

National Grid Electricity Transmission's Enhancing Pre-existing Infrastructure project in the Snowdonia National Park

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We¹ are consulting on our assessment of a funding request by National Grid Electricity Transmission (NGET) to deliver a new Enhancing Pre-existing Infrastructure (EPI) output to reduce visual amenity impacts on the western edge of the Snowdonia National Park. We would like views from people with an interest in electricity transmission networks. We would also welcome responses from other stakeholders and the public.

This document outlines the scope, purpose and questions of the consultation and how you can get involved. Once the consultation is closed, we will consider all responses. We want to be transparent in our consultations. We will publish the non-confidential responses we receive alongside a decision on next steps on our website at [Ofgem.gov.uk/consultations](https://www.ofgem.gov.uk/consultations). If you want your response – in whole or in part – to be considered confidential, please tell us in your response and explain why. Please clearly mark the parts of your response that you consider to be confidential, and if possible, put the confidential material in separate appendices to your response.

¹ The terms 'we', 'us', 'our' refer to the Gas and Electricity Markets Authority (the Authority). Ofgem operates under the direction and governance of the Authority.

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1. Executive summary

1.1. We are consulting on our assessment of a funding request made by National Grid Electricity Transmission (NGET) to deliver a new Enhancing Pre-existing Infrastructure (EPI) project under its RIIO-2 price control. The proposed EPI project will replace a 3.3km section of 400kV/132kV double overhead lines and pylons with an underground cable tunnel and associated infrastructure, on the western edge of the Snowdonia National Park near Porthmadog, Wales. NGET will deliver the EPI project by 2030.

1.2. NGET made a project submission in March 2021 under the RIIO-1 price control policy for electricity transmission licensees to reduce the impact of pre-existing infrastructure on visual amenity within nationally designated areas and their settings. Ofgem can make amendments to NGET’s RIIO-2 licence to add the EPI projects that a licensee submitted prior to April 2021 for which no allowance has been provided under Special Licence Condition (SpC) 3.10.15 of the Visual Impact Mitigation Re-opener and Price Control Deliverable and Enhancing Pre-existing Infrastructure Projects allowance licence condition.

1.3. Following a significant increase in generation connection requests in north Wales over 2020, NGET decided a change in the project scope was required and re-tendered the main tunnel works. Consequently, NGET submitted an updated funding request in November 2021 for £299.6 million (2019/20 prices) to deliver the EPI project.

1.4. This consultation sets out our views on the Snowdonia National Park EPI project in the following areas:

- whether NGET has complied with its Visual Impact Provision (VIP) policy in selecting the EPI project;
- whether the technical scope of the proposed EPI project is justified; and,
- whether the proposed costs for delivering the EPI project are efficient.

1.5. Based on the documentary evidence provided in its submission, we are satisfied that the steps taken by NGET meet the commitments set out in its 2014 VIP policy and that the EPI project is a valid outcome of working with stakeholders on the selection of EPI projects.

1.6. From our assessment of the Options Appraisal Study, we are satisfied that NGET and the Stakeholder Advisory Group considered an appropriate range of options to potentially address the visual impacts of the 4ZC.1 section of overhead line. We also consider that the

technical scope of NGET’s proposed EPI project is appropriate given the characteristics of the area and the complexity involved in a tunnelling project.

1.7. We have assessed NGET’s proposed costs for the Snowdonia EPI project. We consider that NGET’s proposed contractors’ costs for the project are efficient and are minded to adjust NGET’s price control allowances for these. We are proposing to remove six high-value low likelihood risks from NGET’s risk contingency. We consider that including a specific re-opener for these risks is a more efficient way to fund NGET the efficient material costs of managing the impacts in the unlikely event that any such risks occur. We are satisfied that NGET’s other direct activity costs are efficient and propose to allow these in full. We have removed from the funding assessment costs for indirect activities by NGET and its contractors that are programmed for the RIIO-3 price control period. This is because NGET will receive an opex allowance under its RIIO-3 price control for indirect activities associated with the baseline capital expenditure in its RIIO-3 business plan, which will include the remainder of the work during RIIO-3 to deliver the Snowdonia EPI project. Overall, our proposed funding assessment is 4.1% less than the funding NGET requested.

1.8. We welcome responses to our consultation, in particular on the specific questions we have included in Chapters 3, 4 and 5. The deadline for responses is 24 June 2022. We expect to publish our decision in July 2022. Alongside our decision we will consult on the changes to NGET’s licence that we propose to make for the Snowdonia EPI project.

2. Introduction

What are we consulting on?

2.1. We are consulting on our assessment of a £299.6 million funding request made by National Grid Electricity Transmission (NGET) in March 2021 to deliver a new Enhancing Pre-existing Infrastructure (EPI) project. The proposed EPI project will replace a 3.3km section of 400kV/132kV double overhead lines and 10 pylons with an underground cable tunnel and associated infrastructure, on the western edge of the Snowdonia National Park near Porthmadog, Wales. NGET will deliver the Snowdonia EPI project by 2030.

Context

2.2. In the RIIO-1 price control, we introduced a policy for electricity transmission licensees to reduce the visual impact of pre-existing infrastructure within nationally designated areas and their settings. The policy applies to the following designated areas: National Parks, Areas of Outstanding Natural Beauty (AONB), and National Scenic Areas. The mitigation projects proposed by the electricity transmission licensees are known as EPI projects.

2.3. An electricity transmission licensee can propose new EPI projects and request funding for these under its price control as long as it has a policy in place for working with stakeholders to select EPI projects within their transmission area.

2.4. NGET submitted this project in March 2021 under Special Condition (SpC) 6G (Mitigating the impact of Pre-existing Transmission Infrastructure on the visual amenity of Designated Areas) of its RIIO-1 price control electricity transmission licence. Ofgem can make amendments to NGET’s RIIO-2 licence to add the EPI projects that a licensee submitted prior to April 2021 for which no allowance has been provided under SpC 3.10.15 of the Visual Impact Mitigation Re-opener and Price Control Deliverable and Enhancing Pre-existing Infrastructure Projects allowance licence condition.²

² The policy, introduced in the RIIO-1 electricity transmission price control, for addressing the impacts of existing transmission infrastructure in designated areas that was continued in RIIO-2. The RIIO-2 licence condition SpC 3.10 is largely based on the RIIO-1 licence condition SpC 6G but was amended to include a proviso on how the regulatory approval process would work in the RIIO-2 price control period for project proposals submitted before the end of RIIO-1.

Consultation approach

2.5. In its submission, NGET has provided Ofgem with supporting evidence on its Visual Impact Provision (VIP) policy, on working with stakeholders to select the Snowdonia EPI project, the proposed technical scope of the project and the project costs.

2.6. Section 3 summarises the steps taken by NGET to implement its VIP policy in the selection of the Snowdonia EPI project and our view on whether NGET has met its commitments.

2.7. Section 4 summarises the options considered by NGET and our view on whether the proposed technical solution is justified.

2.8. Section 5 summarises NGET’s proposed funding request to deliver the Snowdonia EPI project and our view on whether these costs are efficient.

2.9. Section 6 summarises the next stages for finalising a decision on the EPI project funding request.

2.10. Through this consultation we are seeking views on our assessment of NGET’s EPI project and on our minded-to position to approve this proposal for additional funding.

Consultation

2.11. This consultation will run for 28 days and will close on 24 June 2022. We will review responses before finalising and publishing our decision in July 2022.

How to respond

2.12. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document’s front page.

2.13. We’ve asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.

2.14. We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations.

Your response, data and confidentiality

2.15. You can ask us to keep your response, or parts of your response, confidential. We’ll respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do want us to keep your response confidential, please clearly mark this on your response and explain why.

2.16. If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you *do* wish to be kept confidential and those that you *do not* wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we’ll get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.

2.17. If the information you give in your response contains personal data under the General Data Protection Regulation (Regulation (EU) 2016/679) as retained in domestic law following the UK’s withdrawal from the European Union (“UK GDPR”), the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy Notice on consultations, see Appendix 4.

2.18. If you wish to respond confidentially, we’ll keep your response itself confidential, but we will publish the number (but not the names) of confidential responses we receive. We won’t link responses to respondents if we publish a summary of responses, and we will evaluate each response on its own merits without undermining your right to confidentiality.

General feedback

2.19. We believe that consultation is at the heart of good policy development. We welcome any comments about how we’ve run this consultation. We’d also like to get your answers to these questions:

1. Do you have any comments about the overall process of this consultation?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?

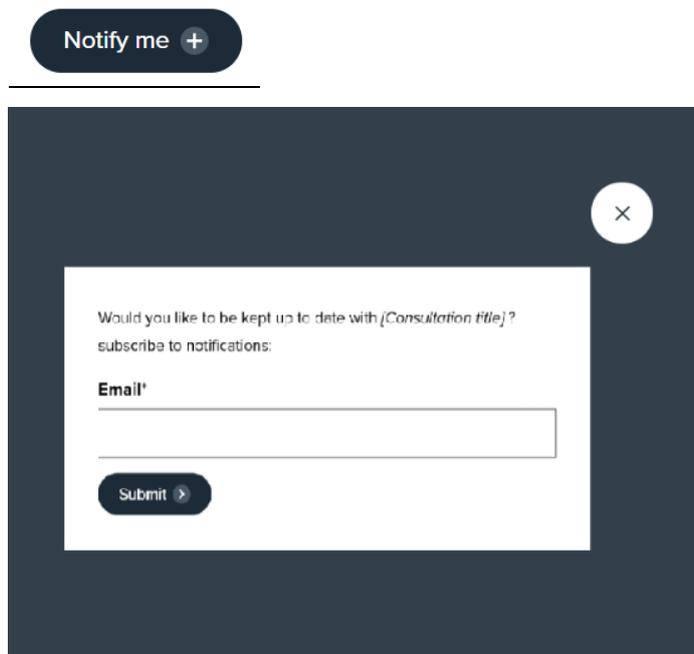
6. Any further comments?

2.20. Please send any general feedback comments to stakeholders@ofgem.gov.uk

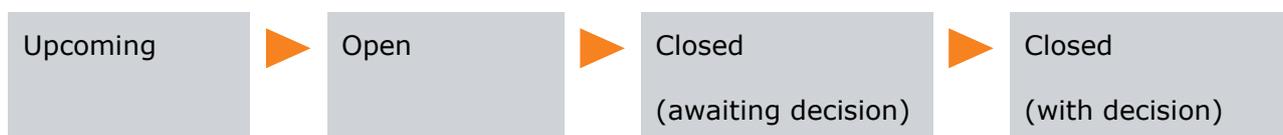
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You can track the progress of a consultation from upcoming to decision status using the 'notify me' function on a consultation page when published on our website.

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Once subscribed to the notifications for a particular consultation, you will receive an email to notify you when it has changed status. Our consultation stages are:



3. Implementation of NGET’s Visual Impact Provision policy

Section summary

In this section, we summarise the steps taken by NGET to implement its VIP policy and our view on whether NGET has met its commitments to work with stakeholders on the selection of EPI projects.

Consultation Question 1: Do you agree with our ‘minded to’ view that NGET has fulfilled its VIP policy commitments?

Consultation Question 2: Do you agree with our ‘minded to’ view that the Snowdonia EPI project is the valid outcome of NGET working with stakeholders on the selection of EPI projects?

NGET’s VIP policy and EPI project selection

3.1. In accordance with the then applicable SpC 6G licence condition, NGET prepared its VIP policy in 2014.³ The policy sets out how NGET will work with stakeholders during RIIO-1 to identify EPI projects and to maximise the benefits of these for consumers.

3.2. In 2014, NGET set up a national Stakeholder Advisory Group (SAG), made up of independent stakeholder organisations, to guide and advise on selecting EPI projects in RIIO-1. The group’s primary role is to advise NGET on key decisions, on the basis of the following guiding principles (the five principles of NGET’s VIP policy):

- result in greatest landscape enhancement benefits
- result in greatest opportunities to conserve and enhance natural beauty, wildlife and cultural heritage whilst avoiding unacceptable environmental impacts

³ A copy of NGET’s VIP policy can be found here: <https://www.nationalgrid.com/electricity-transmission/document/120581/download>

- result in greatest opportunities to encourage public understanding and enjoyment of the protected landscapes, including positive socio-economic impacts
- are technically feasible in context of the wider transmission system
- are economical and efficient.

3.3. From November 2014, NGET has convened the SAG regularly and ran a multi-stage selection process for EPI projects. This involved:

- a landscape and visual assessment of all 571km of transmission lines in National Parks and AONB in England and Wales by landscape architects, from which the SAG shortlisted 12 sections of overhead line based on their high adverse impact on the landscape.⁴ The first section of a 400kV/132kV overhead line on the western edge of the Snowdonia National Park, 4ZC.1 was one of the 12 shortlisted sections of line.
- the identification and appraisal of potential mitigation options for all 12 shortlisted sections of lines, which were also consulted on with local stakeholder reference groups.
- the SAG ranking of the mitigation options for the 12 shortlisted sections against the five VIP principles in order to make a recommendation to NGET on the sections of lines and EPI options to be progressed for further development. The overhead line section 4ZC.1 was one of four EPI projects that the SAG recommended NGET prioritise in RIIO-1.⁵

Expected benefits of the Snowdonia EPI project

3.4. The 4ZC 400kV overhead line connects the Pentir 400kV and Trawsfynydd 400kV substations in north Wales. The Snowdonia EPI project focuses a section of the line, 4ZC.1, which runs from the Garth Sealing End Compound (SEC) near the village of Minffordd (east of Porthmadog) and across the Dwyryd Estuary to the western edge of the national park. It then

⁴ A copy of the landscape and visual assessment can be found here:

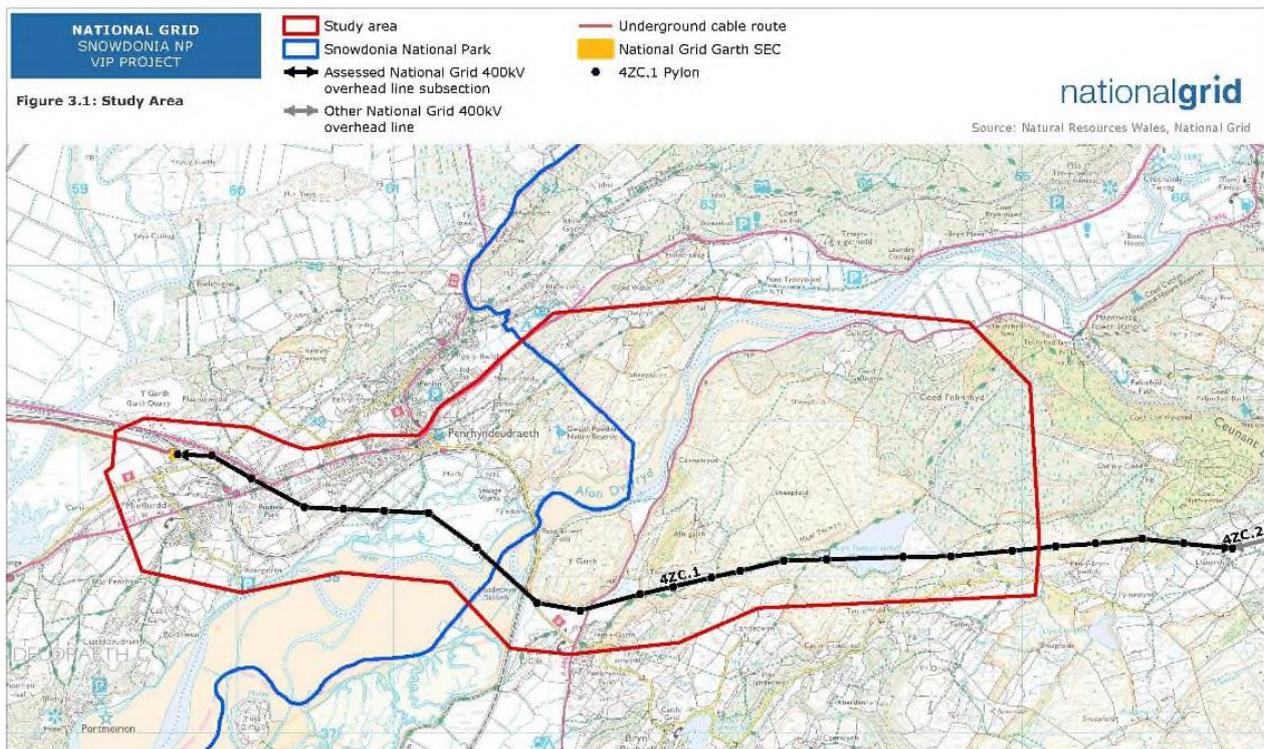
<https://www.nationalgrid.com/electricity-transmission/document/84141/download>

⁵ The three other overhead line sections prioritised for EPI projects in RIIO-1 were: section 4YA.7 in the Dorset Area of Outstanding Beauty, section 4YB.2 in the New Forest Area of Outstanding Natural Beauty, and section 4ZO.2 in the Peak District National Park. Ofgem approved NGET’s funding requests for EPI projects in [Dorset](#) and the [Peak District](#), and also adjusted allowances for NGET to recover the efficient costs incurred on development work for the New Forest EPI project up to the point the project was mothballed due to environmental challenges posed by the EU Habitats Regulations.

continues past the small settlement of Cilfor and up towards the summit of Moel Tecwyn (see figure 1).

3.5. The pylons operate with one circuit at 400kV, while the circuit on the other side operates at 132kV as part of the distribution network.

Figure 1: Section 4ZC.1 of 400kV/132kV overhead line



3.6. NGET has assessed the impacts of 4ZC.1 and the expected benefits of removing the line section on the western edge of the Snowdonia National Park. This is summarised below.

Landscape and visual enhancement benefits

3.7. Section 4ZC.1 crosses the flat and open Dwyryd Estuary to the south of Porthmadog, then continues east, running through the rocky landform of Y Garth, past the settlement of Cilfor before climbing through the rugged landform towards the summit of Moel Tecwyn and beyond. The landscapes that will benefit most from the EPI project are the low-lying coastal Morfa Harlech landscape, the Ardudwy Coastal Hinterland landscape and much of the adjacent landscapes of the Dwyryd Estuary. The latter provides an important setting for the Snowdonia National Park. These areas are very susceptible to landscape and visual impacts of the existing overhead line.

3.8. The visual enhancement benefits of the Snowdonia EPI Project will be enjoyed by different groups of people. These include local communities, users of promoted recreational amenities (i.e. footpaths, cycle routes etc), visitors to the Snowdonia National Park, as well as users of nearby transport routes, especially recognised scenic or promoted tourist routes.

3.9. NGET commissioned an independent assessment of the landscape and visual impacts, before and after the Snowdonia EPI project is completed. The current landscape and visual impact score of 29 (denoting impacts of high significance) is expected to reduce to 6 after the removal of the large-scale towers and the screen planting around the cable sealing end compounds has had time to mature.⁶

Opportunities to conserve and enhance natural beauty, wildlife and cultural heritage

3.10. NGET highlight that the effectiveness of the Snowdonia EPI project in achieving conservation and enhancing natural beauty are allied to the expected visual benefits due to the specific effects on the special qualities relating to landscape. This includes improved perception of the character, quality and integrity of the landscapes within the national park and its setting. Another benefit will be the enhanced tranquillity in the area through the removal of detracting electricity infrastructure. Enhancing the area’s special qualities will also reinforce the recreational enjoyment of walkers, cyclists and those visiting publicly accessible areas and tourist destinations.

3.11. NGET notes that the works involved in the EPI project will have effects on some of the sites that are designated of importance for nature conservation. However, it expects that as a result of mitigation measures incorporated during and after construction that any direct and indirect effects upon these sites will be avoided, reduced or mitigated. Mitigation measures include appropriate timing of works, prompt re-instatement of important habitats, landscape planting, and limits on night working as well as appropriate lighting design.

3.12. The area of Snowdonia National Park and its immediate setting is of considerable interest for its landscape history. Although there are no scheduled monuments in the vicinity of the EPI project, there are nearly 20 Listed Buildings. The removal of the overhead line and

⁶ A score of greater than 25 indicated an impact of ‘very high importance’ while a score from 0 to 9 indicated an impact of ‘lower importance’.

pylons is expected to result in permanent beneficial effects for cultural heritage assets in the area which have visibility of the line.

Opportunity to encourage public understanding and enjoyment of the protected landscapes

3.13. NGET expects the EPI project to be of benefit to residents of local communities and to the large number of visitors and tourists to the area. Snowdonia National Park is a popular destination, with an average of 4 million visitors per annum. Tourist attractions close to the existing overhead line include the Ffestiniog and Welsh Highland Railways, the Wales Coastal Path, National Cycle Route 8 and the tourist village of Portmeirion. As a result of the improved visual amenity and special qualities of the area, the EPI project will likely also result in an enhanced experience of the nationally designated landscape for local residents as well as visitors to the area.

Acceptability testing

3.14. In 2018, NGET commissioned a survey of just over 2,000 representative bill-payers to test whether increases in electricity bills would be acceptable to deliver the four EPI projects recommended by the SAG.⁷ The estimated bill increase for the Snowdonia EPI project is expected to amount to £0.60 per year per household for 25 years. In the survey, 65 per cent of bill payers found it acceptable that this additional cost is included in electricity bills whilst 14 per cent of the research group found it unacceptable for these costs to be passed on to consumers. Finally, 17 per cent did not provide a view either way, while the remaining 4 per cent didn’t know or could not say.

3.15. As part of its RIIO-2 business plan, NGET carried out a joint willingness to pay study in 2019 with SP Transmission and SSE Transmission.⁸ This covered a sample of 1,000 domestic consumers plus 600 business customers. Respondents were asked to think about enduring bill impacts of projects to reduce the visual amenity impacts of existing lines in nationally

⁷ A copy of the Visual Impact Project Acceptability study can be found here: <https://www.nationalgrid.com/electricity-transmission/document/121706/download>

⁸ The 2019 study updated NGET’s 2012 willingness to pay study to assess how much domestic consumers were willing to pay to underground overhead lines in National Parks and AONBs. The findings from both studies helped inform the level of the expenditure available to the transmission owners to fund visual amenity projects in designated areas in the respective price control period.

designated landscapes (Areas of Outstanding Natural Beauty, National Parks and National Scenic Areas in Scotland).

3.16. The results confirmed a GB-wide willingness to pay an enduring value of £6.87 per household per year (2019/20 prices) to underground an additional 20 miles (32km) of existing lines in designated areas.

Our view of NGET’s implementation of its VIP policy

3.17. NGET has provided documentary evidence of the steps it has taken to implement its VIP policy and the stages involved in the selection and development of the Snowdonia National Park EPI project. For example, minutes from the quarterly SAG meetings summarise each stage of the selection process including the considerations covered by the SAG when making its recommendations on four EPI projects to be prioritised for development in RIIO-2.⁹

3.18. There is also good evidence that in addition to involving local stakeholders in each of the designated areas, NGET has continued to involve the SAG in the further technical development of the Snowdonia EPI project when new information was available. This included, for example, asking the SAG in 2020 to reflect on the project cost estimate, to check whether they still supported continuing with the project, especially during a period of economic uncertainty resulting from the Coronavirus pandemic. Although the SAG acknowledged the increase in economic volatility, they still believed that the benefits of the project would be invaluable and stated their continued and substantive support for it.

3.19. On the basis of NGET’s analysis of the pre-mitigation impact of the existing line and the post-mitigation benefits and effects, and the results of 2018 acceptability testing of bill-payers, we consider that the project will benefit consumers by mitigating a significantly adverse impact of the existing transmission infrastructure on the highly valued landscape within the designated area and its setting.

⁹ <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/visual-impact-provision>

3.20. Overall, our initial view is that NGET has enacted the key commitments in their VIP policy, and that the Snowdonia National Park EPI project is a valid outcome of NGET working with stakeholders on the selection of EPI projects.

3.21. NGET has considered several options to mitigate the visual impact of the overhead line in the Snowdonia National Park. In the following section we discuss the optioneering carried out by NGET and our views on the proposed technical scope of the Snowdonia EPI project.

4. Assessment of options and the proposed project

Section summary

In this section, we summarise the options considered by NGET and our views on the option appraisal and whether their proposed EPI project is justified.

Consultation Question 3: Do you agree with our views on option appraisal carried out by NGET?

Consultation Question 4: Do you agree with our view on the technical scope of the Snowdonia EPI project proposed by NGET?

Options assessment

4.1. Throughout 2015, NGET investigated the feasibility of potential options to reduce the adverse impact of the 4ZC.1 overhead line section on the western edge of the Snowdonia National Park.¹⁰ This assessment took the form of an Options Appraisal Study covering the technical, environmental, and socio-economic factors. It was also informed through consultation with a stakeholder reference group comprising local and Welsh organisations.¹¹

Options appraisal study

4.2. We summarise below the five main options included in the study, along with NGET’s view on their feasibility.

¹⁰ An Options Appraisal Study was carried out for all 12 shortlisted sections of lines and was used by the SAG to inform their recommendations to NGET on the four EPI projects to take forward for further technical development. A copy of the study for the Snowdonia National Park can be found here: <https://snowdonia.nationalgrid.co.uk/documents/options-appraisal-study/>

¹¹ These are: Cadw, Gwynedd Archaeological Planning Service, Gwynedd Council, Gwynedd Council Planning Service, National Trust, Natural Resources Wales, Network Rail, Ward Councillors for Penrhyndeudraeth, Trawsfynydd, and Harlech and Talsarnau, and the Snowdonia National Park Authority.

Option 1: Alternative pylon design using same route of the current overhead line

4.3. Although alternative pylons, such as low height or T-Pylons, would be lower than the existing lattice pylons, they would still be highly visible in the landscape, particularly in the wide, open views of the Dwyryd Estuary.¹² There would be also challenges around replacing the existing lattice pylons on steep, mountainous terrain to the east of the estuary due to the lack of access. Option 1 was not supported by the SRG because they considered it would not mitigate the landscape and visual impacts sufficiently.

Option 2: Placing overhead line on an alternative route alignment

4.4. This option would be heavily constrained by the terrain on either side of the estuary to the north, the width of the estuary to the south, as well as ecological designations associated with the Dwyryd Estuary. An alternative route to the north was explored but would result in re-locating adverse visual impacts within another part of the national park. As a result, this option was also rejected by the SRG for not sufficiently mitigating landscape and visual impacts.

Option 3: Underground cable by a combination of Horizontal Directional Drilling (HDD) and direct burial

4.5. HDD, or trenchless drilling, could be used for steep terrain or to avoid disturbing ecologically sensitive areas such as the estuary. The feasibility of trenchless drilling for cable installation is dependent on the length of drill itself, the size of the cables and the geology and topography of the ground. Two separate routes for a trenchless drilling/direct burial underground cable were identified. A shorter route (Option 3a), from an area between Minffordd and the western estuary bank to just beyond the settlement of Cilfor, was considered better due to less engineering challenges associated with the terrain than a longer route running from Minffordd to the Llyn Tecwyn Uchaf reservoir (Option 3b) and the significant space constraints associated with the terrain beyond Cilfor. Option 3a was taken forward for further consideration.

¹² For more information on T-pylons see this weblink:

<https://www.nationalgrid.com/stories/engineering-innovation-stories/construction-worlds-first-t-ylon-completed>

Option 4: Underground cabling within a bored tunnel

4.6. Tunnels created using a tunnel boring machine are considered over direct burial methods either when located in an urbanised environment (where direct burial would cause unacceptable disruption) or where trenchless drilling/direct burial is not a realistic option for technical or environmental reasons (for example, under a large water body). The same two routes considered in Option 3a and Option 3b were also investigated for a bored tunnel option. The shorter route Option 4a was preferred over the longer route Option 4b because the terrain and space constraints in the terrain northeast of Cilfor would make the latter unfeasible. Option 4a was taken forward alongside for further consideration.

Option 5: Replacement of the line with a cable along an existing bridge, Pont Briwet

4.7. It was found that there was insufficient space to carry the cables, alongside the existing gas pipeline in the road. The bridge was also not structurally designed to hold the additional weight of 12 cables. As a result, option 5 was deemed unfeasible.

Further appraisal of undergrounding cable options

4.8. Both Options 3a and 4a were expected to have significant landscape and visual benefits if located from an area around the existing Garth SEC near Minffordd and running to the eastern side of the estuary near Cilfor. In both options, up to 10 pylons and 3.3km of overhead line could be removed.

4.9. The construction of SECs for Option 3a and tunnel headhouses for Option 4a close to the existing Garth SEC and also near Cilfor are less likely to impact on important habitats of the estuary as the locations are pasture land and near inhabited areas. However, for Option 3a, a length of direct burial would be needed through the village of Minffordd, potentially causing unacceptable disruptions to community, road and rail transport links, as well as disturbance to habitats alongside the estuary. Option 4a would remove the need for direct burial.

4.10. To minimise the disruption to Minffordd village, the western SEC for Option 3a could be located closer to the estuary. However, this would have greater landscape and visual impacts as there would be a greater number of visual receptors if it were sited in this location instead of a site near the Garth SEC, which is relatively well screened locally. It would also leave up to five pylons in an isolated, short section of overhead line north of the estuary as there is an existing section of underground cables to the west of the 4ZC.1 section across the Glaslyn estuary. The fragmented section of overhead line is likely to be adversely perceived as

distracting focal point in the landscape. Option 4a would have less construction impacts and would be located furthest away from the estuary.

4.11. For both options, a tunnel headhouse or SEC near Cilfor could have impacts on views from the local community; however, there was potential to mitigate the impact through sensitive design, siting and screen planting.

4.12. The main technical challenge for option 3a is crossing the estuary. It is unlikely that a HDD could achieve the full estuary crossing without either the launch or reception location being sited in areas of special ecological value i.e. Special Area of Conservation (SAC). The underground cable could be extended via a second HDD section or direct burial, but there would likely be the requirement for a permanent cable joint bay within the SAC.

4.13. For both underground cable options, a shunt reactor was also likely to be required to compensate for the electrical properties of an additional underground cable in north Wales.

SAG recommendations on the Snowdonia EPI project

4.14. On the basis of the Options Appraisal Study, the SAG recommended to NGET that it should proceed with an underground cable option. However, it considered that Option 3a was inferior to Option 4a as it would be less acceptable to local stakeholders due to it being substantially more disruptive during construction. Although launching a HDD drilling technique closer to the estuary to avoid Minffordd village was a potential alternative, the SAG rejected this option as it would remove fewer pylons, introduce new visual impacts, and have an adverse environmental impact on the Special Area of Conservation alongside the estuary. In comparison, the SAG highlighted that the cable tunnel Option 4a, would achieve the maximum benefits by removing 10 pylons, have less impact on ecologically sensitive areas, have a smaller footprint during construction and likely be more acceptable to local communities due to it being less disruptive.

Ofgem’s view on the appraisal of potential options

4.15. Based on our review of the Options Appraisal Study, we are satisfied that NGET and the SAG considered an appropriate range of options to address the visual impacts of the 4ZC.1 section of overhead line.

4.16. We agree that Option 1 (alternative pylons) and Option 2 (re-routing the overhead line) are unlikely to significantly reduce the existing landscape and visual impacts. In the case

of Option 2, it could potentially exacerbate the adverse impacts. We agree with NGET’s discounting of these options.

4.17. We are also satisfied from the analysis that Option 5 (to run the cables along the Pont Briwet bridge) was not feasible due to space constraints in the road (as it already conveys a gas pipeline) and insufficient spare structural capacity to take the additional permanent loading of the 12 cables that would be required.

4.18. Our initial view is that the only feasible option to address the visual impact of the existing overhead line is to cross the estuary via underground cabling. We also accept that the topography and sensitive nature of the location pose technical challenges and significant environmental considerations for the routing and method of installing underground cables.

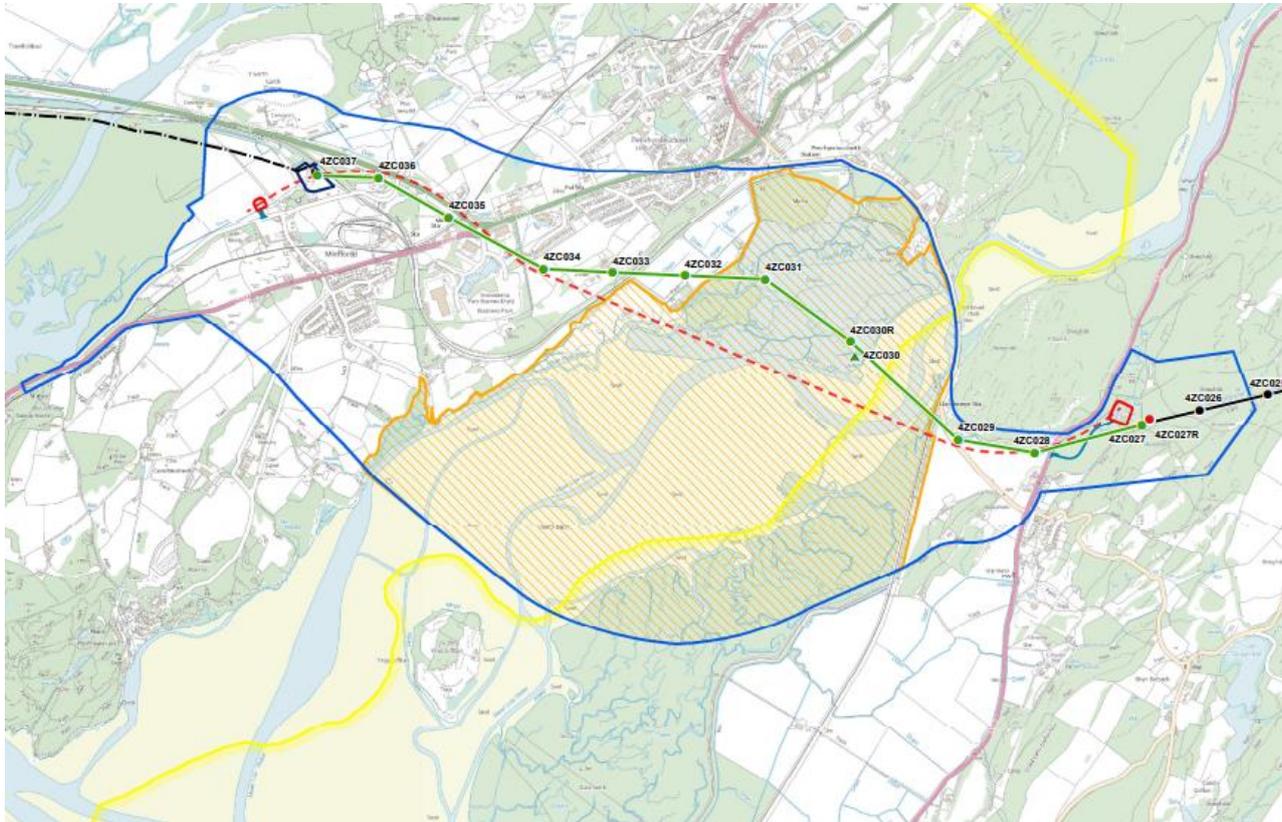
4.19. Overall, we consider that the combination of these factors tips the balance in favour of the cable tunnel Option 4a over the trenchless drilling/direct burial of Option 3a. Option 4a will remove the maximum number of pylons, and at the same time avoid sections of direct burial that would likely cause some disruption to local communities and disturb the special area of conservation alongside the estuary, which is protected under the Habitats Regulations.¹³ Therefore, we are satisfied that NGET’s proposed EPI project based on Option 4a, as recommended by the SAG, is the better option to fulfil the VIP policy’s five guiding principles.

Technical scope of the proposed Snowdonia EPI project

4.20. The Snowdonia EPI project will involve replacing a section of overhead line that crosses the Dwyryd Estuary with an underground cable in a tunnel that runs from the existing Garth Sealing End Compound in the west to just beyond the settlement of Cilfor in the east. In addition, a tunnel head house and sealing end compound will be built at the eastern end of the tunnel to connect the new cables to the remaining overhead line beyond Cilfor that runs to the Trawsfynydd 400kV substation. A tunnel head house would also be required at the western end of the tunnel near the Garth SEC (see figure 2).

¹³ Projects that could affect a SAC must undergo a Habitats Regulations Assessment and an integrity test to show whether an adverse effect on the SAC can be ruled out or not.

Figure 2: Indicative cable tunnel route (red dashed line) and existing overhead line (green line with dots)



Cables

4.21. The existing overhead line forms part of two circuits – the Pentir -Trawsfynydd 400kV transmission circuit and the Four Crosses – Trawsfynydd 132kV distribution circuit.

4.22. The 400kV circuit requires two cables per phase and NGET propose that the 132kV circuit is built to be 400kV capable, with two cables per phase i.e. twelve cables in total. NGET propose that the latter is operated at 132kV for the time being, until the additional circuit rating is required when new generation connects into the area around 2030.¹⁴ ¹⁵ NGET say it would be more economical to install the two cables per phase solution on both circuits

¹⁴ There are more than 3,000MW generation connections applications in north Wales including onshore wind, and offshore wind in the Crown Estate Round 4 Offshore Lease. The latter were selected to progress by the Crown Estate in February 2021.

¹⁵ NGET notes that when it takes operational control it would provide the DNO with supply from an alternative grid supply point.

at this stage rather than installing one cable on the 132kV circuit and returning at a later date to install a second cable.

Tunnel

4.23. The tunnel will be 3.4km long and run between two tunnel shafts at Garth and Cilfor. The tunnelling method will use a tunnel boring machine to bore through the ground, which will be launched from the Garth site. The tunnel will maintain a depth of at least 15 metres below Ordnance Datum at any point.¹⁶ The actual vertical alignment of the tunnel will be designed around the ground conditions.

4.24. The tunnel will have an internal diameter of 3.5 metres to contain the 12 cables for the two circuits with appropriate cable spacings, which will allow for the cable ratings to be increased in the future (up to 3,000MVA) if needed. The intention for the proposed tunnel is that the cables within it will not become a limiting factor of the Pentir – Trawsfynydd circuit.

Tunnel shafts, tunnel head houses and sealing end compounds

4.25. In order to construct the tunnel, vertical shafts will need to be built at the start and end points of the tunnel. The Garth shaft will have 15 metres internal diameter and be 23.7 metres deep. The Cilfor shaft will have 12.5 metres internal diameter and be 66 metres deep. Sump pumps will be installed at the bottom of the Cilfor shafts to remove water from the tunnel as required.

4.26. The tunnel shafts and head houses will be sited close to the existing overhead line route to minimise alterations required at the Garth SEC in the west or to the existing overhead line near Cilfor.

4.27. Each tunnel shaft will be topped with a permanent tunnel head house containing the necessary operating and control equipment for the pumping systems, tunnel ventilation, all associated sensors, cabling and connections.

4.28. New cable circuits emerging from both ends of the tunnel will require termination via cable sealing ends at the transition to existing assets on the surface. At Garth, the cables

¹⁶ The term ‘Ordnance Datum’ refers to the height of mean sea-level, taken from a reference point at Newlyn in Cornwall.

emerging from the tunnel will be buried for 200 metres through fields and under a road and several third party services to the existing SEC where they will terminate at new cable sealing ends. The layout at the Garth SEC will be modified to incorporate the new cable connections and the existing overhead line landing gantry will be removed. A new SEC will be installed at Cilfor, adjacent to existing tower 4ZC27, which will also be changed from a suspension pylon to a new termination pylon.

OHL removal

4.29. Pylons 4ZC28 – 4ZC37 (see figure 2 above) will be removed including the overhead line spanning across them. Pylon 4ZC27 at the east end of the tunnel is to be replaced with a terminal pylon. The foundations for pylons 4ZC27 - 4ZC37 will be removed to a depth of 1.4 metres below ground excluding pylons 4ZC30R, 4ZC030 AND 4ZC031, which are located in the estuary. NGET will attempt to remove 4ZC30R’s piled foundations in full. If this is not possible, they will be removed to two metres below ground level. The foundations for 4ZC30 will have the whole of the pile caps and piles removed as far as is reasonably practicable and 4ZC31’s foundations will be removed to 3.75 metres below ground level as per an agreement with Natural Resources Wales.

Installation of shunt reactor to avoid network voltage issues

4.30. Underground cables have a higher capacitance than overhead lines operating at the same voltage and power rating. If a section of overhead line is replaced by an underground cable equivalent, then the effect of the increased capacitance is an increase of the voltage in that part of the system.

4.31. NGET has carried out load flow studies that model the effect of replacing sections of overhead line with cables. The results showed that the reactive gain introduced by the Snowdonia EPI project and other projects in the region will breach voltage limits under certain conditions. There are limited options to avoid exceeding voltage limits in this part of the network other than installing an additional 200 MVar shunt reactor to compensate for the network capacitance introduced by the increased length of cables in north Wales. NGET propose this is installed at Trawsfynydd 400kV substation.

132kV distribution network cable

4.32. NGET note in their submission that undergrounding part of the distribution network circuit would cause some commercial and operational challenges for the distribution network

owner, SPEN. For example, SPEN do not have personnel who are trained in working in tunnels because they do not have any on their network.

4.33. As a result, NGET and SPEN are agreed that it would be better for NGET to own the section of 132kV cable within the tunnel. NGET also noted that there is a precedence for it to own 132kV assets that are not part of the transmission system.¹⁷ NGET has confirmed that it has an Asset Use Agreement in place with SPEN which allows NGET to install, own and maintain the new 132kV cables and allows SPEN to use those cables.

Primary planning consents for the Snowdonia EPI project

4.34. In March 2020, NGET submitted the planning application for the EPI project to the Snowdonia National Park Authority and Gwynedd Council. In July 2020, NGET received planning permission subject to the discharge of a number of conditions from both the Snowdonia National Park Authority and Gwynedd Council. Both planning committees were unanimous in their approval of the project.

4.35. There is a biodiversity net gain (BNG) requirement for both planning permissions.¹⁸ Across both authorities, NGET will deliver a 7.43% net gain in biodiversity units through on site BNG and financial contribution.¹⁹

4.36. NGET has also been granted the necessary marine licences from Natural Resources Wales for the boring of the cable tunnel under the Dwyryd Estuary and the removal of the overhead line, pylons and foundations located in the estuary.

Our ‘minded to’ view of the proposed EPI project

4.37. The Snowdonia EPI project is complex for a variety of reasons, including the area’s topography, ecological sensitivity, relative remoteness, as well as the engineering challenges

¹⁷ “Remote Transmission Assets” are defined in the electricity transmission licence which can be found here:

<https://epr.ofgem.gov.uk/Content/Documents/National%20Grid%20Electricity%20Transmission%20plc%20-%20Special%20Conditions%20Consolidated%20-%20Current%20Version.pdf>

¹⁸ Biodiversity net gain (BNG) is an approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand.

¹⁹ Biodiversity units have been calculated using the Defra Biodiversity Metric 2.0:

<http://publications.naturalengland.org.uk/publication/5850908674228224>

of tunnelling through mixed geology, and at a greater depth than any other power tunnels in the UK.

4.38. We are satisfied that the scope of the tunnel and cables NGET has proposed to cater for the additional generation likely to connect in north Wales within the next decade is justified. We agree that it is economical to install the two cables per phase on both circuits as part of the EPI project, rather waiting to install a second cable per phase on the second circuit for an additional cost at a later date.

4.39. We also agree that the installation of a 200 MVAR shunt reactor at the Trawsfynydd 400kV substation is necessary to manage the voltage issues in north Wales that will arise under certain condition from the additional cabling of the EPI project.

4.40. In relation to the above ground infrastructure associated with the cable tunnel i.e. the SEC and tunnel head houses, we consider that NGET’s proposals are fit for purpose and note that they are acceptable in planning terms, having achieved planning approval from the relevant authorities.

4.41. Overall, we consider that the scope of NGET’s proposed EPI project is appropriate given the characteristics of the area and the complexity involved in a tunnelling project. The following Chapter analyses the costs for this project that have been submitted by NGET for consideration by Ofgem.

5. Cost assessment of the proposed project

Section summary

This section sets out our assessment of the submitted costs of the Snowdonia EPI project. The results represent our current view of the efficient costs of the solution.

Consultation Question 4: Do you agree with our cost assessment of NGET’s proposed Snowdonia EPI project?

NGET’s procurement strategy

5.1. NGET separately packaged the three main elements of the EPI project: the cable tunnel and associated works; the overhead line works; and the shunt reactor installation at Trawsfynydd. NGET has run a spot tender event for the cable tunnel work package. It has not yet tendered the other two elements because those work packages will not start before 2026. NGET considers that tendering too far in advance would likely lead to inefficient bids due to a lack of suppliers putting in tenders and/or because uncertainty about the future market conditions would lead to suppliers adding premiums to bids.

5.2. NGET carried out early market engagement to inform its contracting strategy for the cable tunnel work package. Due to the complexity of the work package, which is likely to require further refinement, NGET decided to use a NEC4 Option C type contract to ensure there would be sufficient participation in the tender event to lead to a competitive outcome.²⁰

5.3. In 2019, NGET launched its formal procurement process for the cable tunnel work package. However, prior to selecting its preferred bidder, a number of new applications were made for large connections in north Wales. As a result, NGET put the tender process on hold while it investigated the impacts of the new connections on the scope of the project. It re-

²⁰ The NEC4 Engineering and Construction Contract (ECC) Option C is a target cost contract with an activity schedule where the out-turn financial risks are shared between the client and the contractor.

engaged with suppliers in April 2021 to re-price for the change in the scope of works via a new tender.²¹

5.4. Three tenders scored well against the combined commercial and non-commercial tender bid evaluation criteria. NGET decided to progress all three bids through to final tender negotiations to ensure a competitive tension in the remainder of the process. Following the conclusion of the negotiations and final clarifications, NGET selected its preferred bidder, as it was the most economically advantageous tender.

Work package cost assessment

5.5. NGET has submitted a breakdown of costs for the EPI project covering the cable tunnel and associated works; the overhead line works; and the installation of the shunt reactor at Trawsfynydd.

5.6. Each of these work packages comprise preliminary costs, contractors’ costs, and NGET’s direct and indirect project costs (e.g. risk and real price effects contingency, equipment procurement, project services, and project management and project support services). Our assessment is as set out below and is based on our treatment of cost submissions for the RIIO-2 price control. More generic information on our cost assessment approach can be found in the RIIO-2 Electricity Transmission final determination documents.²²

Preliminary costs

5.7. Preliminary costs cover activities to develop the project in preparation for delivery and to obtain the necessary planning consents. The majority of preliminary costs submitted in NGET’s funding request have already been incurred.

5.8. NGET has provided satisfactory detail on both the scope and extent of preliminary activities undertaken to date on the Snowdonia EPI project. We consider these are reasonable and are at an efficient level. Consequently, we propose to allow these in full.

²¹ The change in scope was to increase the diameter of the tunnel from 3 metres to 3.5 metres in order to accommodate the two cable per phase solution on both circuits.

²² Chapter 3 of RIIO-2 Final Determinations Electricity Transmission System Annex (REVISED) [RIIO-2 Final Determinations for Transmission and Gas Distribution network companies and the Electricity System Operator | Ofgem](#)

Contractor costs

Cable tunnel and associated works

5.9. We consider that NGET’s tender process for the cable tunnel work package was well specified and competitively tendered in the wider market. Therefore, we accept that NGET’s preferred bidder’s costs for delivering the cable tunnel and associated works are representative of the economic and efficient level obtainable from the market. We are not proposing any adjustment to this element of NGET’s proposed costs for the Snowdonia EPI project.

Overhead line works and installation of shunt reactor

5.10. The contractors’ costs for the overhead line and shunt reactor work packages have not been tendered and are NGET estimates. Where contracts have not been competitively tendered, we have reviewed the constituent parts to benchmark against both the asset and other cost data we have from previous EPI projects.

5.11. In our review, we found a significant divergence between the cost estimate NGET proposed for the overhead line work in the Snowdonia EPI project and the costs for the same component on the previous EPI projects in the Dorset Area of Outstanding Natural Beauty and the Peak District National Park. Upon request, NGET provided further information on the relevant cost drivers. These include:

- separate site accommodation to that used in the tunnel work package. NGET explained that site accommodation cannot be shared given the different contract timescales, duration and activity milestones.
- the additional crossings (e.g. railway, roads, roundabout, building and car park) that need to be protected during the overhead line removal on the Snowdonia EPI project compared to the previous projects.
- the installation or upgrading of access for pylon removal, and the additional complexity of meeting requirements for access routes located in the ecologically sensitive salt marshes and estuary (required under the Habitats Regulation Assessment).
- differences in the new pylon at Cilfor compared to the new pylons installed on previous projects (that will transition the new cable to the existing overhead line

beyond Cilfor). For example, it is more heavy duty to meet technical requirements due to challenging ground conditions.

5.12. On the basis of the additional information NGET provided, we are satisfied that the contractor’s costs overhead line works on the Snowdonia EPI project are justified.

5.13. We have also assessed NGET’s estimate of contractor’s cost for the installation of the shunt reactor at Trawsfynydd. This compares favourably to the cost of similar works on a previous project therefore we consider that NGET’s estimate is at an efficient level.

5.14. We note that the overhead line works and the installation of the shunt reactor are programmed after the end of RIIO-2 and that NGET’s contractor’s cost estimates include an amount for project management and detailed design activities.

5.15. We are proposing to remove the costs for these specific elements from NGET’s estimate of contractors’ costs. This is because under the RIIO price control arrangements, contractor’s project management and design work are not classified as direct activities but are closely associated indirect (CAI) activities.²³ The cost of the CAI activities after March 2026 will be covered by the opex allowance that Ofgem determines for NGET in the RIIO-3 price control.²⁴ Removing the costs for these specific elements reduces NGET’s estimates of contractors’ costs for the overhead line works and the shunt reactor installation by 18%.

NGET’s risk contingency

5.16. In its funding request, NGET has included an amount, known as risk contingency, to cover cost increases due to programme and project risks that NGET hold i.e. possible events or changes in circumstances that affect the project delivery costs that cannot be predicted with certainty. NGET’s proposed risk contingency for the three work packages is £23.0m in total.

²³ Direct costs are those which include expenditure attributable to physically delivering works on assets on site.

²⁴ In the price control, Ofgem uses regression modelling to set the efficient level of indirect opex allowance for a licensee, taking account of baseline capital expenditure in its price control business plan. Capital expenditure allowances approved for the Snowdonia EPI project for activity that falls in RIIO-3 will form part of NGET’s baseline business plan and will be used to set its opex allowance. Removing the CAI costs that fall in RIIO-3 will ensure that NGET does not receive double funding for these contractor’s activities when Ofgem sets its opex allowance as part of the next price control review.

5.17. We have assessed NGET’s proposed risk contingency costs for the Snowdonia EPI project by reviewing the risk registers for each work package that set out the individual risks NGET has identified.²⁵

Cable tunnel and associated works risk contingency

5.18. NGET’s risk contingency for the cable tunnel work package comprise ground condition risks and other risks related to the project and programme.

Ground condition risks

5.19. NGET updated the tender Geotechnical Baseline Report (GBR) for final contract negotiations with tenderers. Following negotiations, its preferred contractor will hold ground condition risks that fall within the parameters of the GBR and NGET holds the remainder of ground condition risks that exceed the GBR parameters.

5.20. The most significant set of risks held by NGET for the Snowdonia EPI project relate to uncertain ground conditions during tunnelling. The top 3 risks by value are:

- geological parameters (e.g. rock quality designation, tensile strength, abrasivity etc) are more adverse than conditions indicated from ground investigations reducing tunnel boring productivity
- the profile of bedrock differs to that indicated from borehole analysis, and the tunnel boring machine breaks out into other materials/more challenging conditions delaying progress
- failure of the tunnel boring machine and loss of the tunnel due significantly adverse ground conditions, including buried obstructions

5.21. If such risks eventuate, they will likely lead to delays, and an increase in the project cost.

²⁵ Programme risks typically are outside the direct control of the contractor, whereas project risks are within the control of the contractor but may result in compensation events from the contractor or an increase in delivery costs.

5.22. NGET has proposed that the ground risk values are not included in the risk contingency allowance at a P50 level.²⁶ They consider this could lead to significant windfall losses or gains. Instead, NGET propose that the ground risk values for the cable tunnelling work package are included at a P20 value, and if expenditure for these risks is greater or less than the total P20 value, the risk allowance is re-adjusted to reflect actual expenditure on the specific ground risks. NGET propose this is done through specifying an allowance adjustment for actual expenditure on the specific ground risks in the Cost and Output Adjusting Event (COAE) provision within NGET’s licence.²⁷

5.23. We accept that evaluating ground condition risks is difficult because of uncertainty around the extent to which actual ground conditions along the whole of the tunnel route will match the borehole results. We consider that NGET has taken appropriate steps in the development of the project to manage ground condition risks, particularly the risk sharing arrangements agreed with its preferred contractor for risks within the GBR parameters in the final tender negotiations.

5.24. On its cable tunnel risk register, NGET has identified 25 ground related risks it holds outside the parameters of the GBR. NGET has evaluated three risks as having a relatively high impact i.e. a likely cost impact greater than £3.5m if the specific risk occurs.²⁸ Two of these can be classed as high impact low likelihood events i.e. the likely cost impact of each risk is more than £11m with a 5% probability of occurring. NGET has evaluated another ten risks as each having a medium cost impact (between £1m and £3.3m); five of those risks have a probability between 40% and 60%, and the other five have a probability between 1% and 30%. The remaining twelve ground risks have a probability between 3% and 60% and a likely cost impact each of less than £1m.

5.25. Given the differences in the probability/impact profile of ground related risks held by NGET, we are not convinced that it is appropriate to depart from our typical treatment of setting a P50 risk allowance for well-justified risks as NGET has proposed (see paragraph 5.22 above). However, we consider there could be a case for specifying a re-opener to apply to the

²⁶ A P50 estimate is the risk value modelled from Monte Carlo simulations at which it is equally likely that the actual cost impact of a realised risk turns out to be higher or lower.

²⁷ There is a Cost and Output Adjusting Event (COAE) provision within NGET’s licence, SpC 3.10.16(e), that allows it to recover additional costs incurred on an EPI project if it meets the criteria set out in the licence or Ofgem’s direction on an EPI project.

²⁸ NGET simulates risk values using Monte Carlo simulation software. The generation of a risk value involves the use of data assumptions about the minimum, likely and maximum impact of a risk occurring and the associated costs to simulate the risk value over 10,000 iterations.

two high value low likelihood ground risks in NGET’s cable tunnel risk register. Both risks could have significant cost impacts if they did occur relative to the overall risk contingency NGET has requested for the project.

5.26. Therefore, we propose to include a P50 allowance for NGET’s ground related risks (excluding the two risks that are high impact low likelihood). The difference between NGET’s P20 and P50 valuation for the 23 ground related risks that are not high impact low likelihood is £4.2m. We propose to add this amount to NGET’s risk contingency allowance.

5.27. For the two high impact low likelihood ground risks, we propose to remove the P20 funding request of £1.3m from NGET’s proposed risk contingency. We consider that a more efficient approach to the two risks is to specify a targeted cost re-opener to adjust the allowance for the Snowdonia EPI project if a material amount of additional expenditure is needed in the event that these risks eventuate during the tunnelling works. This approach avoids consumers paying upfront for risks which have a low likelihood of occurring but could have a high impact value if they did. It also provides comfort to NGET that if a high-cost risk occurs, it would be funded for the efficient costs relating to it if these are material.

5.28. To trigger the COAE re-opener, we propose that the amount of additional expenditure incurred by NGET on either of the two high value low likelihood risks would need to be 10% or more of the total ground risk contingency value. We consider it is appropriate to set a materiality threshold for the COAE to avoid triggering the re-opener for relatively minor expenditure. We expect NGET can manage additional expenditure that is less than the materiality threshold through the combination of the total risk contingency allowance and the totex incentive mechanism that splits the difference between NGET’s actual expenditure and allowance with customers. We note that NGET’s modelled value of the minimum likely impact of each risk significantly exceeds our proposed materiality threshold. Therefore, we expect that in the event the risk occurs, the additional expenditure NGET would incur on managing the impact will trigger the COAE re-opener.

5.29. In accordance with the COAE provision within NGET’s licence, we propose to include the specific risk events for which NGET can apply to recover the efficient material costs in a direction on the EPI project. We have listed in Appendix 2 the high value low likelihood ground condition risks for the Snowdonia EPI project that we propose are covered by a COAE provision and the proposed materiality threshold.

Other risks

5.30. NGET’s proposed risk contingency for the cable tunnel work package also includes programme and non-ground related project risks which will be held by NGET. Programme risks are outside the direct control of NGET’s contractor and arise because of external events. Project risks are within the influence of NGET’s contractor and may result in compensation events under the financial risk-sharing contract or increase the delivery costs of the project.

5.31. On its cable tunnel risk register, NGET has identified 54 specific programme and project risks. Based on our review, we consider that NGET has clearly specified and used reasonable assumptions to derive P50 allowances for the majority of other programme and project risks. However, we have found four high impact low likelihood risks with a likely impact value between £3.6m and £6.3m and a relatively low probability between 10% and 20%.

5.32. Similar to our proposals on the high value low likelihood ground risks, we propose that it is more efficient if the P50 risk values of £2.8m for these four risks are removed from the risk contingency allowance. We propose to specify a targeted cost re-opener to adjust the allowance for the Snowdonia EPI project if any of the non-ground related high value low likelihood risks occur, to fund the associated efficient material costs relating to them. We have listed in Appendix 2 the high value low likelihood programme and project risks for the Snowdonia EPI project that we propose are covered by a COAE provision and the proposed materiality threshold. For the non-ground high value low likely ground risks, we propose that the amount of additional expenditure would need to be 10% or more of the total non-ground risk contingency value to trigger the COAE re-opener. We consider this is an appropriate threshold for the same reasons set out in paragraph 5.28.

Overhead line work and shunt reactor installation risk contingency

5.33. NGET also provided separate risk registers for the overhead line and shunt reactor installation work packages. Each register sets out the assumptions and P50 impact values for the programme and project risks that are associated with the work packages.

5.34. We note that the total impact value of each risk register, as a proportion of the total delivery cost for each work package, exceeds 7.5%. Our RIIO-2 determinations for electricity transmission capped average risk across projects around this proportion, following a review of outturn risk on a number of transmission projects in RIIO-1.

5.35. Our starting point is that risk on new transmission projects should not exceed 7.5% of the delivery cost unless there is good justification for a difference. We note that NGET has not yet tendered either work package. As a result, it is still uncertain what level of project risk will sit with contractor. Therefore, we are proposing to cap the total risk value for each work package at 7.5% of the delivery cost. This will remove £0.4m from the total of the two risk contingencies. We consider this will incentivise NGET to negotiate efficient contracts for the delivery of these work packages.

Real price effects contingency

5.36. NGET has also requested a contingency for real price effects (RPE), i.e. the difference between changes in input prices and general inflation. NGET expects that the cost of materials and labour will increase more than general inflation over RIIO-2 period during which it is delivering the Snowdonia EPI project.²⁹

5.37. To illustrate the issue, NGET provided analysis to compare forecasts of the projected changes in consumer price index including housing and the relevant construction index over RIIO-2 and then applied the difference to the relevant project activities/cost that will be exposed to the changes in the construction index. It proposed that an additional contingency is needed to cover the expected differential. It calculated an additional contingency as a P50 estimate of the projected cost impact to cover the RPE throughout the RIIO-2 period.

5.38. The delivery of the Snowdonia EPI project will span the current RIIO-2 price control and into RIIO-3. Funding allowances included in NGET’s RIIO-2 price control for the Snowdonia EPI project will be adjusted for general inflation and baseline capital expenditure allowances in RIIO-3 will be adjusted for RPE. However, we note that there are strong inflationary pressures in the economy, particularly in the construction sector, as a result of several factors including structural changes and disruptions from Brexit and other global events.

5.39. Overall, we consider that it is likely that there will be a difference between construction input prices and general inflation for some time during RIIO-2. Consequently, we propose to

²⁹ NGET’s totex allowances are automatically adjusted for changes in Consumer Price Index (CPIH), which includes owner occupier housing cost, as part of the annual iteration of the price control financial model.

include £0.9m as a contingency for RPE over RIIO-2 for the Snowdonia EPI project, in line with NGET funding request.

NGET’s other delivery costs

5.40. NGET has provided a breakdown of costs for other activities involved in the delivery of the Snowdonia EPI project. These cover a variety of direct and indirect activities including equipment procurement, project insurance, third party works, project management, project services and support, lands rights and acquisition, environmental management and consenting, engineering and ongoing stakeholder management.

5.41. As highlighted earlier, the Snowdonia EPI project will be in construction throughout the remainder of RIIO-2 and for most of RIIO-3. As a result, a significant proportion of NGET’s indirect activity on the cable tunnel work package, and most of its indirect activity on the overhead line and the shunt reactor installation work packages will proceed after the end of RIIO-2.

5.42. We are proposing to remove the costs of NGET’s indirect activities (i.e. business support and CAI) that are programmed after March 2026 from the funding request for the Snowdonia EPI project. This is because under the RIIO price control arrangements, these indirect activities will be covered by the opex allowance that Ofgem determines for NGET in the RIIO-3 price control. Removing the costs for NGET’s indirect activities on the project after March 2026 from this assessment will reduce the overall funding request by £10.7m.

5.43. We have assessed the reasonableness of NGET’s proposed direct delivery costs across the three work packages i.e. third party works, equipment procurement, project services, ETAM Ops, and land acquisition. We consider these to be at an efficient level. Consequently, we propose to allow these in full.

Summary of costs

5.44. The table below summarises NGET’s funding request, our proposed reductions, and our proposed allowances for the Snowdonia EPI project.

Table 2: Proposed adjustments and allowances

Cost category £m (2019/20 prices)	NGET request	Ofgem proposed adjustments	Ofgem proposed allowances
Preliminary costs	20.090	-	20.090
Contractor costs for all three work packages	208.035	-1.947	206.088
Risk and real price effect contingencies	23.016	+0.5	23.516
NGET’s other direct and indirect costs	48.466	-10.697	37.769
Total	299.607	-12.144	287.463

5.45. When we make our final decision on the funding allowances for the Snowdonia EPI project, we will update the costs of the main contract price for changes in the metal price and exchange rate indices³⁰ that occur in the period between the contractors submitting their final price and NGET awarding the contract exchange.

5.46. As explained in paragraphs 5.15 and 5.42, NGET will receive an opex allowance under its RIIO-3 price control for contractors’ and NGET’s indirect activities on the project during RIIO-3.

³⁰ The indices to be used to adjust the contract price are: Metals: London Metal Exchange <https://www.lme.com> Forex: Bank of England <https://www.bankofengland.co.uk/statistics/exchange-rates>

6. Next Steps

6.1. We welcome your responses to this consultation, both generally, and in particular on the specific questions in Chapters 3, 4 and 5. Please send your response to: Anna.Kulhavy@ofgem.gov.uk. The deadline for response is 24 June 2022.

6.2. We will conclude our assessment of NGET’s Snowdonia EPI project with a decision in July 2022. To implement our decision, we will consult on our proposed direction to make the changes to NGET’s electricity transmission licence to specify the delivery of the Snowdonia EPI project by 2030.

Appendices

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Appendix 1 – Consultation questions

Consultation Question 1: Do you agree with our view that NGET has fulfilled its VIP policy commitments?

Consultation Question 2: Do you agree with our view that the Snowdonia EPI project is the valid outcome of NGET working with stakeholders on the selection of EPI projects?

Consultation Question 3: Do you agree with our views on option appraisal carried out by NGET?

Consultation Question 4: Do you agree with our view on the technical scope of the Snowdonia EPI project proposed by NGET?

Consultation Question 5: Do you agree with our cost assessment of NGET’s proposed Snowdonia EPI project?

Appendix 2 – High value low likelihood risks

The table below lists the high value low likelihood risks for the Snowdonia EPI project that we propose are covered by a targeted COAE re-opener in NGET’s licence. The table also sets out our proposed materiality threshold to trigger the COAE re-opener.

Risk	Details	COAE trigger
Tunnel boring machine failure (TBM) with total loss of tunnel	Loose ground conditions, incorrect operation or buried obstructions result in TBM breaking down and unable to either move backwards or forwards.	Risk event occurs and requires additional expenditure of at least 10% of the total ground related risk contingency for the cable tunnel work package
TBM failure i.e. main bearing failure	Catastrophic main bearing failure during tunnel drive i.e. due to more adverse ground conditions.	As above
Change in Law (including impacts of Brexit but excluding Covid19)	Change in law could include change to CDM regulations and devolved changes to laws, changes in localised taxation (excluding Landfill tax - separate risk) by Welsh Assembly. This risk excludes Coronavirus but includes Brexit (examples of Brexit impact may include specific import regulations, limits/conditions on port of entry over and above what is currently in place)	Risk event occurs and requires additional expenditure of at least 10% of the total non-ground related risk contingency for the cable tunnel work package
Coronavirus - Impact on NG and non-Contractor personnel	Control measures locally, nationally and internationally may restrict activities of National Grid or non-Contractor personnel	As above
Extreme weather & flooding (worse than 1 in 10)	Construction works are vulnerable to extreme weather which exceeds the 1-in-10 year value of the specified weather data. On site activities are programmed for 5 years so there is a	As above

	significant probability of multiple occurrences of this risk	
(Construction - Site setup) Archaeological Discovery	Important unknown archaeological finds are discovered on site - Note: Potential for Roman Road on West site	As above

Appendix 3 – Privacy notice on consultations

Personal data

The following explains your rights and gives you the information you are entitled to under the General Data Protection Regulation (GDPR).

Note that this section only refers to your personal data (your name address and anything that could be used to identify you personally) not the content of your response to the consultation.

1. The identity of the controller and contact details of our Data Protection Officer

The Gas and Electricity Markets Authority is the controller, (for ease of reference, “Ofgem”). The Data Protection Officer can be contacted at dpo@ofgem.gov.uk

2. Why we are collecting your personal data

Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

3. Our legal basis for processing your personal data

As a public authority, the GDPR makes provision for Ofgem to process personal data as necessary for the effective performance of a task carried out in the public interest. i.e. a consultation.

4. With whom we will be sharing your personal data

We will not share your personal data with any third parties.

5. For how long we will keep your personal data, or criteria used to determine the retention period.

Your personal data will be held for six months after the project has closed.

6. Your rights

The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right to:

- know how we use your personal data
- access your personal data
- have personal data corrected if it is inaccurate or incomplete
- ask us to delete personal data when we no longer need it
- ask us to restrict how we process your data
- get your data from us and re-use it across other services
- object to certain ways we use your data

- be safeguarded against risks where decisions based on your data are taken entirely automatically
- tell us if we can share your information with 3rd parties
- tell us your preferred frequency, content and format of our communications with you
- to lodge a complaint with the independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at <https://ico.org.uk/>, or telephone 0303 123 1113.

7. Your personal data will not be sent overseas.

8. Your personal data will not be used for any automated decision making.

9. Your personal data will be stored in a secure government IT system.

10. More information

For more information on how Ofgem processes your data, click on the link to our "[Ofgem privacy promise](#)".