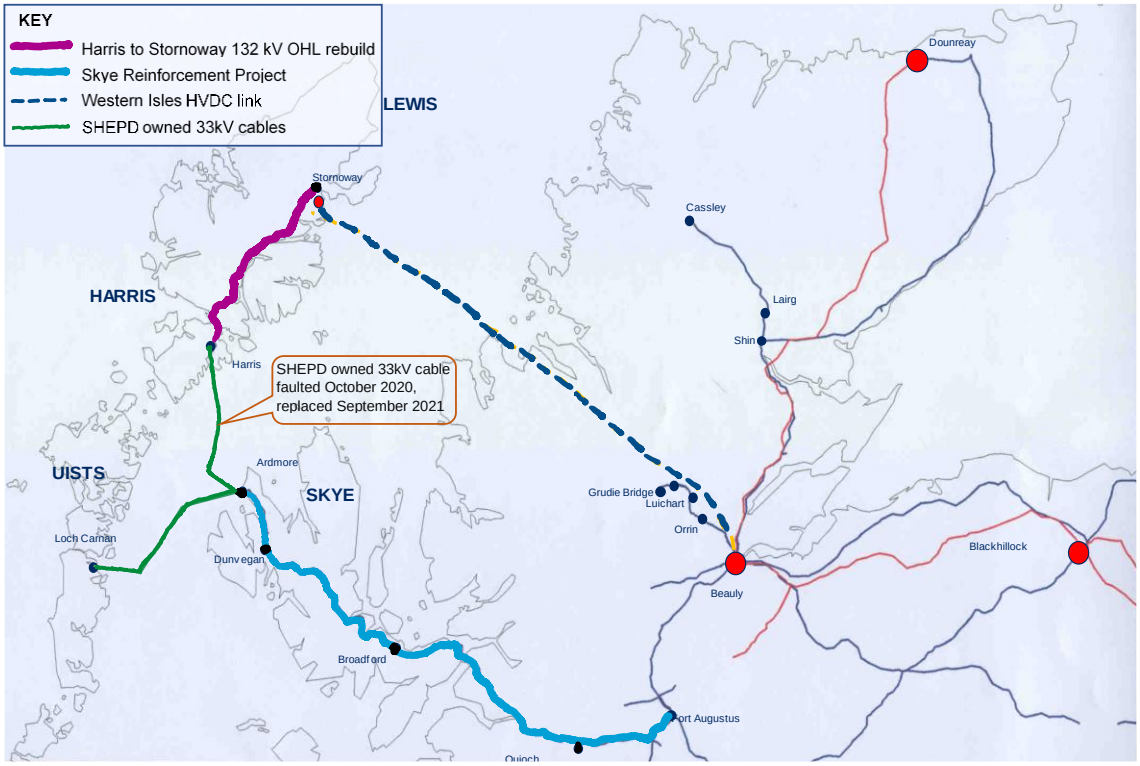
2.4.5 The limited rating of the subsea cable from Ardmore to Harris has been an operational constraint on the electricity network for over a decade. Prior to the recent subsea cable failure, generation exports from Harris to Skye were operationally managed to stay within the rating of the cable, i.e. generation output was constrained. Likewise, during times of high demand on Western Isles, the cable is insufficiently rated to meet demand. This presents power import constraints onto the Western Isles resulting in the need to either reduce demand or to run local diesel generators in order to maintain supply.

[5] Available at: https://www.ssen-transmission.co.uk/media/5705/skye-loti-initial-needs-case-30-jul-2021_redacted-final-31-aug-version.pdf
[6] Available at: https://www.ofgem.gov.uk/sites/default/files/2022-04/Isle%20of%20Skye%20-%20Initial%20Needs%20Case%20decision.pdf

2.4.6 Due to the limited rating and operational constraints, SSEN Transmission worked closely with SHEPD in exploring whole system solutions for the replacement of the failed 33 kV subsea cable. A transmission option comprising a 132 kV cable was considered among other options but was not progressed as the delivery time was much longer compared to the 33 kV solution and safeguarding security of supply was paramount. Furthermore, analysis indicated that a 132 kV cable on its own or in addition to the SHEPD replacement 33 kV subsea cable would not meet all the generation capacity requirements on the Western Isles. Whilst a 132 kV cable option would provide some capacity for renewable generation on the Western Isles, it would not provide the primary solution for this.

2.4.7 Due to the limited capacity of the 33 kV subsea cable to Harris, the case for the Skye Reinforcement Project is not strongly coupled to developments on the Western Isles and the Western Isles link to the mainland at this time.

Plate 2.2: Planned Transmission Reinforcements for Skye and the Western Isles



2.5 Skye Reinforcement Options

2.5.1 To meet the needs of the project, the reinforcement strategy[4] considered a wide range of reinforcement options and potential development pathways for the electricity network on Skye and in the overall Skye / Western Isles region. The principle aim of this process within system planning was to identify the most appropriate network solution to meet project need, taking into account the cost to consumers. This work was undertaken as a precursor to SSEN Transmission preparing the Initial Needs Case submission to Ofgem on behalf of the Applicant, through which the regulator assessed the need for the Skye Reinforcement Project. The key factors considered during this process were technical and economic and included:

- The asset condition of the existing OHL;
- Known and potential future generation capacity requirements and scenarios;
- Security of supply on Skye and the Western Isles;
- The possibility of the proposed Western Isles HVDC link;

- Economic and high level environmental[7] considerations related to different development pathways; and
- Stakeholder feedback received on relevant development work undertaken to-date.

2.5.2 To enable the effectiveness of different potential technical solutions to be explored, project need was considered using three categories for the project drivers that reflect the assessment criteria used by Ofgem in its assessment of the Initial Needs Case. These are:

- Non-load need related to asset condition;
- Security of supply need partly related to asset condition; and
- Renewable generation additional capacity need.

2.5.3 Following the identification of an initial range of options, further technical and economic optioneering was carried out to determine the best, and most viable option against each driver, and prior to a cost benefit analysis being undertaken.

Non-Load Need

2.5.4 Given that the structural and mechanical integrity of the existing OHL are critical for the safe performance and operation of the existing OHL, a 'do nothing' option was ruled out as this would result in the existing OHL being operated until the point of catastrophic failure, with associated security of supply, safety and operational cost implications.

2.5.5 The options initially considered to address the non-load related driver were therefore:

- Refurbishment of the existing steel tower OHL between Quoich and Broadford. This would result in an extended period of disruption and the requirement to run backup diesel generators during outage, as well as security of supply risks. **This option was not considered a viable option and was therefore discounted**;
- Refurbishment of the existing steel tower OHL between Quoich and Broadford, using temporary diversions. This could be achieved through a hybrid method of either refurbishing the existing OHL and stringing the other, currently empty, side of the steel lattice, or by using temporary wood pole diversions while the steel line is refurbished instead. The existing towers would not comply with current design standards and therefore the first option could not be achieved. In addition, temporary diversions would be extremely challenging, costly and with the potential for significant environmental impact during construction and dismantling. **This option was not considered a viable option and was therefore discounted**;
- Asset replacement (do-minimum). This option would require a new 132 kV OHL between Quoich and Ardmore, providing some additional capacity, but not sufficient for all contracted renewable generation on Skye. **As it does not meet the capacity requirements this option was not considered a viable option and was therefore discounted**; and
- Asset replacement (beyond do-minimum). Considered further as a technical solution for the renewable generation capacity driver but also identified as a solution for the non-load driver. **Viable option**.

2.5.6 The conclusion from consideration of the options assessed to meet the requirements of the non-load driver was that asset replacement was the only viable option and should therefore be progressed, with an offline asset replacement identified as the only credible asset intervention option.

Security of Supply Need

[7] In terms of the carbon cost and environmental impact of running back up diesel generators, and maintenance requirements of different options.

2.5.7 In order to address the security of supply related driver, the following options were considered:

- Exploring the viability of an existing 33 kV backfeed from Grudie Bridge to Broadford. The capacity of the existing 33 kV OHL is very limited due to the distance from Grudie Bridge to Broadford, and it would not be economical to upgrade the OHL. It would also not provide for additional capacity requirements for the transmission of new renewable generation to the mainland GB electricity grid. **This option was not considered a viable option and was therefore discounted**;
- Constructing a new 132 kV interconnection OHL between Grudie Bridge and Broadford. This would require constructing a new OHL over difficult terrain, with limited access, and high costs. Whilst it could provide demand security to Broadford, it ultimately would not be able to address the critical non-load driver or the forecasted capacity requirements for the Skye circuit. **This option was not considered a viable option and was therefore discounted**;
- Constructing a new 132 kV interconnection OHL between Corriemoillie and Broadford. This option had similar challenges and constraints as the new 132 kV OHL to Grudie Bridge. **This option was not considered a viable option and was therefore discounted**; and
- Creating a second Skye infeed via the planned Western Isles HVDC link. This option would involve the construction of a HVDC link between Beauly and Stornoway, providing a second infeed to Broadford via the 33 kV Harris to Skye SHEPD owned cable. This option potentially provides security of supply for demand on both Skye and the Western Isles, although the need for asset intervention and the provision of additional transmission capacity on the Skye circuit would still be required. **Due to the uncertainty of the Western Isles HVDC link, and the unmet need for critical asset replacement, this option was not considered a viable option and was therefore discounted**.

2.5.8 It was determined that none of these options would be progressed as they would be unable to meet the requirements arising from the non-load and generation capacity needs.

Renewable Generation Capacity Need

2.5.9 A range of credible future energy scenarios, informed by stakeholder consultation with communities, statutory and non-statutory bodies, were used to determine the baseline and future load requirements, including potential growth scenarios on Skye.

2.5.10 Initially, minimal build and commercial solutions were considered as having the potential to release capacity on the existing network in order to meet renewables generation capacity requirements. Such solutions included: Dynamic Line Rating (DLR); Active Network Management (ANM) and flexibility services through SHEPD's distribution-based solution; and Constrained Management Zones (CMZ). **Due to none of these options being able to address security of supply, additional capacity or non-load need requirements, all were discounted**.

2.5.11 Subsequently, asset solutions were considered comprising different OHL technologies, capacities and voltages to deliver project need requirements. As part of this analysis, environmental, consenting, cost, constructability and operability of the potential solutions were considered.

2.5.12 The following asset options were considered in order to meet renewable generation capacity requirements:

- Wood poles are the lowest cost asset option due to material and installation costs in comparison to other options and are typically used on 132 kV circuits that require lower capacity provision and single circuit security. They often have a lower visual impact than steel structures given reduced height. However, wood pole structures are less reliable than composite or steel structures, requiring more regular inspections and maintenance. They are also incapable of carrying a double circuit line.

- Composite poles are an intermediary solution between trident wood poles and steel lattice towers. They are more reliable than wood poles, but more expensive, and their use across Europe is fairly limited.
- Steel lattice towers are commonly used across the electricity network for voltages of 132 kV, 275 kV and 400 kV. Towers are taller than wood poles, and more expensive due to material and construction costs, but they have much greater span lengths and are more resilient with lower maintenance requirements. The standard 132 kV tower is the L7, already used along parts of the existing Skye transmission OHL network. There are also larger towers that can support higher voltages where required.
- Underground cables are generally not used over long distances due to their high costs and engineering challenges related to the stable and safe operation of an OHL. A full underground cable solution was therefore not considered for this project, although underground cable could be used in shorter sections where considered appropriate, for example to mitigate a likely significant environmental effect.

Summary of Credible Options

2.5.13 An optioneering exercise was then carried out to establish a short list of options based on strategic, technical and stakeholder input that could best deliver the non-load and load requirements of the Skye Reinforcement Project from a strategic system planning perspective. At that stage consideration was given to cost, delivery programmes, capacity and constraint hotspots on the existing circuit as well as feedback from stakeholders. This resulted in SSEN Transmission shortlisting five options in respect of which the Applicant and the Electricity System Operator, National Grid ESO, ("the ESO") carried out cost benefit analysis ("CBA").

2.5.14 **Table V1-2.2** provides a summary of the five shortlisted options that were identified through this process and that were the subject of CBA and included in the Initial Needs Case submission to Ofgem on behalf of the Applicant[8]. The ESO also carried out a CBA in respect of these 5 shortlisted options. This work was required as part of the Large Onshore Transmission Investment ("LOTI") re-opener mechanism under Ofgem's RIIO-2 price control mechanism. The current position in relation to this assessment work is summarised below in Part 2.6 of this Chapter.

Table V1-2.2: Options Shortlisted for the Skye Reinforcement Project

Option	Description	CAPEX (£m)	OPEX (£m p.a.)	EISD
0	Baseline (Minimum option) – Single Circuit Trident 132kV wood pole Fort Augustus to Ardmore	[redacted]	[redacted]	2025
1b	Two 132kV wood pole single circuits from Fort Augustus to Broadford, 132kV double circuit steel structure strung on one side from Broadford to Edinbane and a 132kV wood pole single circuit from Edinbane to Ardmore	[redacted]	[redacted]	2025
4a	132kV steel tower double circuit from Fort Augustus to Edinbane and a 132kV wood pole single circuit from Edinbane to Ardmore	[redacted]	[redacted]	2025
4a0 to 4a1	Two 132 kV wood pole single circuits from Fort Augustus to Invergarry, 132 kV double circuit steel tower strung both sides from Invergarry to Edinbane then single circuit wood pole to Ardmore. If the Invergarry 400 kV substation progresses, the Fort Augustus to Invergarry section will be dismantled and the line turned into the new substation	[redacted] [redacted]	[redacted] [redacted]	2025 2030
5a	Double Circuit 275 kV from Fort Augustus to Edinbane with single trident 132kV to Ardmore	[redacted]	[redacted]	2027

[8] Available at: https://www.ssen-transmission.co.uk/media/5705/skye-loti-initial-needs-case-30-jul-2021_redacted-final-31-aug-version.pdf

2.6 Strategic Reinforcement Option

2.6.1 Following consideration of viable options and solutions to deliver the Skye Reinforcement Project, it was concluded in the Initial Needs Case that the most appropriate reinforcement option to deliver the project need requirements (the Preferred Option) was to rebuild the full 160 km length of the existing Skye OHL from Fort Augustus to Ardmore on the Isle of Skye as follows:

- Rebuild the Fort Augustus to Edinbane section with a high capacity 132 kV double circuit steel tower OHL (2 x 348 MVA summer rating); and
- Rebuild the Edinbane to Ardmore section with a 132 kV single circuit wood pole OHL (176 MVA summer rating).

2.6.2 The above reinforcement option is that identified as Option 4a in **Table V1-2.2** above and is the Applicant's preferred option. Ofgem has confirmed that the assessment work carried out by SSEN-Transmission has covered an appropriate range of options to address the non-load and load related drivers for the Skye Reinforcement Project. The options identified in **Table V1-2.2** were considered to be appropriate in terms of their technical solution and the preferred option is considered to be reasonable and likely to provide the optimal solution having regard to the combination of non-load and load related drivers, and background generation assumptions used in the CBA.

2.6.3 The preferred option was subject to further consideration of environmental, engineering and cost factors during the routeing and alignment selection stage of the project, as described within **Volume 1, Chapter 4: The Routeing Process and Alternatives.**

2.6.4 This resulted in changes to the design of the preferred option, Option 4a, that was the proposed development solution at the time that the Initial Needs Case submission was made. The main revisals to the design for Option 4a that have been required to take account of environmental and technical considerations are summarised below:

- 24 km of new build 132 kV double circuit underground cables between Fort Augustus and Edinbane Substations (approximately 9.5 km in Section 6 and approximately 15 km in Section 2 of the route), and associated sealing end compounds at the cable remote ends; and,
- the installation of required reactive compensation equipment, in the form of shunt reactors, at both Broadford and Edinbane Substations and synchronous condensers at Edinbane Substation because of the long radial nature of the sections of underground cables.

2.6.5 SSEN Transmission proceeded with submission of the Final Needs case to Ofgem in July 2022. In the submission it updated the Initial Needs Case through the presentation of the details of the final configuration and design of the proposed and recommended solution for the Skye Reinforcement Project, having regard to the above design decisions that had been taken since the Initial needs Case was submitted in July 2021. Ofgem had issued its Decision on the Initial Needs Case in April 2022.

2.6.6 The Final Needs Case submission continues to support the need for SSEN Transmission to undertake the reinforcement of the Skye OHL circuit that will cover the full 160 km length of the existing Skye 132 kV single circuit OHL from Fort Augustus Substation to Ardmore on the Isle of Skye, which Ofgem is being asked to approve. The total investment cost is currently estimated to be £488m and from additional cost benefit analysis carried out by SSEN Transmission it is estimated that the significant wider economic and environmental benefits that would be created from the recommended Skye reinforcement option would be:

- The creation of over £300m and £1.2bn to the local and UK economies inclusively over the lifetime of the asset, and,

- £160m of net benefit to society based on the whole life carbon profile of the recommended Skye reinforcement option.

2.6.7 The Final Needs Case submission was made on 21 July. In Ofgem's Decision on the Initial Needs Case, Ofgem recognised the need to allow flexibility in its LOTI regulatory process to ensure that the necessary delivery dates for the Skye Reinforcement Project can be met and therefore were willing to consider the Final Needs Case prior to the statutory consents for the construction and operation of the proposed Skye Reinforcement Project being granted. Following further discussion, Ofgem is supportive of reviewing and providing a conditional decision on the Final Needs Case prior to statutory consents being granted on the basis that SSEN Transmission provide further information on how the generation background on Skye has progressed since the Initial Needs Case in July 2021. This additional information was submitted to Ofgem on 12 September.

2.6.8 The submission clearly rejects an alternative design solution considered by Ofgem as worthy of investigation (the lower capacity Option 1b) as it would not meet two of the drivers for the Skye Reinforcement Project, those being: the delivery of security of supply within the necessary timescale; and, the provision of capacity for contracted generators, 50% of whom would be denied connection unless the project is delivered within the timeframe set out in the paragraph above.

2.6.9 Since the Skye Reinforcement Project was first the subject of investigation and design, the case for providing additional capacity for identified growth in renewable generation has strengthened significantly. In the Final Needs Case submission, the current position in relation to contracted generation and updated generation pipeline has been updated, which demonstrates the requirement for increased network capacity in the next 5 years taking account of Net Zero targets. SSEN Transmission confidently predicts in its Final Needs Case submission that to proceed with reinforcement of the existing network at the lower capacity of Option 1b, would be to build a network that would be under capacity and significantly oversubscribed from the date of energisation.

2.6.10 SSEN Transmission seeks the approval of Ofgem for it to undertake the reinforcement of the Skye OHL circuit based on its recommended Option 4a with the updated design requirements as described in the Final Needs Case submission. Based on updated cost benefit analysis it has been submitted to Ofgem that this reinforcement option provides the highest consumer value and meets the system requirements based on the drivers for the Proposed Development. In relation to meeting the objectives of both the Scottish Government and UK Government to meet the Net Zero targets, the momentum of both legislative and Government policy changes has significantly strengthened the level of support for projects such as the Skye Reinforcement Project in order to deliver the required transmission network infrastructure for connection of new renewable generation.