

Argyll & Kintyre Reinforcement Strategy Final Needs Case Submission

10th May 2023



Contents

Executive Summary	1
1. Introduction	4
2. Stakeholder Engagement.....	7
3. The Need	14
4. Reinforcement Options	25
5. Reinforcement Options Assessment.....	27
6. Proposed Reinforcement Option	34
7. Project Timeline and Delivery Strategy.....	40
8. Conclusion.....	54
9. Appendices.....	56

Executive Summary

SSEN Transmission is submitting the Final Needs Case (FNC) for the Argyll and Kintyre 275kV Reinforcement Strategy, under Special Licence Condition 3.13 of our Transmission Licence and Ofgem's Large Onshore Transmission Investment (LOTI) Guidance. This follows the submission of our Initial Needs Case (INC) which was approved on 15 December 2022.

We are seeking Ofgem's support and approval for the recommended Argyll and Kintyre 275kV Reinforcement Strategy. This consists of the upgrade of the existing network to 275kV operation from Crossaig in the South to a connection point located to the east of the village of Dalmally on the ScottishPower Transmission (SPT) Dalmally – Windyhill 275kV Overhead Line (OHL).

Key Messages:

- **The current network is full and the need for growth is certain.** Continued growth of contracted and consented generation provides an imperative for reinforcement options development (chapter 3).
- Rigorous and extensive stakeholder consultation has shown that there is a strong and **increasing need for network capacity to export renewable energy** to the Great Britain (GB) system from the Argyll and Kintyre network (chapter 2).
- We have **considered a wide range of possible solutions** to meet the need for increased capacity, narrowing these to a shortlist of deliverable options (chapter 4).
- Our **recommended option is ranked as highest value for consumers** by the Electricity System Operator's (ESO) Cost Benefit Analysis (CBA) results of operable network solutions (chapter 5).
- The recommended Argyll and Kintyre Reinforcement Strategy is in line with Future Energy Scenarios and is **an essential component of the pathway to a Net Zero energy system.**
- Enabling connection of significant volumes of renewable energy through new network capacity will provide **significant benefits to the GB consumer**, supporting the transition to a low-carbon economy.
- In September 2022 the Local Authority objected to the Section 37 (s37) planning application for the proposed new 275kV overhead line between Creag Dhubh substation and connection onto the existing SPT Dalmally – Windyhill 275kV overhead line. This has triggered a Public Local Inquiry (PLI) which may delay this consent and full energisation of the Strategy by up to 18 months.
- We have identified opportunities to re-sequence activities to mitigate the impact of the PLI, reducing the delay by up to 11 months, based on FNC approval by the end of August 2023 and all planning consents received by April 2024. We will be able to provide a final view on target energisation dates in our Project Assessment (PA) submission once the regulatory and planning consents status for the project is clearer.
- We anticipate to place contracts in late 2023 and start construction in 2024 with the scheme fully energised as early as December 2027 (subject to outcome of the PLI for the

Creag Dhubbh to Dalmally OHL s37 and timely FNC approval by Ofgem), at a current estimated cost of [REDACTED]

- To support the mitigation of the PLI delay, we are seeking Ofgem’s approval this FNC ahead of securing planning consent for the overhead line elements of the Strategy.

The current network is full and the need for growth is certain

The current network is nearing capacity and will shortly be full from the connections of existing contracted generation. Continued growth in the need for generation connection capacity is certain. With a current total installed generation capacity of 582 Megawatts (MW) against a peak demand of approximately 64MW, the Argyll and Kintyre area is a net exporter of renewable generation.

Increasing drive for network capacity to export renewable energy

The existing network can accommodate an additional 108MW of additional contracted generation. The current contracted background is approximately 2,265MW, representing an increase of 1,595MW since the submission of the INC which was 670MW. There is a further 444MW which is in the application process and there continues to be interest from scoping generation. This is shown in Figure 1. The trend in generators seeking connection to the grid from 2026 onwards will continue. As electricity demand increases and energy becomes greener, further renewable and pumped storage developments are expected.

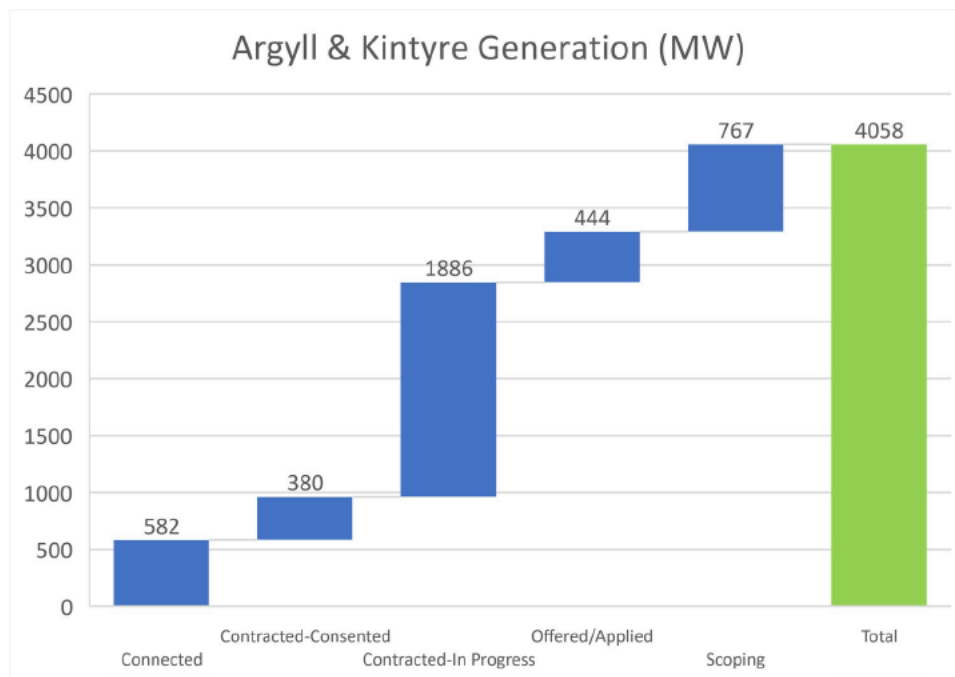


Figure 1 Capacity looking to connect into the Argyll and Kintyre area categorised into connected, contracted-consented, contracted-in progress, offered, and scoping generation

Our recommended option is ranked as highest value for consumers

To connect low carbon, renewable generation customers while maintaining a safe and secure system we are seeking approval for the Argyll and Kintyre 275kV Reinforcement Strategy. This

consists of the upgrade of the existing network to 275kV operation from Crossaig in the South to a connection point located to the east of the village of Dalmally on the SPT Dalmally – Windyhill 275kV OHL. This will form a reinforced transmission network in Argyll, providing significant benefits to the GB consumer, supporting the transition to a low-carbon economy by enabling the connection of the next tranche of low carbon contracted generation in Argyll and Kintyre and provide benefits to the local economy. It consists of five key elements:

- Establishing a new 275/132kV substation at Creag Dhubh to enable connection to SPT's Dalmally-Windyhill 275kV OHL circuits. These are to be connected by c.14km of new 275kV Double Circuit OHL.
- c.10km of new 275kV Double Circuit OHL between Creag Dhubh and a tee point on the existing Inveraray-Crossaig circuits to enable 275kV operation of this section.
- Construction of replacement An Suidhe and Crarae substations to enable them to maintain connection to the new 275kV network – to be delivered for November 2028.
- Establishing a new 275kV substation at Craig Murrail and relocation of the Port Ann Grid Supply Point (GSP) to this site.
- Establishing a new 275/132kV substation in the vicinity of the existing Crossaig Substation.

Subject to necessary regulatory and planning approvals, we will place contracts in 2023 and start construction in 2024 with full energisation as early as December 2027. However, if we do not receive a minded-to FNC decision ahead of all material planning consents then our anticipated full energisation date is November 2028. We have produced programmes that work towards these two energisation dates, and these are presented in the annexes for this FNC submission. The total investment cost will depend on the detailed design that is under consultation with stakeholders but is currently estimated to be [REDACTED], excluding generation connections.

1. Introduction

1.1. Project Background

This FNC for the Argyll and Kintyre 275kV Reinforcement Strategy (Argyll 275kV Strategy) is submitted under Special Licence Condition 3.13 for LOTI Reopener in RIIO-T2, which allows for large transmission developments to be brought forward during the course of the price control period on a case-by-case basis. This submission follows Ofgem's INC approval on 15 December 2022 and direction permitting us to submit the Argyll and Kintyre FNC prior to securing all material planning consents.

The Argyll 275kV Strategy is fundamental to achieve a Network for Net Zero in the north of Scotland and the 2045 Scottish and 2050 UK Government net zero targets. The UK Government recently updated its interim target to reduce emissions by 78% by 2035¹. In October 2021, the UK Government committed to decarbonise the electricity system by 2035².

To keep up growth of renewable capacity, key infrastructure investments must be progressed at pace to ensure costs are efficient for consumers today, and tomorrow. The ESO's modelling at the time demonstrated that after Network Options Assessment (NOA) 2020/21 investments, constraint costs increase from around £500 million per year to between £1 billion and £2.5 billion per year at a maximum, before falling away towards 2040³. Since then, we have seen the ScotWind generator connection applications which will result in the level of constraints increasing, and any delay in delivering the necessary infrastructure will make this worse. The right investment in the network, delivered at the right time, is essential to meet Net Zero targets.

This LOTI submission presents the case for the Argyll 275kV Strategy which consists of the upgrade of the existing network to 275kV operation from Crossaig in the South to a connection point located to the east of the village of Dalmally on the SPT Dalmally – Windyhill 275kV OHL. This will form a reinforced transmission network in Argyll, providing significant benefits to the GB consumer, supporting the transition to a low-carbon economy by enabling the connection of low carbon generation, and providing benefits to the local economy.

Following the Ofgem LOTI guidance, this FNC submission provides evidence of a well justified need for the reinforcement, evidence on the options considered and clear justification for the proposed solution. It also provides details of the delivery strategy to meet the project timeline, along with details of the significant stakeholder engagement undertaken as we have progressed the reinforcement options and confirmed the generation background.

The history of the transmission network in Argyll and Kintyre area, and details of the work undertaken on this network prior to the submission of the INC for the Argyll 275kV Strategy is provided in Chapter 2 of the INC.

¹ <https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035>

² <https://www.gov.uk/government/news/plans-unveiled-to-decarbonise-uk-power-system-by-2035>

³ <https://www.nationalgrideso.com/document/194436/download>

1.2. The Need

Following commitment from both the UK and Scottish Governments to achieve net zero emissions by 2050 and 2045 respectively, SSEN Transmission set out an economically justified pathway for reinforcement that will meet net zero targets at the lowest risk to GB consumers. This allows incremental development of network capacity to support the connection of additional renewable generation when it is ready.

A significant and sustained increase in the volume of renewable generation is seeking connection to the Argyll and Kintyre transmission network since late 2019. In March 2022 we submitted the INC for the proposed Argyll 275kV Strategy that is required to enable connection of the significant volume of generation seeking connection to the network on this part of the network as detailed in the INC. Since the submission of the INC, we have continued to see an increasing trend in generator applications, with a number of generation interests progressing from scoping to submitting connection applications, and some of them proceeding to agree connection contracts. Power system studies identified that network reinforcement is required to accommodate the contracted generation while maintaining compliance with the National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS).

Details of the generation development in Argyll and Kintyre which is driving the load need for network reinforcement is contained within **Chapter 3** of the FNC.

1.3. Ongoing commitment to stakeholders

Stakeholder engagement has been ongoing since early 2016 on a project-by-project basis due to the changing generation background in the Argyll and Kintyre region. The recent rapid increase in generation connection requests across Argyll and Kintyre has consequently resulted in an accelerated engagement process for the wider Argyll 275kV Strategy. We subsequently adopted a holistic engagement approach to ensure all stakeholders are aware of the full breadth of the project remit and requirement and provided with opportunities to feed into the decision-making process.

Following the submission of the INC we have continued to develop the projects that make up the Argyll 275kV strategy, which includes the submission of planning consent applications. In September 2022 Argyll and Bute Council objected to the s37 planning application for the proposed new 275kV overhead line between Creag Dhubh substation and connection onto the existing SPT Dalmally – Windyhill 275kV overhead line. This has resulted in the requirement for a PLI on this element of the project.

Consistent with our RIIO-T2 Business Plan commitment and Ofgem’s enhanced engagement approach in RIIO-T2, we have worked closely with our stakeholders to gather their feedback which has influenced our options and preferred solution. Further details can be found in **Chapter 2**.

1.4. Structure and content of Final Needs Case Submission

The comprehensive stakeholder engagement we've undertaken, including an overview of stakeholder views and how these have informed our recommended Strategy, is discussed in **Chapter 2**.

The need for reinforcement of the Argyll and Kintyre network is discussed in **Chapter 3** and is driven by the requirement to provide efficient capacity to accommodate renewable generation seeking to connect in the area.

The transmission reinforcement options are discussed in **Chapter 4**, and the solutions that are considered operable from the system operability studies are highlighted. Full details of the optioneering process and operability studies are listed in the INC.

The CBA refresh undertaken by the ESO on the identified operable options from the INC are discussed in **Chapter 5**. Here we demonstrate the expected long-term value for money of the proposed solution for consumers when compared to alternative approaches.

The preferred reinforcement option is discussed in **Chapter 6**.

The project timeline and delivery strategy are discussed in **Chapter 7**.

Finally, the conclusions are given in **Chapter 8**.

Chapter 9 is the Appendices. Supporting documents are clearly signposted throughout the submission. The Appendices set out a list of the supporting documents, with a description of purpose and contents for each document.

2. Stakeholder Engagement

Since March 2022, we have continued with our planned engagement activities as outlined in the INC submission. This includes strategic engagement on the wider Argyll 275kV Strategy and targeted engagement on the individual projects within this strategy, particularly the Creag Dhubh to Dalmally 275kV connection and the Creag Dhubh to Inveraray 275kV OHL and developer engagement to help inform the FNC, as we seek to work with stakeholders to co-create the final solution.

The engagement throughout Q2, Q3 and Q4 2022 has primarily been:

- **Strategic Regional Engagement**
- **Public and Statutory Consultation**
- **Targeted Community Engagement**
- **Targeted Developer Engagement**

2.1. Continued Stakeholder Engagement, Feedback and Actions Taken

In the following table, we have summarised the key engagement activities since the INC submission, outlining the feedback received and any actions we have undertaken as a result of this feedback.

<p><u>Argyll and Kintyre Reinforcement Strategy- Information Sharing Webinar</u></p> <p>Following on from the success of our regional webinar in March 2021, where 93% of responders told us that they were interested in hearing more about the Argyll 275kV Strategy, a further regional webinar was held in May 2022. This was considered an optimal time to provide a detailed update to a wide range of stakeholders, as an extensive programme of regulatory and statutory submissions relating to the project was planned across Spring/Summer 2022.</p> <p>The engagement aimed to ensure those with an interest in the region were well informed of upcoming project milestones and their opportunities to provide comment and help shape proposals, whilst also providing a platform for stakeholders to put questions directly to the project team. A regional whole picture approach provided context to individual projects and avoided fragmented engagement.</p> <p>The webinar was attended by nearly 100 stakeholders, including statutory consultees, elected members, community members, regulators and customers.</p>	<p>Feedback received on the event was positive. Stakeholders found it informative and helpful, confirming it was seen as an accessible method to understand how individual projects fitted into the overall Argyll 275kV Strategy and the regions' role in the delivery of Net Zero. We also used this as an opportunity to understand stakeholder preferred method and frequency of communication.</p> <p>54 questions/comments were received during the event. Questions received during the session can be grouped into the following themes:</p> <ul style="list-style-type: none"> • Supply chain information regarding timescales, forecasting and opportunities • Alternatives to new overhead line solutions • Potential environmental impacts and means for mitigation <p>Actions Taken: A recording of the webinar⁴ is publicly available on our website and further events will be considered at strategic milestones in the project where appropriate, this includes Meet the Buyer events and supply chain engagement. All questions raised which were not answered during the event received a full response after the event. The other actions in response to the feedback gathered are covered in the table below.</p>
<p>Public and Statutory Consultation – Q2 & Q3 2022</p>	<p><i>Feedback Received and Actions undertaken</i></p>
<p><u>Creag Dhubh to Inveraray 275 kV - Overhead Line Alignment Consultation and Blarghour Windfarm Connection Route Options Consultation</u></p> <p>Consultation events were held in May 2022 on the Creag Dhubh to Inveraray 275 kV Overhead Line Alignment and Blarghour Windfarm Connection Route Options. A mail drop to 156 properties, advertisements in the local press, a social media campaign and direct emails to interested stakeholder encouraged participation and feedback. Consultations took place on:</p>	<p>Feedback received from stakeholders during these consultation events reiterated the themes previously outlined by stakeholders and can be summarised as:</p> <p>Design and build a solution that is sensitive to the environment and fully environmentally assessed, with particular attention to ornithology, fish habitats, potential impacts on forestry and peat as well as landscape and visual impacts.</p> <p>Fully consider alternative technologies in the design and build to limit, including undergrounding as much as possible, to mitigate any visual impacts.</p>

- Face to Face Events -Tuesday 18th and Wednesday 19th May 2022 from 2pm - 7pm Loch Fyne Hotel, Inveraray
- Live chat sessions - Tuesday 24th and Wednesday 25th May 2022 from 5pm-7pm

Tangy and Earraghail Wind Farm connection – Routeing Consultation

In August 2022 we consulted with stakeholders on the route for the Earraghail Wind Farm Connection project. This was done in conjunction with the route consultation for the Tangy IV Wind Farm connection project. Promotion included 4634 maildrops to local properties, press advertisements and invitations to Councillors for the Mid Argyll Ward and South Kintyre Ward and Community Council's for West Kintyre, East Kintyre, South Kintyre and Tarbert and Skipness. 63 people attended the in-person events and 49 visited our consultation portal 76 times throughout the consultation period.

- Face to Face Events- Tuesday 23rd August 2022 from 2pm till 7pm Campbelltown Town Hall and 24th August 2022 from 2pm till 7pm at Whitehouse Village Hall
- Live chat session -Thursday 25th September 2022

Sheirdrim Wind Farm Connection – Alignment consultation

In August 2022 we consulted with public stakeholders on the alignment options for the Sheirdrim Wind Farm Connection project. Maildrops were issued to 650 local properties, advertisements placed in local press and invitations extended to Councillors for the Mid Argyll Ward, and Community Councils for West Kintyre, East Kintyre, Tarbert and Skipness.

Local communities were interested in making sure the socio-economic benefits were fully realised while ensuring due consideration was taken of potential impacts on local tourism.

Actions taken: Where consultees have requested further in-depth environmental survey works and assessments, all requirements will be fully addressed during project refinement, with robust assessments included within this process and environmental consultees kept updated and informed as to progress of assessments at each stage for each element and invited to make further comment on outcomes. Technology options will continue to be assessed alongside environmental considerations to determine the best and most appropriate solution.

Consultation on the windfarm connections highlighted a need for further collaboration between SSEN Transmission and windfarm developers during consultation events, to help community members understand the role of each and how best to ensure any feedback is directed appropriately to the correct organisation.

In addition, we will explore opportunities to develop a programme of STEM engagement and outreach with local schools, in consultation with Developing Young Workforce Argyll, to deliver skills training in the region to help build the net zero workforce. We will also continue to provide potential opportunities for local companies and local employment during construction, for example, in areas including accommodation, minor civils, fencing, landscaping and catering type services.

⁴ <https://www.ssen-transmission.co.uk/our-stakeholder-engagement/recent-stakeholder-publications/>

- Face to Face Events - Skipness Village Hall on Tuesday 27th September and Whitehouse Village Hall on Wednesday 28th September 2022
- Live chat session - Thursday 1st October 2022

Summary of our engagement activities and stakeholder participation

Regional Webinar	Consultation Events
<ul style="list-style-type: none"> • 184 registered for our regional webinar • 97 attendees to the webinar • 54 questions submitted and responded to • 22 Feedback from received 	<ul style="list-style-type: none"> • Maildrop to 156 properties & 8 commercial properties • Advertisements in 4 local press publications • Social media campaign • Email to MP's & MSP's, Community Council, Statutory and Non-Statutory Consultees • 24 attendees at our in-person events • 30 visits to the project webpage • 9 articles of feedback at the in-person events • 1 follow up email received • 7 written consultation responses were received from statutory and non-statutory consultee • 7 community members feedback received via land agencies representing them

Targeted Stakeholder Engagement

In line with our commitment, as outlined in the INC, to tailor our engagement methods to suit individual stakeholder groups we've continued to adopt this approach throughout Q3 & Q4 2022. Where existing relationship-based engagement channels were already established we undertook engagement through these to minimise stakeholder fatigue, additionally undertaking specific engagement with individual stakeholder groups. Details of this more targeted engagement is below:

Community Engagement-Q2 2022	Feedback Received and Actions undertaken
<p>Creag Dhubb to Dalmally Information Sharing Event</p> <p>In recognition of feedback received from local community stakeholders in the Dalmally area, regarding the effect of additional infrastructure in the vicinity of the village, we have continued targeted engagement with a view to building trust and ensuring further efforts are made to describe the trade-offs in the decision making undertaken to date. To aid transparency and help set appropriate expectations</p>	<p>Feedback from these sessions is consistent with that heard from stakeholders previously and can be summarised as:</p> <p>Any disruption in the area must be minimised, urging us to develop an economic, co-ordinated solution that minimise the effect of additional infrastructure on the village of Dalmally.</p>

<p>for the community, in May 2022 we wrote to residents to inform them of our intention to apply for consent for our preferred route.</p> <p>This was supported with an Information Sharing Event, held in June 2022, in Dalmally Community Centre, to allow the local community and wider stakeholders the opportunity to review the planning application details and engage with the project team. This recognised previous stakeholder requests, in October 2021, for increased visualisation and clearer representations of what the route would look like. The information event was attended by around 50 people and included photomontages from key local landmarks as well as SSEN Transmission’s 3D model, which allows a 3D visualisation⁵ of the overhead line and substation to be viewed from anywhere in the local area.</p>	<p>Actions taken: Further ongoing engagement to help aid community understanding of the project and address any misinformation, while continuing to focus on sharing the stakeholder trade off process and resultant decisions. We acknowledged the effectiveness of 3D modelling and will focus on creating additional promotional media and communication materials such as information videos, interactive maps, and 3D models to aid transparency and improve understanding. A Dalmally Communications Plan will be developed to support delivery of this objective and we will publicise more widely the socio-economic benefits we estimate will be associated with the project.</p>
<p><i>Developer Engagement- Q3 2022</i></p>	<p><i>Feedback Received and Actions undertaken</i></p>
<p>Understanding Argyll’s Future Energy Ambitions Questionnaire & Drop In Sessions</p> <p>To supplement our initial assessment, completed for the INC, of the future generation potential in Argyll and Kintyre and to provide further supporting evidence to the CBA, we carried out further targeted engagement with developers with plans to connect to the electricity network in this area in early August. They were invited to complete a questionnaire to confirm their connection interests and two online Drop-in sessions were provided, where the project team were available to support with any queries on purpose or content of the questionnaire or the wider Argyll strategy in general.</p>	<p>Feedback from these sessions is consistent with that heard from stakeholders previously and can be summarised as:</p> <p>Developers continue to request we develop an enduring solution which would provide sufficient capacity for significant additional renewable generation and mitigate risk of future connection delays.</p> <p>Already contracted customers reiterate the need for timely delivery of the required reinforcement as critical to meet connection dates. They also recognise a wider requirement beyond just their own schemes in the area.</p> <p>Actions taken: This successful engagement with customers provided us with critical information on the certainty of future generation projects and route to market and allowed us to refresh the future scenarios used in the INC. This up-to-date developer information evidences a strong generation pipeline in Argyll which will be further defined through ongoing interface meetings.</p>
<p><i>Ofgem Engagement</i></p>	<p><i>Feedback and Actions Taken</i></p>

⁵ <https://www.ssen-transmission.co.uk/projects/creag-dhubh-dalmally-275kv-connection/>

<p>Bilateral Meetings</p> <p>In August 2022 we met with Ofgem to provide an indication of the key changes between INC and FNC, to seek flexibility in the LOTI assessment process and explore possible FNC submission dates ahead of securing planning consents, in order to allow connection of renewable generation to the electricity system by the contracted generation dates. We will continue to engage with Ofgem to provide relevant project updates and ensure they are kept abreast of any changes.</p>	<p>Throughout our engagement with Ofgem their feedback can be summarised as:</p> <p>Design and build an economic solution which provides the best value to GB consumers.</p> <p>Actions taken: Ongoing engagement with Ofgem at interface and update meetings to discuss the CBA ensure the project supports the delivery of a net zero economy at the lowest cost to consumers.</p>
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2.2. Objection to our Section 37 application

In September 2022, Argyll and Bute Council’s Planning, Protective Services and Licensing Committee objected to our s37 application for the Creag Dhubh-Dalmally overhead line. Under the provisions of the Electricity Act, an objection to a s37 application by a local authority automatically triggers a PLI. The application has now been referred to the Department for Planning and Environmental Appeals (a division of the Scottish Government) who have appointed a Reporter to hear evidence from all parties, including community representatives, and make a recommendation to the Scottish Ministers as to whether the application should be granted. SSEN Transmission is preparing for the PLI, upon which we anticipate receiving a decision from the Scottish Ministers by April 2024.

We remain confident that our s37 application for the proposed overhead line was developed following robust and extensive stakeholder consultation to help shape its final design, as outlined in both this and our INC submission. We continue to believe that the proposal represents an appropriate balance between the key environmental, technical and economic factors which need to be considered in the development of any critical national infrastructure and recognise that ongoing engagement is required with the community to enable them to understand the balancing of these considerations which have been applied in the decision-making process to date.

We will continue to work positively and constructively with local councillors and community members, with further engagement planned, to find further ways to deliver on our commitment to openness and transparency as we progress with the project.

2.3. Next steps

We remain committed to ongoing and comprehensive engagement with stakeholders and will continue to seek to understand stakeholders’ positions and as far as reasonably practical, ensure that their views are addressed to achieve consensus decision making throughout the duration of the project.

We recognise further engagement is required with all stakeholder groups particularly those high interest stakeholders identified in our initial stakeholder mapping, including communities such as the Dalmally area, community councils, planning authorities and elected members. We will continue to review our stakeholder identification approach, ensuring all relevant stakeholders are included across each stage of the project development, construction and operational lifespans.

We have reviewed the feedback received in the INC consultation responses and are comfortable that the issues raised have been addressed in the comprehensive Q&A document published on our website⁶. This document has been widely circulated to stakeholders in the Dalmally area, including Community Councils and letter drops to all homes.

We will continue to review any questions raised to ensure all queries are fully answered and our dedicated project Community Liaison Manager is available to offer support. We remain committed to ongoing further engagement with the community throughout the lifecycle of the project.

2.4. Conclusion

We have continued in our efforts to go above and beyond the statutory engagement requirements in Argyll and Kintyre to deliver the request from local and community stakeholders for a holistic view of developments and early opportunities to review and influence proposals.

To date, our approach to the triangulation of any feedback we have received has enabled the identification of requirements and requests at an early stage in the development process ensuring adequate time for these to be applied in the project refinement where possible.

A summary of the key mitigations agreed following the engagement activities are as follows:

- Design and build an enduring solution that recognises both local and developer needs and provides sufficient capacity for future generation without additional works required in the future.
- Environmental and wildlife sensitivities will continue to be robustly assessed through the Environmental Impact Assessment (EIA) process, with the implementation of any appropriate mitigation measures.
- Development of a Dalmally Communications Plan to support ongoing and transparent engagement with the community in Dalmally, to explain how their views have been considered and the trades offs necessary to deliver the country's carbon reduction targets and the socio-economic benefits associated with the project.

⁶ <https://www.ssen-transmission.co.uk/globalassets/projects/projects/creag-dhubh---dalmally-275kv-connection-downloads/dalmally-community-qa-21-oct-2021.pdf>

3. The Need

3.1. Introduction

The need for reinforcement of the Argyll and Kintyre network is driven by the requirement to provide efficient capacity to accommodate renewable generation which will connect in the area. In the INC, we provided robust evidence of the drivers for undertaking the proposed works.

Following the submission of the INC in March 2022, the generation background has become more certain with a significant number of generators applying for a generation connection in the Argyll and Kintyre area, and subsequently agreeing connection contracts. This demonstrates a progression and increased certainty of the generation in the area as generators move from a scoping position to a contracted or applied position. The local Future Energy Scenarios (FES) has also been updated to reflect the change in generation background. This progression of the generation background is detailed within this chapter.

We conclude that the renewable generation driven need for increased network capacity on the Argyll and Kintyre network has been established.

- **Current consented generation, 380MW, exceeds the available network capacity of 108MW**
- **Contracted generation, 2,265MW, far exceeds that level**
- **Both the ESO FES and our local FES all point to generation growth at levels which are significantly higher.**

We see compelling evidence that further reinforcement will be required to meet the continued generation growth. To this end, our incremental investment strategy is ideally suited, avoiding unnecessary investment and ensuring we remain on a Net Zero pathway.

3.2. Summary from INC

As referenced in the introduction of this chapter, the generation background has significantly increased and become more certain. The update within this chapter focusses on the generation background. It provides updates to the contracted background, the scoping background, and the local FES.

Details on the non-load need in this network area is detailed in Chapter 4 of the INC. This has not changed since the INC, and the conclusion of the non-load need assessment is that intervention is required to replace the insulators and associated fittings on the Taynuilt – Inveraray double circuit OHL beyond the RIIO-T2 period. Approximately half of this circuit is proposed to be rebuilt as part of this project which will realise efficiencies for the non-load replacement works. The remaining section of circuit to Taynuilt is a radial circuit that is not proposed to be reinforced as part of this project.

The current total installed generation capacity in the area is 582MW against a peak demand of 64MW. The area is therefore still a net exporter of renewable generation. The proposed reinforcement option from the INC ensures that we maintain compliance with the demand security criteria of Engineering Recommendation ER P2/7 (applicable to Distribution) and the NETS SQSS (applicable to Transmission). This is detailed in Chapter 4 of the INC.

Connection studies undertaken in accordance with the NETS SQSS and the Connect and Manage criteria of the Connection and Use of System Code⁷ (CUSC), pursuant to the Transmission Standard Licence Condition D3, indicate that network augmentation is needed to provide the necessary efficient capacity to connect the contracted generation. The proposed transmission reinforcement works are set out in the connection agreements with developers. Any minimum enabling works required to connect generation are required to be completed before the generation requiring them can connect.

The following sections discuss updates to the contracted generation background, and an update to the local FES.

3.3. Contracted generation

At the time of submitting the INC we had observed a significant and sustained increase in renewable generators that were seeking to connect to the Argyll and Kintyre transmission network. Since the submission of the INC we have continued to see a significant volume of generation submitting connection applications for this part of the network. We have updated this section of the FNC to reflect the significant increase.

As shown in Figure 2, a significant volume of generation has been offered a connection to this network in the three years leading to the submission of the INC in March 2022. However, since the submission of the INC we have seen this increase even further. The 582 MW of connected generation includes two onshore wind farms, Blary Hill (35 MW) and BAT III (50 MW), which connected in September 2021. This is represented in Figure 2 by the drop shown between July 2021 and October 2021 on the 'Contracted' line.

⁷ [Connection and Use of System Code \(CUSC\) | National Grid ESO](#)

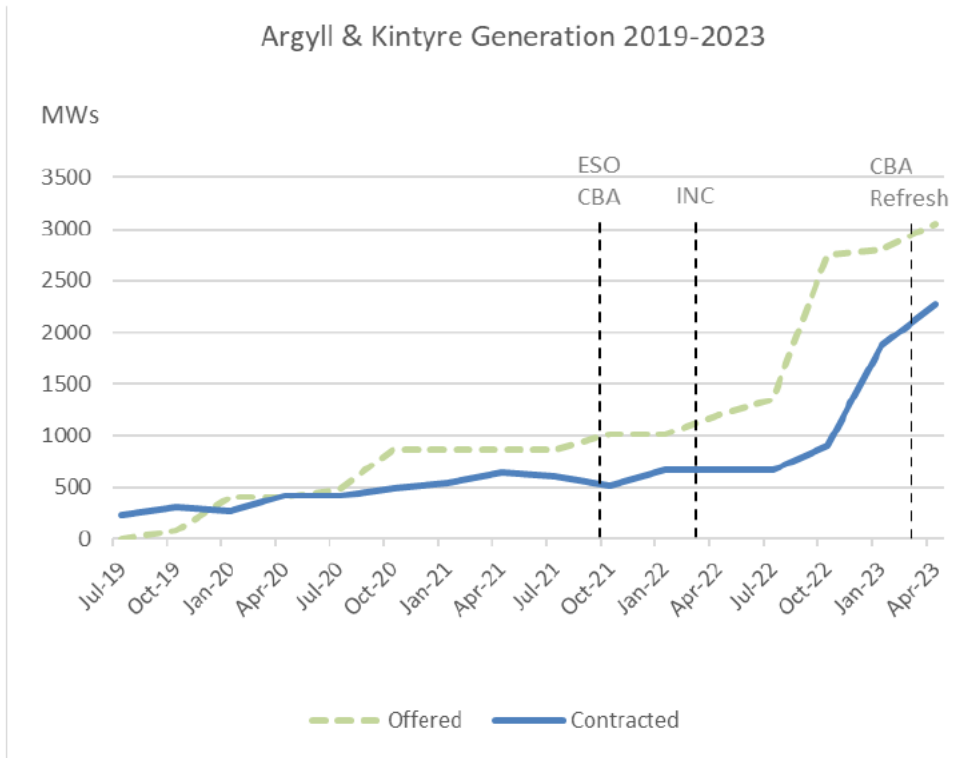


Figure 2 Level of generation that has been issued an offer, and generation that has contracted

Table 1 shows details of the generation contracted to connect to the Argyll and Kintyre network, as well as generators currently in the application process. Only the first three generators in Table 1 can connect to the existing network without network reinforcement. We have continued to see an upward trend in generation applications in the Argyll and Kintyre region post submission of the INC, which has seen an increase in the volume of contracted generation and generation that is in the application process. Generation in the application process are those which have submitted a connection application and have been issued with a connection offer or those for which a connection offer is currently being prepared. Table 1 shows the consent and contractual status between INC and FNC for each generator listed. Where the status is N/A the scheme was not in the application process at the INC.

Table 1 Contracted and offered generation schemes in the Argyll and Kintyre area as of April 2023

[Redacted Table Content]

[REDACTED]

[REDACTED]

Since the submission of the INC an additional 1,595MW of renewable generation, made up of seven generators, have signed connection offers, bringing the total contracted generation level to 2,265MW. And another 444MW, made up of six generators, have been issued with connection offers or connection offers are being prepared.

380MW of the contracted generation is consented, which is an increase of 99MW since the submission of the INC. A further 312MW in the consent application process, which is an increase of 228MW since the INC. The contracted developers in Argyll and Kintyre are predominantly experienced large developers. These developers have significant portfolios of generation across the UK and are experienced in developing onshore wind farms within our network area. The contracted generators that do not have planning consents are currently in the consent application process or are in scoping.

The proximity of our network to the SPT network in the Argyll and Kintyre area results in our transmission network being classified as an Affected Transmission Owner (TO) for connection applications made to SPT's network. This requires us to undertake connection studies on those applications to consider any potential network reinforcements to enable the connection to the SPT network. The same is true of SPT for connection applications to our network. We work closely with SPT to undertake connection studies, understand the impact of the connection on each network, and coordinate any identified network reinforcement requirements. [REDACTED]

[REDACTED]

3.4. 2022 FES

The contracted generation background provides a short-term view of system capacity requirements. In making a long-term investment decision, it is important to draw on energy insights on potential future connections in the area. We acknowledge that the level of uncertainty increases in the mid to long-term and below we describe the approach we took to deal with the uncertainty based on a review of the ESO's FES in light of renewable developer aspirations in the Argyll and Kintyre area.

FES 2022 for Kintyre and Argyll identified up to 1,952 MW of new renewable generation that could emerge over the period to 2050. Figure 3 shows the FES 2022 new generation for the Argyll and Kintyre area over the period to 2050.

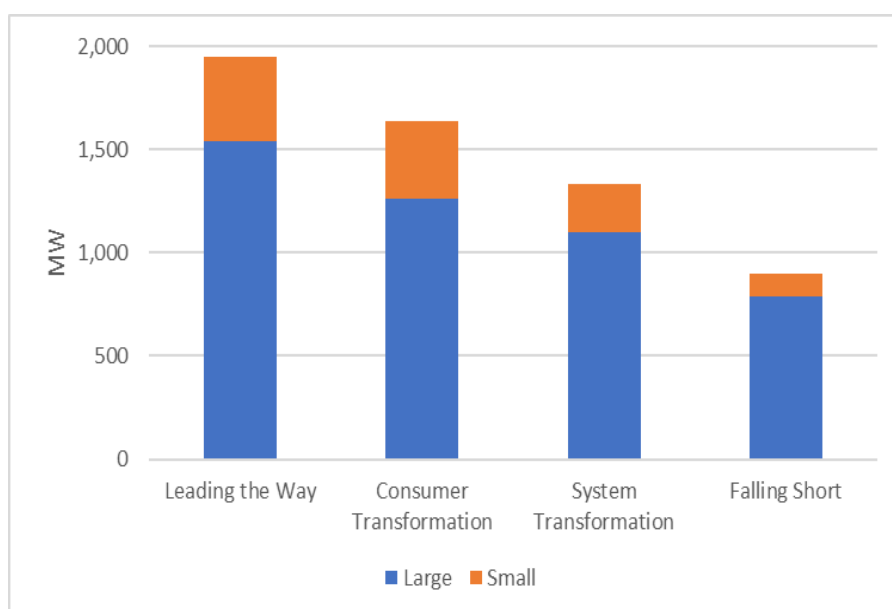


Figure 3 FES 2022 new large (>10MW) and small generation development in Argyll and Kintyre by 2050

It is worth noting that onshore wind generation in the north of Scotland FES has been upwardly evolving on an annual basis over the past seven years as the UK moves towards net zero aspirations and policies and technologies evolve. Lately, there has also been an increased interest in large pumped hydro storage schemes which are seen as necessary complementary technologies to mitigate the intermittency of renewable generation as well as provide ancillary services for the secure operation of the grid. Figure 4 shows the total installed onshore wind and pumped hydro capacity by 2040 as assumed in the ESO's FES from 2016 to 2022 for the north of Scotland area. The graph does not reflect the connections activity since the 2022 FES data freeze in March 2022.

It is clear from the graph that the generation growth trends within the Argyll and Kintyre area is in line with trends for similar technologies in our network area.

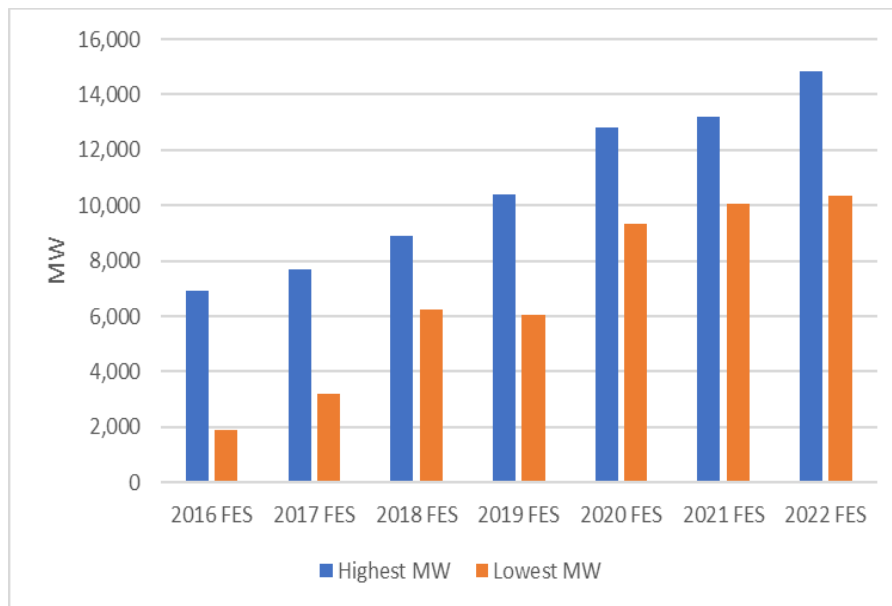


Figure 4 2016 – 2022 FES total installed onshore wind and pumped hydro generation by 2040 for the north of Scotland

As explained in the INC, the ESO FES are macro in nature, focusing largely on contracted generation and are not intended to capture more granular detail of generation development on a smaller network such as Argyll and Kintyre. We therefore developed localised FES for the area to provide additional granularity and better represent local stakeholder needs. We have updated the local FES for the FNC.

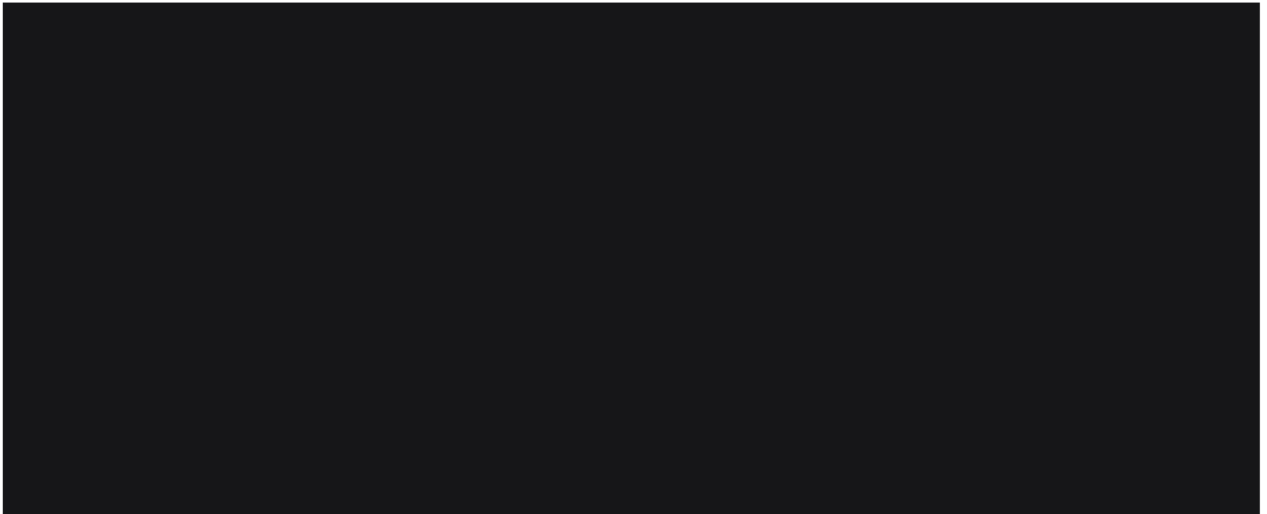
3.5. Stakeholder input

To supplement our view of the generation potential on Argyll and Kintyre, we undertook a stakeholder engagement exercise via an online questionnaire and webinar event in August 2022 to gather intelligence on scoping generation with an interest in developing renewable generation projects in the Argyll and Kintyre area. Table 2 lists the relevant developers that submitted questionnaire responses following the webinar.

Since our INC submission, there has been significant movement in the number of developers that have contracted or applied to connect to the network. The number of scoping generators has reduced since our INC submission from 16 identified scoping generators to 9 scoping generators considered in our FNC local scenarios, which is reflective of the increase in applications and generators signing connection offers.

A total of 767MW of potential new generation, in addition to the current contracted generation capacity of 2,265MW and offered and applied generation capacity of 444MW, was identified through this exercise, giving a total of 3,476MW of potential new generation in this area. This is higher than the 2022 FES generation for the area by 2050. A full table of the generators that make up the 3,476MW is available in Appendix 3.

Table 2 Scoping generation in the Argyll and Kintyre area



The substantial potential generation background identified projects at a range of development stages and is consistent with the recent growth in contracted generation capacity. The projects identified include credible developers and we consider the level of interest high, consistent with interests elsewhere on our network.

The online questionnaire formed the basis of an objective view of generation development on Argyll and Kintyre by better understanding the developer and development perspective. This allowed us to explore the total capacity of projects that may emerge, the scenario 'envelope', along with the timescales and location of these projects. It also allowed us to gain a better understanding of potential projects at the earlier stages of development. Figure 5 shows the build-up of capacity looking to connect into the Argyll and Kintyre area categorised into connected, contracted, offered/applied and scoping generation. The contracted generation is split by consent status.

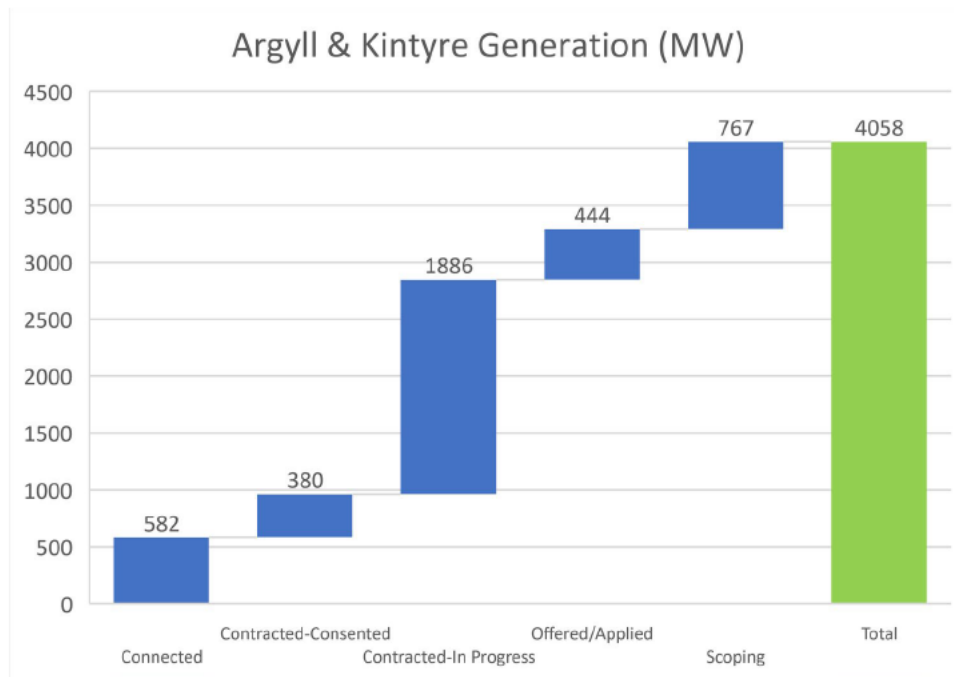


Figure 5: Capacity looking to connect into the Argyll and Kintyre area categorised into connected, contracted-consented, contracted-in progress, offered, and scoping generation

As shown in Figure 5, 380 MW of the contracted generation is consented. With the base network only capable of accommodating up to 108 MW of additional contracted generation in the queue, this clearly shows that network reinforcement will be required to accommodate even the consented generation.

To enable the assessment of potential reinforcements, a refresh of the local FES were undertaken in order to address the inherent uncertainties with future generation capacity in light of generation background changes since the INC local FES were produced. The local FES development was completed in December 2022. The recently contracted generation requires the Argyll 275kV Strategy in the background and may require additional reinforcement in accordance with the SQSS and CUSC Connect and Manage criteria. Our proposed incremental investment strategy ensures timely network investment to accommodate certain generation and maintain the pathway to Net Zero.

3.6. FNC Local FES

We developed a Scenario Assessment Tool (SAT) for the INC to assess the probability of generation connecting to the network. The SAT methodology is set out in detail in the INC. There are additional details of how the applied to the SAT to the updated generation background to develop a refreshed local FES for the FNC in Annex A, Argyll and Kintyre local FES report (provided in the list of supporting documents). The local scenarios developed for this FNC submission build upon the methodology that was developed for our INC submission. We have continued to use the ESO's methodology to determine connection dates for projects not modelled in the ESO FES and the same weightings as agreed in the INC have been applied. The result of the refresh is a set of four plausible scenarios with a relatively wide range of outcomes

based on an objective evaluation of all projects identified within the Argyll area. The outcome provides a suitable scenario 'snapshot' of potential long-term generation outcomes for the local Argyll and Kintyre region – albeit based only on projects that are 'known' at this current time. The resulting scenarios are shown in Figure 6. Also shown on Figure 6 are the 2022 ESO FES for the Argyll and Kintyre region.

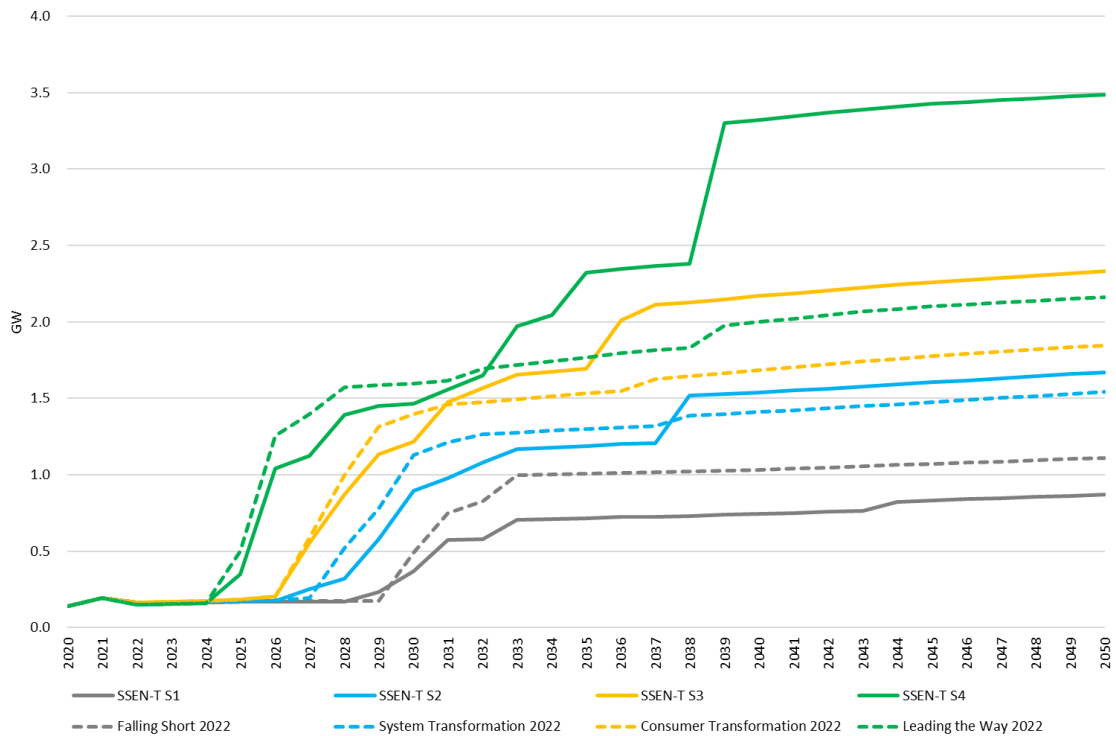


Figure 6 Argyll and Kintyre Local Scenarios – New generation by scenario

Since the INC submission, some projects that were deemed as 'scoping' have now either contracted, been offered a connection contract or have applied to connect to the network, which leads to the increases seen particularly in S2, S3 and S4. This strengthens the pipeline of projects in the Argyll and Kintyre. The four ESO scenarios are within the envelope of the local S1 and S3 scenarios. The highest local scenario S4 has a step change in 2039 as a result of large pumped storage generator, Balliemanoach. The majority of the increase in generator connections across all scenarios is prior to 2035. However, the recent UK Government announcement of a target date of 2035 for a decarbonised power system will likely accelerate renewables growth in the next decade.



Figure 7 below shows the profile for the local scenarios developed for the FNC versus those developed for the INC, including the sensitivity scenario S4+.

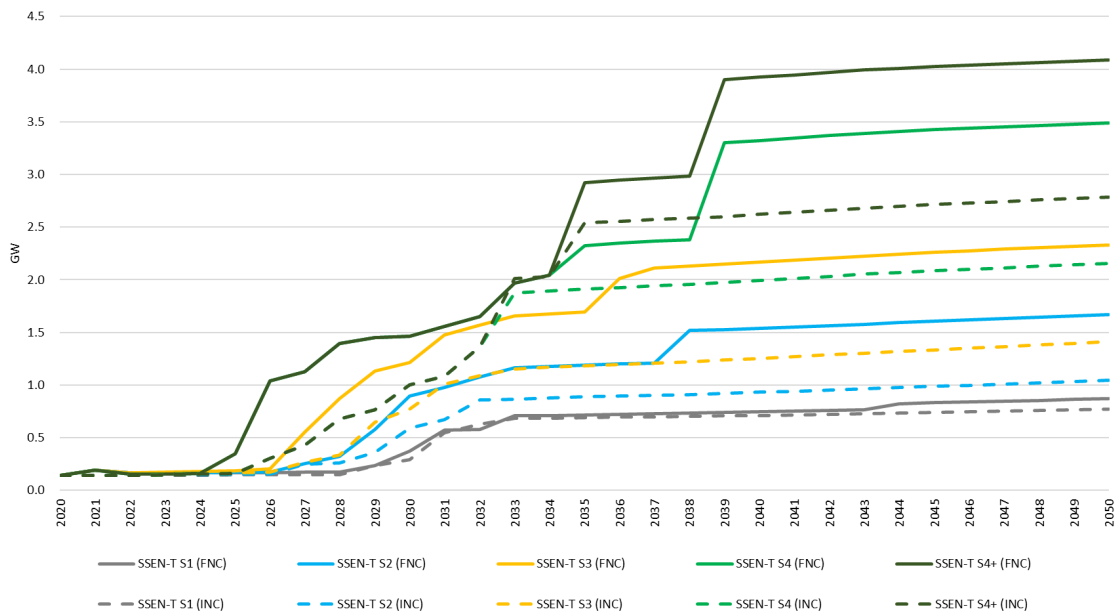


Figure 7 Argyll and Kintyre Local Scenarios versus INC Local Scenarios

The FNC lowest scenario S1 is broadly in line with INC view. The FNC S2 and S3 scenarios both see an increase in capacity and are more broadly aligned with the S3 and S4 scenarios from the INC respectively. The FNC highest core scenario S4 has a capacity which is now greater than the S4+ sensitivity scenario from the INC. The original S1 – S4 scenarios from the INC local FES are within the envelope of the S1 – S3 scenarios from the refreshed local FES for the FNC.

The approach we have developed to the local scenarios provides a balanced view of how generation could develop in the area – engaging with local developers to explore the depth and possibility of future renewable growth, but also objectively analysing each project’s development potential. The result is a set of four plausible scenarios with a relatively wide range of outcomes based on an objective evaluation of all projects identified within the Argyll area, and an additional sensitivity scenario.

3.7. MITS capacity requirement

The network in the Kintyre and Argyll area forms part of the Main Interconnected Transmission System (MITS) and its capacity is also assessed in accordance with the MITS criteria in Section 4 of the NETS SQSS based on MITS boundary B3b.

The 2022 ETYS provides the required transfer capability of the B3b boundary in accordance with the NETS SQSS MITS criteria based on the 2022 FES. Figure 8 shows the required transfers for boundary B3b across a range of 2022 FES and 2021 FES up to 2042 as well as the current capability of the boundary. This shows that the required transfer capabilities have grown since last year and that the current B3b boundary capability of 440MW is lower than the required transfer capability across all scenarios, indicating that constraints are increasing there is a need for more capacity. The capacity requirement on this boundary is driven by power export requirements to enable efficient operation of the GB electricity market as well as to ensure

local generation in the Argyll and Kintyre region can contributing to meeting GB security of supply.

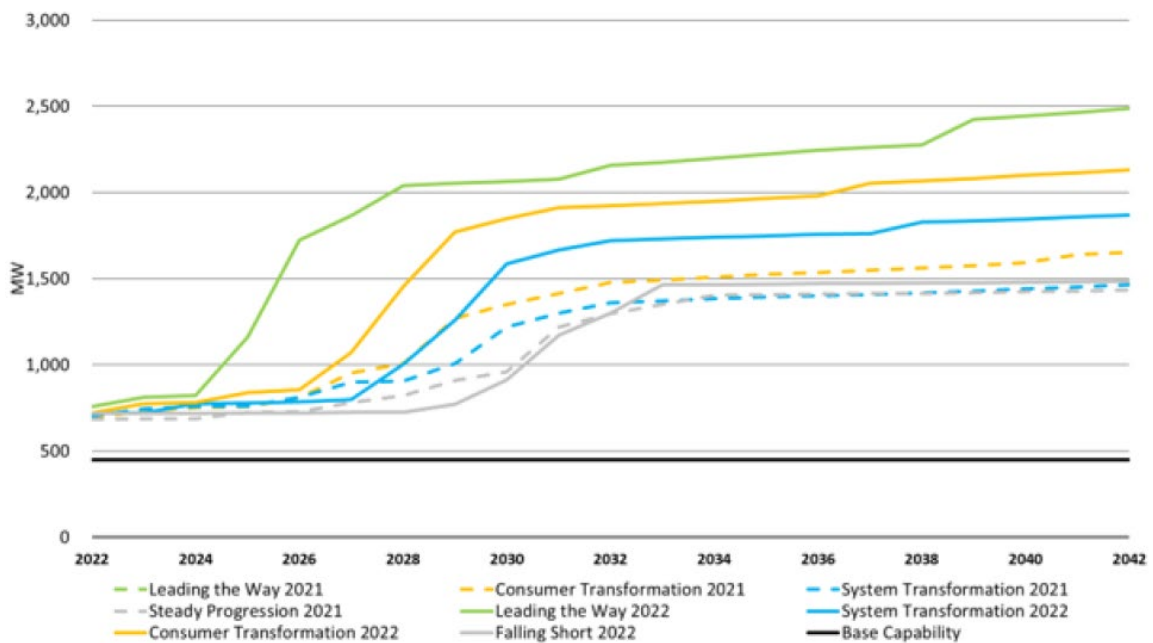


Figure 8. MITS Boundary B3b Required Transfers from ETYS 2022 against the B3b base capability

3.8. Summary of Need

A comprehensive review of need has shown that there is a strong and increasing need to reinforce the Argyll and Kintyre network in order to enable renewable generation to connect. At least the minimum enabling works are required to be completed in accordance with the planning standard (SQSS) and the CUSC Connect and Manage criteria. Since the submission of the INC the generation background has continued to grow and become more certain. There is no imminent non-load need, however intervention is required on insulators and associated fittings on the Inveraray to Taynuilt double circuit OHL beyond the RIIO-T2 period.

4. Reinforcement Options

4.1. Note on Earliest In-Service Dates Presented

Since submitting the INC, we have progressed the planning applications to support the Argyll Scheme. These are currently being reviewed by the relevant authorities. However, we highlight that the PLI may not be determined until April 2024, resulting in a delay to the overall project programme to accommodate this.

The revised energisation dates now proposed are October 2027 for the works comprising Creag Dhubh Substation and the new 275kV OHL to the SPT OHL, and November 2028 for the remainder of the Argyll Scheme. As outlined in the Executive Summary, we have developed a re-worked project programme that may reduce the delay impact of the PLI by as much as 11 months, meaning final energisation could take place as soon as December 2027, however this programme is contingent on timely decisions on the PLI and the FNC. Therefore, we cannot commit to this timescale at this stage when providing customers with EISDs.

The EISDs for the preferred Option 05 from the INC are delayed as per the above statement. All options assessed in the FNC contain the option component impacted by the PLI, there it is assumed that all options are equally affected by PLI delays.

4.2. Options for Detailed Analysis

Based on the reinforcement need set out in Chapter 3 - Need, we undertook a two-stage assessment of reinforcement options for the viable export routes that we identified. This two-stage assessment, the development of reinforcement options, and the assessment methodology utilised is set out in detail within Chapter 5 of our Argyll and Kintyre 275kV Reinforcement Strategy INC. There have been no changes to the option assessment since the submission of the INC.

The options were subjected to system operability analysis and economic CBA as part of the INC and this is extensively detailed this in Chapter 6 of the INC. Because the generation continues to increase, the operability analysis remains valid and relevant for the FNC and therefore has not been re-studied. A refresh of the CBA is described in Chapter 5 of this FNC.

Table 3 shows the five options which meet the minimum operability criteria of being compliant with the pre-fault criteria of onshore generation connection criteria of the SQSS. Only the options that meet the minimum operability criteria have been progressed to a refresh of the CBA for the FNC. The base network Option 01 does not meet the system requirements but is included as a reference for the detailed analysis only.

A detailed description for each individual component that makes up each of the five options in Table 3 can be found in Appendix 1 – Detailed list of option components.

Table 3 Options which meet the minimum operability criteria

Option	Code	Short Description and EISD*
01	Base	Base Network (Counterfactual)
05	DDNC1+ DINC+ DCUP2	Creag Dhubh substation and new 275kV line (N/O) (2027) New 275kV line Creag Dhubh - Inveraray (2028) Uprate Creag Dhubh - Crossaig Line to 275kV (I) (2028)
06	DDNC1+ DINC+ DCUP1	Creag Dhubh substation and new 275kV line (N/O) (2027) New 275kV line Creag Dhubh - Inveraray (2028) Uprate Creag Dhubh - Crossaig Line to 275kV (R) (2028)
07	DDNC1+ CKNC	Creag Dhubh substation and new 275kV line (N/O) (2027) Two subsea cables Carradale - Kilmarnock South (2029)
08	DDNC2+ CKNC	Creag Dhubh substation and new 275kV line (2027) Two subsea cables Carradale - Kilmarnock South (2029)
09	DDNC1+ DINC+ CKNC	Creag Dhubh substation and new 275kV line (N/O) (2027) New 275kV line Creag Dhubh - Inveraray (2028) Two subsea cables Carradale - Kilmarnock South (2029)

* (N/O) = Normally Open, (I) = Interconnected, (R) = Radialised

5. Reinforcement Options Assessment

5.1. Introduction

The results of the independent CBA undertaken as part of the INC by the ESO in September 2021 clearly demonstrated that the 'do minimum', the Argyll 275 kV Strategy, is the best value, technically operable reinforcement option from the perspective of network constraints relief versus Capital Expenditure (CAPEX)⁸. This option will deliver the highest overall benefit to the GB consumer. See Section 6.3 of the INC report for full details of the CBA.

Since the CBA was carried out as part of the INC, a number of changes have emerged, namely an increase in CAPEX and upward generation projections, which have warranted a refresh of the CBA in order to understand an impact of these factors on the overall business case. The results of this analysis, undertaken by ESO in January 2023, are reported in this chapter. Full details of the CBA refresh can be found in the ESO's CBA Report, Annex B to this FNC submission.

5.2. Methodology

The recommended option, the Argyll 275 kV strategy (Option 05), was one of the options shortlisted as a result of the comprehensive system operability assessment undertaken by SSEN Transmission as part of the INC, detailed in INC Section 6.2, which tested the ability of the network to operate under different generation scenarios and over time. As a result of this assessment and, as highlighted in the previous chapter, 5 of the 14 originally considered options met the minimum operability criteria and were put forward for the CBA refresh.

The refreshed CBA is based on the same broad modelling assumptions as the original analysis from the INC, with the key changes summarised below:

- The expectations for generation in the local area have developed since the original CBA, and the possible impacts of this were considered in the analysis.
- To account for an uncertainty in future CAPEX and constraint costs, a wider range of sensitivities was applied.

Consistent with the September 2021 CBA, net present values (NPVs) and least worst regrets (LWRs) were calculated for each option and sensitivity.

5.3. Reinforcement Options

Table 4: List of Reinforcement Options below provides details of the reinforcement options considered in this CBA refresh. It should be noted, however, that the Option 01 (the counterfactual) was also considered unsuitable due to operability reasons and has been included as a reference only.

⁸ Argyll and Kintyre 275kV Reinforcement Strategy – LOTI Initial Needs Case

Table 4: List of Reinforcement Options

Option no.	Code	Description	EISD	EISD Stage 2
01	Base	Base Network (Counterfactual)	N/A	
05	DDNC1+DINC+DCUP2	Creag Dhubh substation and new 275kV line (with normally open circuit) New 275kV line Creag Dhubh - Inveraray Uprate Creag Dhubh - Crossaig Line to 275kV (Crossaig interconnected)	2025 (DDNC1)	2026 (DINC+DCUP2)
06	DDNC1+DINC+DCUP1	Creag Dhubh substation and new 275kV line (with normally open circuit) New 275kV line Creag Dhubh - Inveraray Uprate Creag Dhubh - Crossaig Line to 275kV (Crossaig radialised)	2025 (DDNC1)	2026 (DINC+DCUP1)
07	DDNC1+CKNC	Creag Dhubh substation and new 275kV line (with normally open circuit) Two subsea cables Carradale - Kilmarnock South	2025 (DDNC1)	2027 (CKNC)
08	DDNC2+CKNC	Creag Dhubh substation and new 275kV line Two subsea cables Carradale - Kilmarnock South	2025 (DDNC2)	2027 (CKNC)
09	DDNC1+DINC+CKNC	Creag Dhubh substation and new 275kV line (with normally open circuit) New 275kV line Creag Dhubh - Inveraray Two subsea cables Carradale - Kilmarnock South	2025 (DDNC1)	2027 (DINC+CKNC)

The EISDs in Table 4 are those originally from the INC submission. Since then the EISDs have been delayed, and that was reflected in the spend profiles for the CBA refresh.

5.4. Updated CAPEX

Updated CAPEX present values are summarised in Table 5 below. These figures were originally provided in 2018/19 prices by SSENT and subsequently inflated to 2020/21 prices by ESO.

As can be seen from Table 5, since September 2021 the CAPEX for each option has increased between 24%-64% depending on the option. This increase has been primarily caused by the global factors, such as supply chain pressures, to which SSEN Transmission has not been immune.

To further account for an ongoing volatility and uncertainty, a wide sensitivity range of -20% to +30% has been adopted for these values in the analysis.

Table 5 Updated CAPEX Present Values



5.5. Constraint Costs and Generation Background

The generation scenarios considered in the original CBA provided a range of plausible views of generation growth in the area and were developed by SSEN Transmission in close collaboration with the generation stakeholders and the ESO. An additional S4+ / LW+ scenario was also developed and included in the CBA refresh as a sensitivity and to test even higher levels of generation and their impact on constraint costs. As part of the FNC, the local FES was updated with the latest view of generation projects in the Argyll and Kintyre area. See Chapter 3 of this FNC for a detailed description of the scenario development process.

In the updated local generation view, all of the generation scenarios see an increase in capacity except for S1 which is broadly consistent with INC view. The updated S2 and S3 scenarios capacities are now at similar levels to the previous S3 and S4 scenarios respectively. While the updated S4 scenario has a capacity which is greater than the S4+ sensitivity scenario from the INC. The difference in local FES from INC to FNC is shown in Figure 9. As a result of the upward trend in the generation scenarios from the INC to the FNC, the LW+ scenario from the INC is included in the analysis, alongside the other four INC scenarios, to help capture the direction of travel of the generation trends in the Argyll and Kintyre area.

The CBA is therefore updated from the INC using the new CAPEX costs and constraint costs are forecast to be in line with the previous iteration of the CBA using the total envelope of the INC generation profiles, S1 to S4+ (LW+). As can be seen from Figure 9 below, the INC S4+ scenario sees generation reach just under 3 GW by 2050, a value which is between the new S3 and S4 scenarios. The S4+ profile from the INC is thus used as a credible upper test range for the CBA, labelled as LW+ in the ESO's analysis. For clarity, the LW and LW+ in the tables below relate to the INC generation profiles, as they encapsulate the FNC scenarios in the main. The two scenarios which sit outside this envelope, the FNC S4 and S4+ are tested via the sensitivities used in the CBA analysis, presented below.

As highlighted by ESO, given the trends in energy prices since September 2021 and the subsequent increased costs to balance the system, a range of sensitivities were carried out from -20% to +60% to simulate this. The CBA refresh was conducted with the generation scenarios used in the INC.



Figure 9: Generation Capacity in the Argyll and Kintyre Area

5.6. CBA Results

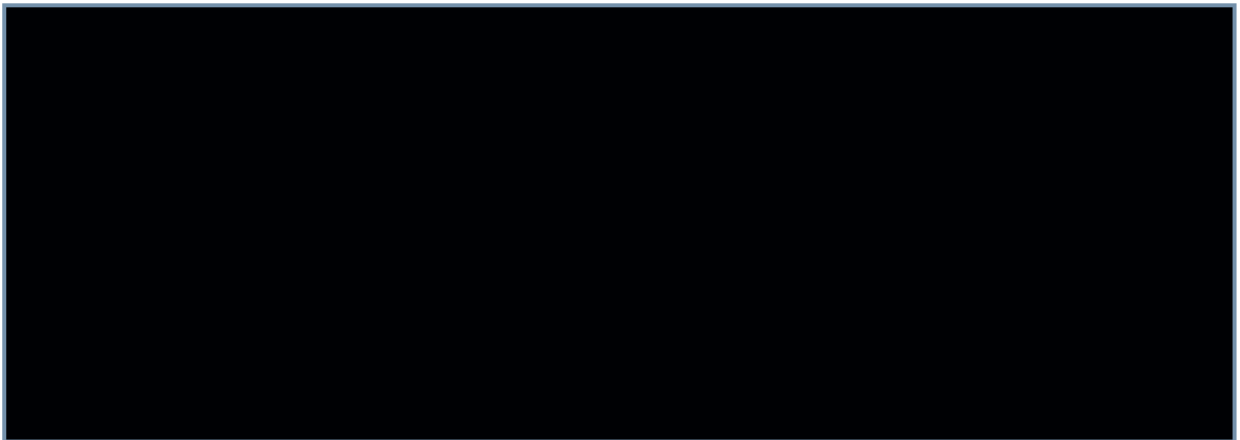
Base Case

Table 6 provides the NPVs for the five options considered in the analysis. The results are broadly consistent with the INC CBA, with the option 05 remaining the most viable under all of the considered scenarios. The increase in CAPEX, however, means that the NPVs of all options drop under all scenarios and leave positive NPVs only for options 05 and 06 under the LW scenario, or any option under the LW+ scenario. As highlighted by the ESO, however, there are negative NPVs for all reinforcement options under the SP, ST and CT scenarios, but the large regrets associated with the 'Do nothing' option under the LW+ and the LW scenarios outweigh the effect of these negative NPVs.

Consistent with INC, Option 05 remains the LWR option, and the one with the lowest CAPEX and highest constraint savings. Moreover, this option generates positive NPV under LW and LW+ scenarios, which are consistent with the updated view of the energy markets and fast-growing additional generation, as summarised in Table 7.

Table 6 NPV in the Base Case

Table 7 Least Worst Regret Analysis



In the high generation capacity background (LW+) consistent with net zero, the proposed solution provides a net benefit of [REDACTED] to the GB consumer. Across the five scenarios considered the solution has the least 'worst regret', with a worst regret of [REDACTED] in stark contrast to a worst regret of [REDACTED] for the 'do nothing' option.

Sensitivities **Figure 10: Preferred options for the sensitivity cases**

The results of the sensitivity analysis provided in Figure 10 below and demonstrate that the Option 05 remains a preferred solution under all sensitivity scenarios, except the highest CAPEX (+30%), where 'Do nothing' option is preferred. As highlighted earlier in this chapter, large regrets, associated with the 'do nothing' option and its operability assessment do not make Option 01 a viable proposal.

		CAPEX					
		-20%	-10%	0%	10%	20%	30%
Constraint Savings	-20%	05	05	05	05	05	01
	0%	05	05	05	05	05	05
	20%	05	05	05	05	05	05
	40%	05	05	05	05	05	05
	60%	05	05	05	05	05	05

Figure 10: Preferred options for the sensitivity cases

5.7. CBA Conclusions

Following the refresh of the CBA from the ESO, the recommended solution does not change and remains Option 05, DDNC1+DINC+DCUP2. This result is consistent across the sensitivity cases, as the option provided the best constraint savings and the joint-lowest CAPEX cost. Despite increases in CAPEX, NPVs of this option remain positive under the LW and LW+ generation scenarios.

In summary, the 'do minimum' Option 05 aligns with the recommended Argyll 275kV Strategy and is the best value and technically operable reinforcement option. ESO's recommendation is that the Option 05 is progressed.

5.8. Wider benefits

The evidence presented in the INC demonstrated our strategy for an economic, efficient and coordinated solution in the Argyll region. We have proposed a solution which meets the investment drivers and assists in the transition towards low-carbon energy sources for the UK supporting Net Zero.

The primary consideration for economic value creation in the INC was built on the dimension of network capacity increase and the long-term security of supply. These are core benefits created as the result of our investment project, but value creation does not end here.

We have therefore investigated two further areas of economic analysis as part of this submission to provide additional intelligence for Ofgem as to the benefits of the proposed reinforcement. The analysis considers: i) the socio-economic benefits of the investment project and ii) the whole life carbon profile associated with the project. These assessments were carried out from November 2022 – February 2023 and were based on the updated data for the FNC.

5.8.1. Socio-economic benefits

Our investment programme represents a major investment into the Argyll region, and the wider Scottish and UK economies. Once established, the Argyll 275kV strategy will enable the connection of a new cohort of renewable energy in the region and bring an enhancement to prosperity in the region. Our investment of [REDACTED] will unlock a range of socio-economic benefits which will make a significant positive contribution towards the Gross Value Added (GVA) and additional employment⁹ both locally and across the UK.

We therefore undertook a study to investigate those benefits and have collated these in a short report; “Argyll & Kintyre Socio-Economic Analysis” which is provided as Annex C to this FNC. For the purposes of this study, GVA encapsulates both economic activities undertaken directly by SSEN Transmission, as well as those of the developers who will connect to the network. A full summary of the details of this study, including methodology and assumptions, can be found in the accompanying report.

Our analysis was conducted for Option 05, the Argyll 275kV strategy, given that it is the preferred option generated by the CBA conducted for the FNC (a consistent result from the INC). The evidence presented in the report demonstrated that during the 45 year life of the asset, the proposed Argyll strategy will generate over £850m in additional value to the local economy and over £4bn to the UK economy (inclusive) in generation scenario S4 (LW).

5.8.2. Carbon economy

The UK energy supply landscape is undergoing a transition towards low-carbon energy in the pursuit of the UK’s Net Zero ambitions. We have pledged our support towards this ambition, as outlined in our RIIO-T2 Business Plan – A Network for Net Zero, which details our role in

⁹ Note that the employment impact hasn’t been quantified in this analysis but is estimated to be significant.

facilitating the connection of renewable generation in the North of Scotland and its transportation to demand centres further south.

Everything that we do as a TO contains a carbon footprint, one of several important indicators as to our impact on the environment and climate. We are committed to lowering that footprint, as demonstrated by our Science Based Target accreditation, to reduce our absolute greenhouse gas (GHG) emissions by 46% by 2030. Our interaction with the carbon economy also goes beyond this, as our infrastructure is a key enabler of renewable low-carbon generation which will displace conventional energy sources over time. We therefore prepared the report “Argyll 275kV Reinforcement – Whole Life Carbon Profile”, provided as Annex D to this FNC, which provides full details of how we quantified the carbon impact to society from this investment.

The analysis takes into consideration the embodied carbon and displaced carbon as a result of the investment, looking at carbon impacts from the construction, operation and eventual decommissioning perspective compared to the contribution to national decarbonisation by facilitating the connection of new renewable generation.

The study was conducted for Option 05, the Argyll 275kV strategy, and found that the investment could deliver an economic benefit to society of £570m by contributing to the decarbonisation of the UK electricity supply.

5.9. Summary

Investments in the transmission network are judged on the basis of value creation; we seek to maximise value and unlock benefits as readily as possible. Looking to the wider context for decision making in the energy sector at present, the need to arrive at decisions in a timely manner is sobering. The UK Government has stated in its Energy Security Strategy the need to transition away from foreign gas sources towards domestically produced energy from renewables, and in doing so address security of supply issues. There is a growing consensus among climate scientists that the next decade presents possibly the ‘last chance’ to avoid the catastrophic effects of climate change, heightening the need to move to sustainable energy sources now. And the UK is facing one of the most challenging energy bill spikes in recent times, putting the issue of affordability at the top of the public’s priority list. In short, this is a time in the energy sector where timely holistic decisions really matter.

Throughout our ongoing dialogue with Ofgem we have sought to evidence the clear need for investment in the Argyll region and the case for value creation as a result. As we have discussed in this chapter, further clarity on the scope of works and project costs are now available. These do not change the outcome of the CBA in the INC and continue to provide a strong net benefit of over £920m over the lifetime of the project.

The investment proposal for the Argyll region, Option 05 is the most economic, efficient and sustainable, and it strengthens the security of supply, improves grid stability as well as carrying with it significant socio-economic and environmental benefits.

These benefits are readily available to be realised and should be pursued without delay, particularly given the role of the energy sector as the backbone of the transition to net zero.

6. Proposed Reinforcement Option

6.1. Overview of proposed option

6.1.1. Scope

Following a review of the outputs of the ESO's refreshed CBA, consideration of the identified generation activity, pathway to Net Zero and our obligations to maintain a safe and secure network, our preferred solution for the Strategy consists of the upgrade of the existing network to 275kV operation from Crossaig in the South to a connection point located to the east of the village of Dalmally on the SPT Dalmally – Windyhill 275kV OHL. This will form a reinforced transmission network in Argyll, providing significant benefits to the GB consumer, supporting the transition to a low-carbon economy by enabling the connection of low carbon generation and provide benefits to the local economy. It consists of five key elements:

- Establishing a new 275/132kV substation at Creag Dhubh to enable connection to SPT's Dalmally-Windyhill 275kV OHL circuits. These are to be connected by c. 14km of new 275kV Double Circuit OHL.
- c.10km of new 275kV Double Circuit OHL between Creag Dhubh and a tee point on the existing Inveraray-Crossaig circuits to enable 275kV operation of this section.
- Construction of replacement An Suidhe and Crarae substations to enable them to maintain connection to the new 275kV network.
- Establishing a new 275kV substation at Craig Murrail and relocation of the Port Ann GSP to this site.
- Establishing a new 275/132kV substation in the vicinity of the existing Crossaig Substation.

The proposed reinforcement option described above will have a number of staged energisation dates which will be finalised ahead of Execution. The sequence for energisation has been determined utilising our extensive experience in the development and delivery of transmission infrastructure, with timescales benchmarked against those actually incurred on comparable projects and reviewed against initial submissions from our Contractors.

In addition to our works, SPT are to undertake works to reinforce their network in line with the relevant Transmission Owner Reinforcement Instruction (TORI) to allow connection of the above works. These comprise of the following:

- Construction of a new tower on the existing Dalmally-Windyhill 275kV OHL to allow the connection of the new 275kV OHL from Creag Dhubh in a hard tee arrangement.

SSEN Transmission and SPT have put in place monthly meetings to manage the works required on both their networks and to discuss key interfaces relating to planning, construction, outages and commissioning to ensure these are effectively managed.

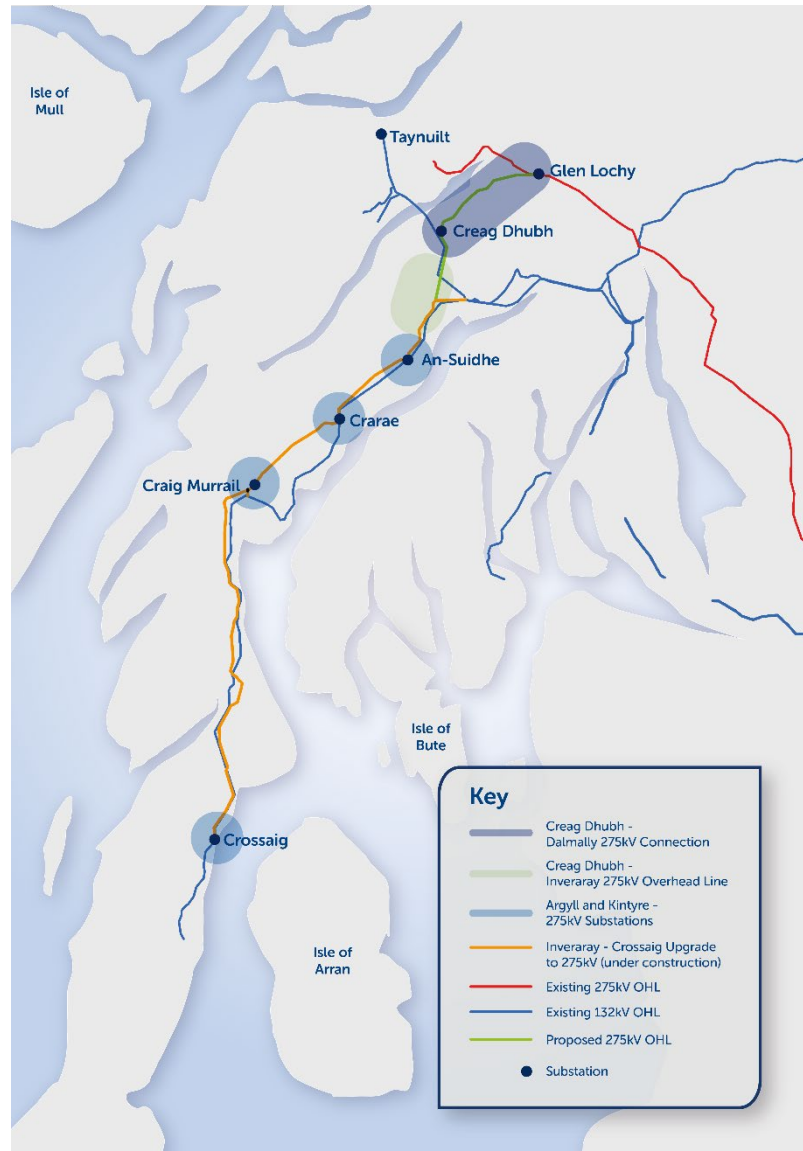


Figure 11 High Level Map of Proposed Option

Figure 11 shows a high-level map of the proposed option will form a reinforced transmission network in Argyll, considering the whole system, delivering significant benefits to the GB consumer, supporting both the transition to a low-carbon economy and the local economy. The proposed option also aligns with the feedback we have received through consultation and allows for generation scenarios that account for the longer term, meaning that future upgrades or reinforcements to the network requiring major construction works in sensitive environments are avoided as far as possible.

6.1.2. Configuration and Design of the Proposed Option

As noted above, the proposed option will allow 275kV operation from a connection to SPT's Dalmally-Windyhill 275kV OHL southwards to Crossaig. To facilitate the upgrade to 275kV, and

to manage the required Customer Connections, a series of new substations and sections of OHL are being established along the route.

6.1.3. Creag Dhubh 275/132kV Substation and New 275kV OHLs

Creag Dhubh is a new 275/132kV Gas Insulated Switchgear (GIS) substation required to connect onto the existing 132kV OHL between Inveraray and Taynuilt.

It will also connect to the existing Dalmally to Windyhill 275kV OHL, owned and operated by SPT, through a new 13.5 km OHL consisting of 48no. L8 towers via a hard tee arrangement, in which the new OHL will connect directly into the existing OHL via a new junction tower. The OHL has been consulted upon during its development, including the proposed alignment. The alignment has been developed to avoid impacts on designated areas where practicable and to reduce the visual impact on the surrounding area which had been highlighted in initial consultations on this element.

The junction tower will be the responsibility of SPT to consent and construct, with this being installed prior to the commissioning and energisation works of the OHL from Creag Dhubh. This arrangement has been arrived at through engagement between SSEN Transmission and SPT and is underpinned by the TORI setting out the works to be completed by either party. Engagement with SPT will continue through the detailed design and construction phase to agree the exact sequence of outages required to install the new OHL and to manage the interfaces between the two parties and their Contractors.

Creag Dhubh Substation will consist of a double 275kV GIS busbar including two OHL bays, a double 132kV busbar GIS including up to four OHL bays, and two super grid transformer (SGT) bays. Solutions for the GIS will seek to utilise alternative insulating gases to Sulphur Hexafluoride (SF₆) where technology permits this.

In addition, from Creag Dhubh Substation a new 275kV OHL of 8km length using L8 towers will be constructed to a tee point on the Inveraray – Crossaig OHL. The north section of the existing 132kV OHL from Taynuilt to Inveraray will be diverted into the Creag Dhubh Substation, and the remaining section of this OHL will be removed between Inveraray and Creag Dhubh Substation.

A summary of consultation undertaken on this element of the project is set out in Chapter 2 with engagement with Statutory and wider Consultees undertaken.

6.1.4. Craig Murrail 275/33kV Substation

Craig Murrail is a 275kV substation to be constructed on the alignment of the existing Inveraray – Crossaig OHL. It will consist of a 275kV GIS double busbar with provision for 4 no. OHL connections. Solutions for the GIS will seek to utilise alternative insulating gases to SF₆ where technology permits this. 275/33kV grid transformers to facilitate the connection to Port Ann GSP will be provided. As part of the recent works to construct the Inveraray – Crossaig OHL, space provision has been made between two towers, with appropriate towers installed, to accommodate the Craig Murrail site.

6.1.5. An Suidhe 275/33kV Substation

The existing An Suidhe Substation is currently connected to the Inveraray-Crossaig OHL at 132kV. Due to the increase in operational voltage to 275kV, a new An Suidhe Substation is to be constructed consisting of a single 275kV GIS busbar with a 275/33kV grid transformer to maintain connection to the existing wind farm. Solutions for the GIS will seek to utilise alternative insulating gases to SF₆ where technology permits this.

The existing Inveraray – Crossaig OHL will be amended to allow connection into the new substation as it is not immediately adjacent to the existing OHL.

6.1.6. Crarae 275/33kV Substation

The existing Crarae Substation is currently connected to the Inveraray-Crossaig OHL at 132kV. Due to the increase in operational voltage to 275kV, a new Crarae Substation is to be constructed consisting of a single 275kV GIS busbar with a 275/33kV grid transformer to maintain connection to the existing wind farm. Solutions for the GIS will seek to utilise alternative insulating gases to SF₆ where technology permits this.

The existing Inveraray – Crossaig OHL, will be amended to allow connection into the new substation as it is not immediately adjacent to the existing OHL.

6.1.7. Crossaig (North) 275/132kV Substation

A new 275/132kV substation is to be constructed in the vicinity of the existing Crossaig Substation. This will consist of a 132kV GIS double busbar with two 275/132kV SGTs. Connections to the existing Crossaig 132kV Substation will be maintained, with this site allowing 275kV operation in full between Crossaig and the connection onto the SPT Dalmally-Windyhill 275kV OHL. Solutions for the GIS will seek to utilise alternative insulating gases to SF₆ where technology permits this.

The existing Inveraray – Crossaig OHL will be amended to allow connection into the new substation.

6.2. Costs

The costs associated with the Argyll 275kV Strategy at this stage in the project are determined utilising the SSEN Transmission Estimating Templates, a document which is continually refined to reflect known costs incurred on our various Transmission projects and using initial costs where available from our tender processes.

These are Class 1 cost estimates and are classed as having an accuracy of -30/+40% in line with SSEN Transmission Governance requirements. As further details develop, increased levels of design are established, and the tender processes progress, the cost estimates will continue to be refined towards Class 3 accuracy.

In the INC in 2022 we anticipated the cost for the project to be £351.8m. We have since developed the requirements for the project and undertaken extensive surveys and assessments which have refined the scope. Examples include:

- Identification of an unexploded ordnances (UXO) risk around the Creag Dhubh Substation and the Creag Dhubh to Inveraray OHL which resulted in extensive surveys leading to a realignment of the OHL which has reduced, but not eliminated the risk.
- Modifications to building designs to accommodate non-SF6 GIS equipment requirements.
- Extensive ground investigation informing substation platform requirements and steel tower foundation type selection.
- Refinement of forestry requirements and landowner commitments.

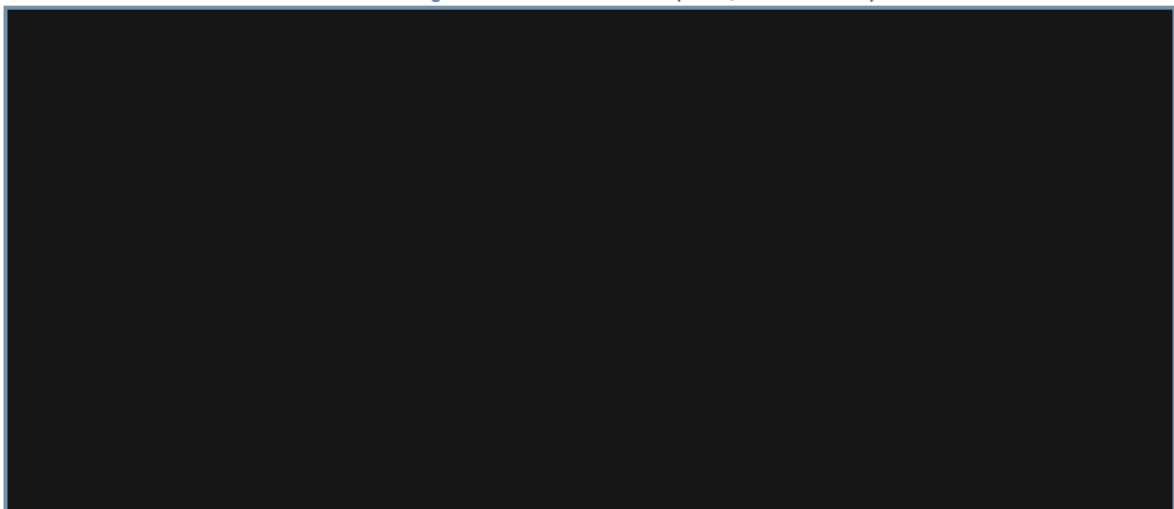
Costs have increased because of challenging market conditions influenced by events such as the war in Ukraine. Material shortages and constrained procurement periods have driven above-inflation cost increases. Variations of material costs at a local level, given the challenges of the project's remote location, are also impacting the anticipated costs. [REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

The updated costs associated with the Proposed Reinforcement Option are as per Table 8 below:

Table 8 High Level cost breakdown (2018/19 Price Base)



¹⁰ <https://www.gov.uk/government/publications/reform-of-red-diesel-entitlements/reform-of-red-diesel-and-other-rebated-fuels-entitlement>

We will continue with our ongoing procurement processes and seek efficient prices, refer to Chapter 7, which will be confirmed in the Project Assessment submission.

7. Project Timeline and Delivery Strategy

7.1. Overview of Project Programme and Key Dates

Since submitting the INC, we have progressed the planning applications to support the Argyll Strategy and these are currently being reviewed by the relevant authorities. The PLI for the proposed new 275kV OHL from Creag Dhubh Substation to the SPT Dalmally-Windyhill OHL is anticipated to be determined in April 2024, delaying full energisation by up to 18 months. The estimated PLI timescales are based on similar inquiries and on legal counsel advice.

The original energisation dates were April 2026 for the works comprising Creag Dhubh Substation and the new 275kV OHL to the SPT OHL, and April 2027 for the remainder of the Scheme. The full impact of the PLI process results in revised energisation dates of October 2027 and November 2028 respectively, refer to Annex E. The opportunity to re-sequence key activities, including early commencement of substation works and resequencing of commissioning and energisation, requires an early Minded To decision ahead of all consents being secured, potentially reducing the delay to full energisation by up to 11 months, refer to Annex F.

The project programmes set out the EISDs achievable for the scheme, as well as the works from the current year through to final energisation.

The project programme reflects current knowledge available to SSEN Transmission in terms of timescales for activities, including the PLI. Construction timescales are based on recent relevant and comparable SSEN Transmission projects, taking consideration of location, seasonal weather, etc. Activity durations are continually reviewed to ensure they reflect the most accurate anticipated programme for the works at any given point. The programme will continue to develop and be informed by the tender processes.

We have established an experienced team, with all key witnesses, to manage the PLI. The Scottish Government's Planning and Environmental Appeals Division (DPEA) has appointed the Reporter for the PLI and the timeframe for the initial stages of the process have been established.

We will continue to explore opportunities to mitigate the impact of the PLI, including re-sequencing commencement of activities and alternative energisation sequences, which may reduce the delay to energisation by up to 11 months. To support this, we require Ofgem to provide approval of the FNC in August 2023 once the substation consents are granted but ahead of all the overhead line consents.

7.2. Overview of Project Delivery Strategy and Monitoring

7.2.1. Large Capital Projects Framework and Project Lifecycle

There are several controls which are put in place within the SSEN Transmission business to ensure projects meet objectives and remain on track with programme, cost, quality and risk management.

Due to the value and complexity of the projects forming the Argyll 275kV Strategy, the Scheme is subject to the requirements of SSE's Large Capital Projects Governance Framework Manual which is in place to ensure projects are governed, developed, approved, and executed in a safe, consistent and effective manner. The internal Framework utilises five project stages charting a project's progress from concept through to operation, with a gated system in place which needs specific requirements to be met prior to a project progressing onto the next stage. Gates are numbered from 0 to 5 and correspond with key points within the project phases where decisions are required to progress the project. The project phases and the associated Gates are set out in Figure 12.

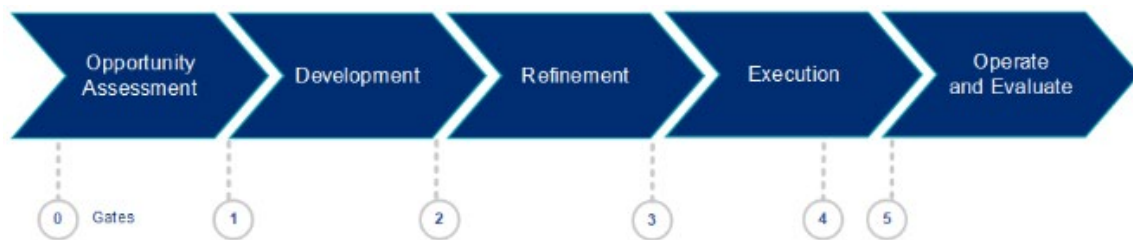


Figure 12 Large Capital Projects Gates and Stages

Opportunity Assessment, Development and Refinement are all Pre-Construction Phases, with Execution, and Operate and Evaluate as Construction and Post Construction respectively. The Argyll Reinforcement is currently in the Refinement Phase. Consents must be successfully obtained to allow the project to move from Pre-Construction to Construction.

The key activities and control measures utilised within each phase that will be undertaken on the scheme in line with the Large Capital Projects Framework are set out in the remainder of this section.

7.2.2. Opportunity Assessment Phase

The Opportunity Phase is the first stage in the Project Lifecycle following the identification of there being a need to undertake works on the Transmission Network and was fully explained in the INC. The key output from this stage is to have advanced the project design from a number of potential options to having preferred site locations for substations and preferred routes for OHLs.

Within the Argyll 275kV Strategy all elements progressed through the Opportunity Assessment Phase including the following summarised key activities:

- Identification of suitable corridors for OHLs, including consultation with Statutory Stakeholders (including the Scottish Environment Protection Agency, NatureScot, Historic Environment Scotland and Argyll and Bute Council) and wider Stakeholders on these corridors.
- Identification of routes for the OHL within the Preferred Corridors and consultation with Statutory Stakeholders and wider Stakeholders on these to identify a preferred route corridor.
- Identification of suitable sites to accommodate the required substations and consultation with Statutory Stakeholders and wider Stakeholders on these to identify a preferred site location.
- Undertaking of Environmental Surveys and Engineering Studies, both desktop and site based to inform the above works.
- Identification of affected Landowners and initial discussions on land acquisition.
- Engagement with Generation Developers to understand wider generation plans in the Argyll and Kintyre Region to assist with ensuring the preferred solutions meet future demand.

During this phase, the following key activities have been undertaken within the Large Capital Projects Framework:

- Project Safety Reviews (PSRs) – Focussing on ensuring that any Health and Safety risks are identified and mitigated adequately. Key items which feed into this review include Hazard Identification Workshops and outputs of internal Principal Designer (PD) works. The role of PD being undertaken by SSEN Transmission in line with the Construction (Design and Management) Regulations 2015.
- Procurement, Insurance and Legal Reviews – Ensuring that risks associated with the Procurement Strategy, Insurance, and any Legal issues, such as land acquisition which may arise at this early project stage, have been identified and mitigation is considered.
- Design Reviews – Focusses on the design undertaken to date and compliance with specifications and standards as well as the required level of maturity to inform the substation Site Selection and/or OHL Routeing.
- Gate 1 Check – A review is undertaken by SSEN Transmission Senior Management to ensure the appropriate option is put forward for development and to challenge the decision-making process undertaken.

7.2.3. Development Phase

The Development Phase takes the identified preferred routes or sites and develops the designs to a stage appropriate for submission of Planning Consents and issue of an Invitation to Tender. These works are supported by undertaking the required environmental studies, landowner negotiations and consultations with stakeholders. Key outputs at the end of this stage are submission of Planning Applications and issue of an Invitation to Tender.

Within the Argyll 275kV Strategy all elements progressed through the Development Phase including the following key activities:

- Development of the Procurement Strategy, for which the overall objective of this element is to deliver value to the end consumer whilst still providing a solution which meets the required uplift in capacity and all requirements of standards and specifications. The details of this are summarised further within this section.
- Development of the substation designs to a point suitable for submission into the Town and Country (Scotland) Consenting process, including identification of the required substation technology. The coastal proximity of the sites selected has driven the selection of GIS located within buildings. The saline environment of the coastal areas around Argyll results in increased degradation of outdoor equipment and it has been determined more economic in this instance to use indoor GIS rather than indoor Air Insulated Switchgear (AIS) which would require a significantly greater footprint and associated land purchase and earthworks, etc.
- The substation design is progressed to a point where it is suitable to accommodate known solutions from SSEN Transmission's Framework Suppliers, thus not precluding any supplier and maintaining the ability for competition during the Tender of the works.
- Development of the OHL Alignment from the Preferred Route selected during Opportunity Assessment. This work sees the tower positions determined within a limit of deviation for submission into the s37 Consenting Process of the Electricity Act (Scotland). SSEN Transmission engaged one of our Framework Contractor Partners to assist in the development of the OHL Alignments. This has consisted of developing the tower positions, requirements for angle and suspension towers and undertaking intrusive ground investigations to confirm suitability of positions and to inform future foundation designs. This support has been undertaken to allow a suitably detailed design for consenting to be produced utilising the Contractor's knowledge of construction of OHL in the region. However, it should be noted the detailed design and construction works are subject to a Tender process.
- Undertaking of ground investigation for substation sites.
- Undertaking of EIA for the OHL's to inform the Planning Applications. The EIA assesses the impacts of the works on a number of receptors to ensure the works and their operation do not have significant impacts on their surroundings.
- Undertaking of an Environmental Assessment (EA) for the substations to inform the Planning Applications.
- Consultation with Statutory and wider Stakeholders – the developed designs for planning will be consulted upon with SSEN Transmission's wide range of stakeholders, with all comments reviewed and incorporated into the scheme plans where necessary. Each element of the project will be covered within a Consultation, with SSEN Transmission obligations under Planning Regulations for Consultation met as a minimum. Reports on the Consultation output will also be published. To date, full Consultation has been undertaken for all elements bar the OHL from Creag Dhuhb to Inveraray.
- Submission of required consent for substations and OHLs as set out in Table 9 below:

Table 9 Required Planning Applications

Project Element	Planning Application
Creag Dhubh Substation	Town and Country (Scotland) Planning Application
Creag Dhubh – Dalmally/Windyhill 275kV OHL	Section 37 Application under the Electricity Act
Creag Dhubh – Inveraray Tee 275kV OHL	Section 37 Application under the Electricity Act
Taynuilt – Inveraray 132kV OHL Diversion at Creag Dhubh	Section 37 Application under the Electricity Act
Crarae Substation	Town and Country (Scotland) Planning Application
Crarae OHL Diversion	Section 37 Application under the Electricity Act
An Suidhe Substation	Town and Country (Scotland) Planning Application
An Suidhe OHL Diversion	Section 37 Application under the Electricity Act
Craig Murrail Switching Station	Town and Country (Scotland) Planning Application
Craig Murrail OHL Diversion	Section 37 Application under the Electricity Act
Crossaig Substation	Town and Country (Scotland) Planning Application
Crossaig OHL Diversion	Section 37 Application under the Electricity Act

- Further negotiation with affected landowners to secure the required land purchases, wayleaves and servitudes is undertaken during this phase. Necessary Wayleaves and Compulsory Purchase Orders will be submitted where appropriate to secure the necessary rights.
- Issuing of the Invitations to Tender for the various work packages for the scheme. This process will see SSEN Transmission working with the supply chain to agree costs for the detailed design and ultimately construction of the works through competitive tender events.
- Submission of the INC.

During this phase, the following key activities were progressed in compliance with the Large Capital Projects Framework:

- Project Assurance Review (PAR) – Led by a Senior Assurance Manager and supported by SSE colleagues external to the project. The project is assessed for its readiness to pass through Gate 2 on a number of categories- including Engineering Design, Environmental and Consents, Procurement, Risk, Safety, Health and Stakeholder Engagement - through a process of interviewing the project team and its key internal stakeholders. The project is required to pass this review in order to be recommended to go forward to its Gate 2 Check.
- Gate 2 Check – A review is undertaken to ensure that all required reviews and documentation have been completed and checked by the relevant approvers prior to the projects moving onto the next phase.

7.2.4. Refinement Phase

The Argyll 275kV Strategy is currently within the Refinement Phase, which is the final phase before commencing construction. During this phase the Contractor partners will be appointed to deliver the works during Execution. Detailed designs will be developed, planning consents will be received, and progression of the associated conditions to be discharged. Final checks will be made to ensure that the project is ready to undertake construction and is meeting the required outputs.

Within the Refinement Phase, the following key project activities will be undertaken:

- Completion of the tender process and appointment of the selected contractors and transformer suppliers for each element of the works
- Undertake design for the substation, OHL and cabling elements to prepare for construction works commencing on site.
- Assessment of the presence of UXOs on the route of the Creag Dhubh to Dalmally OHL and at the site of the Creag Dhubh Substation.
- Confirmation of expected detailed construction costs for the project post-Gate 3
- Submission of this FNC to Ofgem.

Within the Refinement Phase, the following key project activities are ongoing or to be completed:

- Continue to liaise with the relevant Planning Authorities and secure planning consents.
- Continue engagement with all other affected stakeholders to update on the scheme's progression towards construction.
- Finalise negotiations with landowners and have all Heads of Term signed.
- Upon receipt of the consents, discharge the pre-commencement conditions required to allow construction works to commence.
- Confirm arrangements for the award of the Construction Contracts and final costs associated with these.

- Undertake detail design for the substation, OHL, transformers and cabling elements to prepare for construction works commencing on site. This will inform and define the final requirements for the forestry works.

During this phase, the key activities to comply with the Large Capital Projects Governance Manual, e.g. PAR, Procurement Insurance & Legal (PIL) review and the PSR, will be undertaken with a focus on ensuring the project has achieved all elements required to enable a successful execution phase.

7.2.5. Execution

The Execution Phase sees the project move onto site and deliver the works. Within the Execution Phase, the following key project activities will be undertaken:

- Satisfy all pre-commencement consent conditions and implement all land/access agreements.
- Complete all remaining design activities.
- Procurement of grid and super-grid transformers.
- Mobilisation of the appointed Contractors to undertake the construction activities and establish the required infrastructure.
- Commissioning and energisation of the works – following construction of the new infrastructure, the SSEN Transmission Commissioning Team will work with the Contractors to commission and ultimately energise the works onto the Transmission Network. This will be done in line with approved outages provided to undertake the necessary amendments to the system.

7.3. Procurement Strategy

A variety of factors will influence the strategy of a major SSEN Transmission project including programme, project and interface management, technical capabilities, system integration, supply chain availability and risk allocation. Value for money and quality of product are consistent considerations.

During the Refinement Phase, the Procurement Strategy has been further developed to consider the synergies between each package of work as further design detail has been developed.

The substation and OHL contracts are undergoing tender processes for both design and construction works, with the Contracts to be initially awarded to undertake the detail design and pre-construction activities with an option to progress with the construction works following Gate 3.

The 33kV cable works, forestry works, and transformer procurement contracts are also undergoing tender processes with the design works to be progressed in the first instance.

The focus for the Procurement Strategy is to drive value by challenging the supply chain to demonstrate value through offering savings across more than one package of work, particularly where there are similarities in the scope, for example, similar designs for An Suidhe and Crarae Substations.

The combinations of packages of work considers the current and future resource availability of the supply chain under SSEN Transmission’s Frameworks, with a view to ensuring work packages do not result in the Scheme being placed at risk due to a lack of diversity in the Supply Chain.

The supply chain is operating in challenging market conditions with several events, including the war in Ukraine, resulting in above inflation increases to material costs, material shortages and constrained procurement periods which will be confirmed in the Project Assessment submission. The competitive tender approach, and package combinations to all the major elements of the project will ensure value for money and quality products.

7.4. Supply Chain Contracts

The works are currently being procured through SSEN Transmission’s Substation Frameworks for all substation works and the OHL Framework for all OHL works. These frameworks were tendered through a competitive process as part of SSEN Transmission’s preparations for the RIIO-T2 Price Control to ensure value for the consumer could be delivered and, as such, it is considered appropriate to utilise these frameworks for the Argyll and Kintyre Reinforcement Schemes.

The key packages of work being procured as part of the Argyll Reinforcement Scheme are set out in Table 10 below:

Table 10: Key Packages of Work

No.	Works	Contract Proposal
1	OHL between Creag Dhubh and SPT Dalmally-Windyhill Design & Construct Contract	[Redacted]
2	OHL between Creag Dhubh and Inveraray Tee Point Design & Construct Contract	[Redacted]
3	Creag Dhubh Substation Design & Construct Contract	[Redacted]
4	Craig Murrail Substation Design & Construct Contract	[Redacted]
5	An Suidhe and Crarae Substations Design & Construct Contract	[Redacted]
6	Crossaig Substation Design & Construct Contract	[Redacted]
7	Super Grid Transformer Supply, multiple packages	[Redacted]

No.	Works	Contract Proposal
8	Forestry Felling and Replanting Contract	[REDACTED]
9	33kV Underground Cables Design & Construct Contract	[REDACTED]

The New Engineering Contract 3 (NEC3) suite of contracts will typically be used for all key contracts. This suite of contracts has been used successfully on other large projects delivered by SSEN Transmission. The allocation of risk under the contract will be reviewed to determine the party with which the risk is best allocated to manage and mitigate. This approach will assist with protecting the end consumer from increased costs on the project should a risk event occur.

7.5. Procurement Milestones

Key procurement milestones are set out in the Table 11 below:

Table 11: Key Procurement Milestones

	New OHL Creag Dhubh Substation to Dalmally	New OHL Creag Dhubh Substation to Inveraray – Crossaig OHL	Creag Dhubh Substation	Craig Murrail Substation	An Suidhe and Crae Substations	Crossaig Substation
Invitation to Tender Process	Issued Q2 2022	Issued Q2 2022	Issued Q2 2022	Issued Q3 2022	Issued Q3 2022	Issued Q4 2022
	Estimated Date					
Project Costs for Design Contract Award	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Construction Contract Award	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Construction start	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

7.6. Project Risk Management

The Argyll Strategy project is managing risk in accordance with the LCP Governance Manual and its requirements. The Project has a Risk Management Plan, which sets out the process the Project will use to manage risk (threats and opportunities) over the lifetime of the Project. Within the Plan it sets out the risk process that should be followed to manage risk, project teams' roles in respect of managing risk, and that the Project is using the SSE LCP Risk Management Information System, KERIS (Knowledge Exchange Risk Information System) as the

tool for managing risk on the project. KERIS acts as the repository for all project risks as it allows the users to create and assess all risks and track mitigating risk actions. All risks and actions are assigned owners who are then accountable for updating the KERIS system. Risk owners can simultaneously access KERIS, this is an ongoing project activity to ensure that risk data is reliable and can be used to support project decision making.

To supplement the ongoing updates to KERIS, the project teams hold regular risk workshops to collectively review and challenge the Project Risk Register. These workshops are independently facilitated by the SSE Large Capital Projects Risk Team who will bring challenge, experience and learnings from other similar large capital projects. These sessions are also used to identify new and emerging risks (threats and opportunities).

The development of the project Risk Register follows the LCP Governance Gated Process in the LCP Manual, and the risk register is a live document that evolves through continuous updates and contributions from the project team.

Before Gate 3, the Execution risks, and the risks that cannot be transferred to the Contractor, but which should be ALARP (As Low As Reasonably Practicable) are validated. These will be used as inputs in a probabilistic risk model (Quantitative Risk Analysis (QRA)), the output of which will provide a range, and will input to the Project Assessment submission risk figure.

Following conclusion of the multi-contract procurement process when there is a better understanding of how risks will be apportioned between SSEN Transmission and our contractors, this risk figure, and the risks that are the key drivers of it, will be further reviewed and refined for presentation in the Project Assessment. The risk allocation split will be agreed with the contractors to ensure that each risk sits with the party in the best position to own, mitigate and control that risk in order to reduce the impact of the risk and keep costs to a minimum. Costing of the SSEN Transmission and contractor risk allowances will be developed in line with this approach to provide the best Value for Money (VFM) and to reduce the likelihood of the risks of materialising and becoming issues.

The Argyll Strategy Risk Register is also informed by risk data and lessons learned from other projects held on KERIS, for example, the Inveraray to Port Ann 275kV OHL project, the Port Ann to Crossaig 275kV OHL project, and the Kintore and Peterhead Substation projects. The Project has access to records of risks that have impacted other projects and risks that were successfully mitigated; this is a form of lessons learned and will inform the quality of the Risk Register and accuracy of the Project Assessment.

To assist the project team and development advances and improve performance, risks are organised into sub-registers for OHL, substations and general project risk. This breakdown will ensure greater ownership from Subject Matter Experts and visibility of what risks sit on each sub-register. The SSE LCP Risk Team is responsible for monitoring and reporting on the performance, of Risk Management on the project as per the Argyll Reinforcement Risk Management Plan, produced as part of the LCP Governance documentation for the project. The LCP Risk Team provides the Project Manager with weekly reports detailing the status of Risks and Actions to highlight which requires attention. The top five risks for the project are set out in Table 12.

Table 12: Project Risks and Mitigations

Risk	Proposed Mitigation
<p>Market Conditions and Increasing Lead Times</p> <p>External market conditions brought on by global events have resulted in above inflation price increases and a shortage of key components required to produce equipment required. Increasing lead times and costs may result in energisation dates not being met if equipment cannot be delivered on time and costs increasing further above inflation.</p>	<p>The project team are engaging with equipment suppliers to understand lead times and their impact on the programme and costs. Where required ordering of equipment will be advanced to avoid an impact on the programme and reduce cost increases.</p> <p>Tender processes are ongoing, seeking efficiencies including bundling strategies.</p>
<p>Project Interfaces and Interdependencies</p> <p>Due to the complex scope comprising of multiple new substations and construction of sections of new OHL requiring a complex phased energisation sequence, all to be commissioned onto an existing network with dependent customers, there are critical project interfaces to be managed during the Refinement and Execution phases.</p> <p>There is a risk that delays to one element of the overall reinforcement will impact the overall sequence and delay full energisation.</p>	<p>The project team continue to identify and review all project interfaces and interdependencies within the Project Documentation. Requirements for provision of information, completion of works and access to areas are being captured within the Contracts to manage their delivery.</p> <p>Interface meetings established to manage the various projects and their works.</p> <p>The stage-by-stage plans for commissioning and energisation will be further developed. This will include identification of mitigation options should delays occur.</p>
<p>Consenting Timescales</p> <p>Due to significant development in the Electricity Generation and Transmission Sectors there are a high number of consent Applications being lodged with the Scottish Government’s Energy Consents Unit and Local Councils within Scotland, increasing the risk of elongated consenting timescales which could delay the overall programmes.</p>	<p>Applications have been subjected to internal and external reviews prior to being submitted to the relevant authority to ensure they are robust, and all required information is provided to reduce the risk of delays in the planning process.</p> <p>Communication will be maintained with all relevant stakeholders throughout the consent application and determination phases, in particular the consenting authorities to prioritise applications based on the programme.</p>

Risk	Proposed Mitigation
<p>Public Opposition to new Transmission Schemes</p> <p>Public opposition to the transmission network upgrade may influence planning authority decisions on the s37 and planning consents.</p> <p>This risk has already been realised on the Creag Dhubh to Dalmally OHL s37 consent application resulting in a PLI being triggered.</p> <p>There remains a risk of opposition to further consent applications for the Strategy.</p>	<p>The project team continues to undertake appropriate and transparent consultation with the affected local communities.</p> <p>Applications have been subjected to internal and external reviews, including that of the appointed Queen's/King's Counsel, prior to being submitted, to ensure they are robust and all required information is provided to reduce the risk of delays in the planning process.</p> <p>A core team has been established to manage the PLI process to conclusion.</p> <p>An early FNC approval contingent on the outcome of the PLI would allow works to commence on consented works earlier, reducing the overall program delay caused by the objection.</p>

7.7. Applicability of Late Competition

We note that in its INC decision, Ofgem set out that the impact of the Creag Dhubh to Dalmally OHL objection should be taken into account when assessing the applicability of competition models to the Argyll project. In our response below we have re-assessed the applicability of competition models to the Argyll project against the timeline shown in Annex E, where on-site works only commence once all material planning consents are secured. At this stage we are still of the view that implementation of late-model competition would cause additional delay to the Argyll project timeline and push final energisation dates beyond 2030.

Stage 1 assessment – Assessment against criteria for competition

Ofgem considered within the INC that the project meets the new, separable and high value criteria for late model competition. Whilst we agree the project meets the new and high value criteria, and whilst the project in whole could be considered to be separable, much of the upgrade work on substations requires work on existing sites and connects into existing OHL, which is not necessarily separable.

Stage 2 assessment – Delivery model selection

Ofgem has outlined three possible delivery models, that it will consider, within its LOTI guidance. The models proposed by Ofgem are the CATO regime, the Special Purpose Vehicle (SPV) model and the Competition Proxy Model (CPM). All three have unresolved issues that have yet to be addressed. We also note that the CATO and SPV regimes are on hold until enabling legislation is given Royal Assent. We outline below 3 project specific factors that Ofgem should consider when making its competition assessment.

Delays to pathway to Net Zero

Due to the significant increase in generation background in 2019/2020, the Strategy programme is challenging and must be delivered at pace to meet EISDs and connection dates. Large contracted and scoping generation must be connected on time to enable the pathway to Net Zero and ensure stability and reliability of the network. Missed connection dates will have wider impacts for SSEN Transmission, for example on our stakeholder surveys, and ODIs, such as the Quality of Connections Survey, which we may incur financial penalties.

We expect that necessary legislation to enable the CATO regime would not be in place until mid-2023 at the earliest. Based on the timelines presented in the BEIS consultation¹¹ we expect a tender to take between 22-37 months from the pre-tender to licence award stage. We also assume that the new CATO would require a 12-month mobilisation phase before it can begin construction. Overlaying these assumptions onto the Argyll programme critical path suggests that the full energisation could be delayed between c3-4 years. We have mapped this timeline in Figure 13.

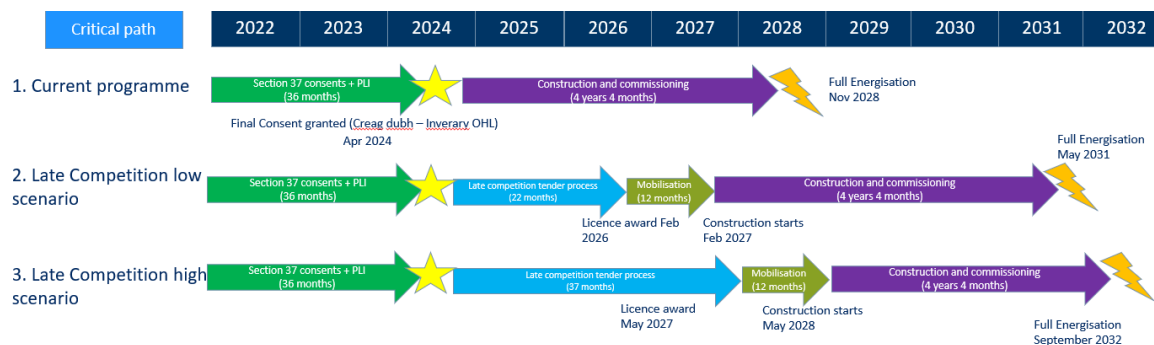


Figure 13 Overlay of BEIS timelines for late competition onto the current Argyll critical path

¹¹ [Competition in Onshore Electricity Networks \(publishing.service.gov.uk\)](https://publishing.service.gov.uk) page 19 and 20

We therefore believe, based on the expected timelines outlined by BEIS, that the introduction of the CATO regime to the Argyll 275kV Strategy would cause a significant delay to the pathway to Net Zero, and therefore would not be beneficial for customers.

The SPV model would require the running of a competition, which we would expect to follow similar timelines to those presented. Both models would require significant development time as they have unresolved issues and would impact on full energisation dates.

Synergies across the Argyll programme

As per the INC, we maintain the view that as a natural monopoly, we are able to apply economies of scale and scope, to implement synergies across our portfolio, and bundle works to obtain volume discounts and efficiency in development and delivery programmes, as well as find efficiencies to provide cost advantage for end costs for consumers. Through coordinating the design of the scheme, we can identify these efficiencies at an early stage and implement them.

Examples of this include utilising the same contractor on project elements with the same deliverables such as delivery of Gas Insulated Switchgear for the substations, on the 275kV OHLs and forestry related works. Where bundling of work to one Contractor allows, the use of a consistent design across the schemes reduces the costs for preparing these individually. Additionally, with SSEN Transmission coordination, this may allow a bulk discount to be applied to the purchase of equipment.

Delivering the Argyll 275kV Strategy in a coordinated approach offers opportunities to utilise Contractor resources in an efficient and sustainable manner, including reduced number of contractor mobilisations, reduced welfare requirements, shared construction resources and tighter programme coordination.

Reducing risk of abortive works

Additionally, as with at INC, having the scheme coordinated by SSEN Transmission reduces the potential for abortive works. We are able to view the whole scheme and its wider interactions with the network to ensure that, where practicable, the design and construction of new infrastructure takes into account the long-term requirements and avoid abortive works such as having to install super grid transformers on a temporary basis to maintain network operation whilst other elements of project infrastructure are completed. We are able to consider this for the Argyll 275kV Strategy as well as its associated Customer Connection works which interface with it to provide the optimum solution for the end users.

Conclusion

Given the schedule issues due to the expected lengthy timelines for running a competition, coupled with the complexity of this project, multiple interfaces, and extensive and coordinated stakeholder engagement throughout the development cycle of the project, we do not think that the delivery of this project through any of the three late competition models is in the best interest of consumers. We would encourage Ofgem to rule out applying late competition to the Argyll 275kV Strategy based on the project specific factors presented.

8. Conclusion

The need for reinforcement of the Argyll and Kintyre network has been clearly demonstrated through the recent significant rise in contracted and applied generation activity at the end of 2019 through to now, with the volume of generation observed looking to connect to the network in the upcoming years.

There is a clear need driver to intervene on the transmission network in the Argyll and Kintyre region; the increase in low carbon renewable generation seeking connection to the network in Argyll. Power system studies undertaken on the existing network to assess the connection of the contracted generation has identified that network reinforcement is required to maintain compliance with the NETS SQSS and the Connection and Use of System Code (CUSC) Connect and Manage Criteria as the capability of the existing network would be exceeded with the connection of the generation. Following commitment from both the UK and Scottish Governments to achieve net zero emissions by 2050 and 2045 respectively, SSEN Transmission set out an economically justified pathway for reinforcement that will meet net zero targets at the lowest risk to GB consumers. This will allow incremental increases in capacity to support the connection of additional renewables generation when such need has been clearly demonstrated.

Whilst the increase in low carbon generation is the primary driver for the reinforcement of the Argyll and Kintyre network, it has been equally important to consider the sensitive environments and communities which surround the area. In line with our RIIO-T2 Business Plan commitment, we have adopted a stakeholder-led approach to gather key feedback which has influenced both our options and preferred solution.

Our strategic approach has allowed us to develop a long-term economic solution which enables renewable generation today, and in the future to mitigate the need for further construction work in the future. This eliminates the potential for disruption to the local environment and communities in later years and instead, enables us to future proof the network whilst facilitating wider moves to net zero.

In order to assess the operable options, we have re-engaged the ESO to undertake a refresh of its CBA of the Argyll 275kV Strategy, to assess increases in option CAPEX and upward generation projections.

Our preferred option for reinforcement of the Argyll and Kintyre network has been developed through an extensive assessment of the potential future generation in the area, in depth engagement with both generators and local communities. The preferred option has also been economically assessed through the refreshed CBA, as well as other economic indicators such as carbon cost and value to consumers. As a result, we are confident that the option, outlined below, is most appropriate in meeting the needs of our stakeholders as well as current and future consumers whilst facilitating the shift towards net zero by 2050 (and 2045 in Scotland).

The information and evidence provided within this submission clearly demonstrates that Ofgem should approve the INC and supporting the proposed solution which is to create a high capacity 275kV double circuit (2 x 1160MVA summer pre-fault rating) and consists of five key elements:

1. Establishing a new substation at Creag Dhubh to enable connection to Scottish Power's Dalmally – Windyhill 275kV OHL circuits via c. 14km of new OHL.
2. c.10km of new OHL between Creag Dhubh and a tee point on the existing Inveraray-Crossaig Circuits to enable to 275kV operation of this section.
3. Upgrade of An Suidhe and Crarae substations to enable them to maintain connection to the 275kV network.
4. Establishing a new 275kV substation at Craig Murrail.
5. Establishing a new 275kV substation at Crossaig in the vicinity of the existing Crossaig substation.

Next Steps

Following submission of this FNC, we anticipate Ofgem's response with a minded-to view by the end of August 2023 at the latest, in line with the 4 – 6 month decision making timeframe specified in paragraph 5.1 of the LOTI Re-opener Guidance¹². During this time SSEN Transmission, will continue to closely monitor generation, and progress its stakeholder engagement with increased focus on local authorities, statutory consultees, communities and landowners on project design to obtain the necessary planning consents.

Following Ofgem's decision on the FNC, we will aim to make our Project Assessment submission for full project funding in June 2024 having secured all material planning consents. At this stage we anticipate commencing with construction activities at all sites and to be awarding all any remaining construction contracts, and we will have a more complete view on the final energisation date for the project. As such we expect to receive Ofgem's response to our Project Assessment submission by 30th December 2024, with a 6-month review period as indicated in paragraph 6.26 of the LOTI Re-opener Guidance. We anticipate the review period for the Project Assessment submission should fall at the lower end of Ofgem's anticipated timescales due to the maturity of the project programme and costs at the time of submission.

We welcome Ofgem's timeliness and flexibility during this process to date, particularly in agreeing to review the FNC in parallel with the ongoing PLI. We will continue to engage positively closely with Ofgem throughout the process in order to ensure we are being as open and transparent as possible throughout the remainder of the LOTI assessment process for the Argyll 275kV Strategy.

¹² <https://www.ofgem.gov.uk/publications/large-onshore-transmission-investments-loti-re-opener-guidance>

9. Appendices

Title	Description	Purpose
All numbered appendix items are found within this document below		
Appendix 1 Detailed list of option components	Detailed description of individual components that make up the reinforcement options	To provide greater granularity and detail on the individual option components
Appendix 2: List of Acronyms	List of acronyms used throughout the Argyll and Kintyre Reinforcement INC	To provide guidance to the reader on acronyms used
Appendix 3: Contracted, offered and scoping generation table	List of all the contracted, offered, and scoping generation in the Argyll and Kintyre network area.	To provide a single table showing all of the generators that are currently in two tables within the Need Section.
All of the following Annex items will be found in separate folder provided with the FNC		
Annex A Argyll and Kintyre Local FES – FNC	A report of the local FES that was used in the detailed options analysis	To clearly evidence how the local FES was developed and the sources utilised
Annex B – Argyll FNC CBA Update – V2.2 – Final	A report completed by the ESO on the CBA they undertook, as required by the LOTI guidance	To clearly demonstrate the CBA methodology applied, the studies undertaken and the CBA outputs.
Annex C Argyll & Kintyre Socio-Economic Analysis	A report investigating the wider socio-economic benefits created by the assets over their lifetime	To provide additional analysis to indicate the wider benefits created from the project.
Annex D Argyll 275kV Reinforcement – Whole Life Carbon Profile	A report investigating the carbon profile of the assets and their contribution to the decarbonisation of energy supply	To provide additional analysis to indicate the important contribution this project makes to Net Zero.
Annex E Final Needs Case Scheme Programme	Current programme for the Argyll 275kV Strategy through to completion in November 2028.	To provide a summary of the programmed key activities and dates associated with the Argyll 275kV Scheme.
Annex F Final Needs Case Scheme Resequenced Programme	Revised programme for the Argyll 275kV Strategy through to completion in December 2027.	To provide a summary of the programmed key activities and dates associated with the Argyll 275kV Scheme.

Appendix 1: Detailed list of Option components

Code	Description	Detailed Description
CKNC	Twin Subsea Cable (Carradale - Kilmarnock South)	Two 220kV 240 MVA subsea cables from Carradale substation to Kilmarnock South substation (SPT). New 132kV Carradale substation, tying in the existing Carradale GSP and the 132kV OHL circuits to Crossaig. Ownership boundary will be the landing point on SPT network. Cable into Kilmarnock South substation and connection to 275kV busbar will be SPT works.
DDNC1	Creag Dhubh Substation - Normally Open	New 275/132kV substation at Creag Dhubh in North Argyll. Turn in the existing Inveraray - Taynuilt 132kV OHL. Open the circuit between Creag Dhubh and Inveraray. A new 275kV double circuit OHL from Creag Dhubh substation to Dalmally - Windyhill circuit (SPT), looped into one side. Ownership boundary will be prior to circuit loop in. Tower works and reprofile of Dalmally - Windyhill 275kV OHL will be SPT works.
DDNC2	Creag Dhubh Substation	New 275/132kV substation at Creag Dhubh in North Argyll. Turn in the existing Inveraray - Taynuilt 132kV OHL. 132kV circuit between Creag Dhubh and Inveraray operated closed. A new 275kV double circuit OHL from Creag Dhubh substation to Dalmally - Windyhill circuit (SPT), looped into one side. Ownership boundary will be prior to circuit loop in. Tower works and reprofile of Dalmally - Windyhill 275kV OHL will be SPT works.
DINC	OHL to Inveraray	A new 275kV double circuit OHL from Creag Dhubh to Inveraray - Crossaig OHL (bypassing Inveraray Substation). Circuit will be operated at 132kV initially. Existing OHL between Creag Dhubh substation and Inveraray switching station to be removed. Inveraray switching station now radialised from Sloy.
DCUP1	275kV Reinforcement - Radialised Network	Operate the Creag Dhubh - Crossaig double circuit at 275kV. Construct new 275kV substations at Crarae and An Suidhe to maintain transmission connected generator connections. Construct a new 275kV substation at Craig Murrail, and

		<p>install new 275/33kV Grid Transformers to maintain connection to Port Ann GSP.</p> <p>Construct a new 132kV Crossaig double busbar and connect OHL from Craig Murrail and OHL from Carradale onto new busbar. Install a normally open point between the two Crossaig busbars, and radialise the subsea cables from Hunterston.</p>
DCUP2	275kV Reinforcement - Interconnected Network	<p>Operate the Creag Dhubh - Crossaig double circuit at 275kV.</p> <p>Construct new 275kV substations at Crarae and An Suidhe to maintain transmission connected generator connections.</p> <p>Construct a new 275kV substation at Craig Murrail, and install new 275/33kV GTs to maintain connection to Port Ann GSP.</p> <p>Construct a new 132kV Crossaig double busbar and connect OHL from Craig Murrail onto new busbar. Install two cable circuits between the two Crossaig busbars to maintain connectivity with the existing Crossaig double busbar.</p>

Appendix 2: List of Acronyms

Acronym	Full Name
AIS	Air Insulated Switchgear
CAPEX	Capital Expenditure
CBA	Cost Benefit Analysis
CPM	Competition Proxy Model
CUSC	Connection and Use of System Code
DPEA	Scottish Government's Planning and Environmental Appeals Division
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EISD	Earliest In Service Dates
ESO	Electricity System Operator
FES	Future Energy Scenarios
FNC	Final Needs Case
GB	Great Britain
GHG	Greenhouse Gas
GIS	Gas Insulated Switchgear
GSP	Grid Supply Point
GT	Grid Transformers
GVA	Gross Value Added
INC	Initial Needs Case
KERIS	Knowledge Exchange Risk Information System
LOTI	Large Onshore Transmission Investment
LWR	Least Worst Regret
MITS	Main Interconnected Transmission System
MVA	Megavolt Ampere
MW	Mega Watts
NEC3	New Engineering Contract 3
NETS	National Electricity Transmission System
NOA	Network Options Assessment
NPV	Net Present Value
OFGEM	Office of Gas and Electricity Markets
OHL	Overhead Line
PA	Project Assessment
PAR	Project Assurance Review

PD	Principal Designer
PIL	Procurement Insurance & Legal
PLI	Public Local Inquiry
PSR	Project Safety Review
PV	Present Value
RIIO	Revenue=Incentives + Innovation + Outputs
s37	Section 37
SAT	Scenario Assessment Tool
SGT	Super Grid Transformer
SPT	Scottish Power Transmission
SPV	Special Purpose Vehicle
SQSS	Security and Quality of Supply Standard
SSEN	Scottish & Southern Energy Network
TO	Transmission Owner
TORI	Transmission Owner Reinforcement Instruction
UXO	Unexploded Ordnances
VFM	Value For Money

Appendix 3: Generation Table

Table listing the contracted, offered and applied, and scoping generation in the Argyll and Kintyre network area, as of March 2023.

