

Dinorwig-Pentir – Consultation on the project’s Final Needs Case

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We are consulting on our views on the Dinorwig-Pentir cable and substation replacement project. We would like views from people with an interest in new transmission infrastructure, meeting the net zero challenge and competition in onshore transmission networks. We particularly welcome responses from consumer groups, stakeholders impacted by the project, stakeholders with an interest in the costs of electricity transmission infrastructure and the transmission owners. 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,

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Executive summary

Needs case

In December 2021, National Grid Electricity Transmission (NGET) (the electricity transmission owner and operator of the transmission network in England and Wales) submitted a Final Needs Case (FNC) for the proposed Dinorwig-Pentir cable and substation replacement project.

The Dinorwig-Pentir project is being driven by the asset health condition of two 400kV cable circuits at Dinorwig in North Wales and the 400kV Dinorwig substation. NGET states that the total cost to develop and deliver the project is £184m. NGET is requesting £166m which excludes funding already in place across RIIO-1 and RIIO-2¹.

In accordance with the RIIO-2 price control arrangements, we have assessed the need for the proposed project under the Large Onshore Transmission Investment (LOTI) mechanism² and its suitability for delivery through a competition model.

LOTI Final Needs Case assessment

We consider that there is sufficient evidence of a clear needs case for the Dinorwig-Pentir project. In our view, NGET has made the case that asset intervention is required.

We are satisfied that NGET's optioneering process has followed a logical approach; however, as part of our assessment we identified a number of options that we considered had been inappropriately excluded from NGET's December 2021 final needs case (FNC) submission. Through further engagement, NGET provided supplementary information and analysis which incorporated a broader range of options.

We consider that the supplementary cost benefit analysis (CBA) undertaken by NGET considers a suitable range of potential options and supports the need for the proposed scope of the Dinorwig-Pentir project. We note that the results of the supplementary CBA are marginal between options 1 versus 2 (i.e. replacing the circuits and substation now versus delaying the project by two years). NGET notes that the timing of its preferred option, option 1, addresses the reliability of the cables and offers the most economic and efficient cost to

¹ Costs incurred in RIIO-1: £7m; costs allowed in RIIO-2 baseline: £11m

² This is set out in Special Condition 3.13 of the Electricity Transmission Licence

consumers whilst also reducing the SF₆³ inventory and leakage at the Dinorwig substation. We recognise that the CBA results are finely balanced, and we have therefore factored a broader range of considerations into our FNC assessment.

Overall, our minded-to position is that option 1 presents marginally lower risk for consumers when compared against option 2.

Delivery model

In line with our Final Determinations for the RIIO-2 period for Electricity Transmission, as the Dinorwig-Pentir project is being considered under the LOTI mechanism, we have assessed the suitability of the project for 'late model' competition⁴. Our view is that the Dinorwig-Pentir project would meet the criteria for delivery via a late model competition⁵.

However, from our assessment, we do not envisage being able to implement either the Competitively Appointed Transmission Owner (CATO) or the Special Purpose Vehicle (SPV) model for this project without causing delay. In addition, we do not have sufficient confidence in the benefits that would be delivered to consumers by applying the Competition Proxy Model (CPM). Given this, we are minded to retain the Dinorwig-Pentir project within the LOTI mechanism of the RIIO-2 framework.

Large project delivery

The Large Project Delivery (LPD) framework applies to large (£100m+) transmission projects and seeks to incentivise their timely delivery and minimise the detriment to consumers of late project delivery.

There are two elements to the LPD policy: one is to ensure TOs don't benefit from the delay, and the second element is designed to protect consumers from the impact of delay.

³ Sulphur hexafluoride (SF₆) is a man-made gas comprising of one sulphur and six fluoride atoms. It is a potent greenhouse gas

⁴ 'Late model' competition refers to the late models of competition (i.e. run for delivery once a project is sufficiently developed) identified for consideration for LOTI projects within the RIIO-2 period (the Competitively Appointed Transmission Owner (CATO) model, the Special Purpose Vehicle (SPV) model, and the Competition Proxy Model (CPM)). For further information, see [RIIO-2 Final Determinations](#), Core Document (REVISED), chapter 9

⁵ The criteria are new, separable, and high value (£100m or above)

To ensure NGET does not benefit from delayed expenditure, we have considered both reprofiling and milestone-based approach. At this stage we do not think it is appropriate to rule out a milestone-based approach in favour of re-profiling and we will continue to engage with NGET and provide our view at the Project Assessment stage.

We are of the view that there is a need to protect the interests of existing and future consumers from the impact of a delayed delivery to the Dinorwig-Pentir: a delay in delivery may lead to additional constraint costs as well as environmental costs as a result of inefficient outage plan and ongoing leakage of SF6 respectively. As such, we are considering the application of a Project Delivery Charge (PDC) to the Dinorwig-Pentir project. We expect any decision on the level of PDC to be made as part of the Project Assessment stage. We invite NGET to continue to engage with us on the matter.

Next steps

We welcome responses to our consultation on the specific questions we have included in Chapters 2, 3, and 4. If you would like to respond to this document please send your responses to: RIIOElectricityTransmission@ofgem.gov.uk. The deadline for responses is 01 July 2022. We expect to publish our decision on the FNC for the Dinorwig-Pentir project around mid-summer 2022.

Once the FNC stage is complete and a decision has been made, the next phase will be the Project Assessment stage.

1. Introduction

What are we consulting on?

1.1. This document sets out our views on the need for (and future regulatory treatment of) a proposed electricity transmission project to deliver the cable and substation replacement at Dinorwig-Pentir. The project is referred to as the “Dinorwig-Pentir” project.

1.2. Chapter 2 summarises our findings on the FNC for this project, the conclusions of our assessment, and our proposed position.

1.3. Chapter 3 summarises our proposed position on whether the project meets the criteria for late competition and whether it should be funded through a late competition model.

1.4. Chapter 4 summarises the LPD funding mechanism and our proposed view of its applicability to the Dinorwig-Pentir project.

Context

1.5. The GB onshore electricity transmission network is currently planned, constructed, owned and operated by three Transmission Owners (TOs): National Grid Electricity Transmission (NGET) in England and Wales, SP Transmission in the south of Scotland, and Scottish Hydro Electric Transmission in the north of Scotland. We regulate these TOs through the RIIO (Revenue = Incentives + Innovation + Outputs) price control framework. For offshore transmission, we appoint Offshore Transmission Owners (OFTOs) using competitive tenders.

1.6. The incumbent onshore TOs are currently regulated under the RIIO-2 price control, which started on 1 April 2021 and will run for 5 years. Under this price control, we developed a mechanism for assessing the need for, and efficient cost of, large and uncertain electricity transmission reinforcement projects. This mechanism is called ‘Large Onshore Transmission Investment’ (LOTI). Once the need for and costs of projects have become more certain, the TOs bring forward construction proposals and seek funding for them. As explained in Chapter 9 of the RIIO-2 Final proposals – Core Document⁶, all projects that come forward for

⁶ [RIIO-2 Final Determinations](#), Core Document (REVISED), chapter 9

assessment via the LOTI reopener during the RIIO-2 period will be considered for their suitability for delivery through one of the late competition models.

1.7. NGET previously requested funding for the Dinorwig-Pentir project in its RIIO-2 business plan. We proposed in the RIIO-T2 Draft Determinations that these works could be submitted through the LOTI re-opener mechanism. This was because we considered the reporting of the cable health in its RIIO-2 business plan was inconsistent with the information previously presented in RIIO-ET1 and considered that the cost information provided at the time was not sufficiently mature to allow us to provide baseline price control funding for the project. We decided in Final Determinations⁷ to use the LOTI re-opener mechanism to review the relevant costs and need for the project in greater detail.

1.8. NGET submitted a joint FNC and Project Assessment (PA) submission for the Dinorwig-Pentir project in December 2021. This document covers our assessment of the FNC submission for the project and explains our findings. The PA stage will be a separate assessment with its own findings.

1.9. Our assessment and proposed position set out in this document are subject to consultation and we invite stakeholders to respond using the contact details set out on the front of this document. We have indicated questions for stakeholders on particular areas at the start of each chapter.

Overview of LOTI reopener mechanism

1.10. The LOTI re-opener mechanism provides TOs with a route to apply for funding for large investment projects that can be shown to deliver benefits to consumers, but that were uncertain or not sufficiently developed at the time we set costs and outputs for the RIIO-2 price control period. The LOTI mechanism provides a robust assessment process through which we can ensure that TO proposals represent value for money for existing and future consumers.

1.11. To qualify for the LOTI mechanism, TO proposals must meet the following criteria:

- a) be expected to cost £100m or more of capital expenditure; and

⁷ [RIIO-2 Final Determinations](#), NGET Annex (REVISED)

b) be, in whole or in part, load related⁸.

1.12. We are satisfied that the Dinorwig-Pentir project meets these criteria and is therefore eligible⁹ as a LOTI project. We are therefore assessing the Dinorwig-Pentir project in accordance with the LOTI process as detailed in the LOTI Guidance¹⁰.

Stages of our LOTI assessment

1.13. Following the approval of eligibility, our LOTI assessment process is made up of three main stages:

1. **Initial Needs Case (INC)** - The usual focus of our assessment at this stage is to review the technical and/or economic need for the project, the technical options under consideration, and the TO's justification for taking forward its preferred option for further development.

2. **Final Needs Case (FNC)** - Following the securing all material planning consents for the project, the TO will then need to submit a FNC (unless we specify alternative timing). The focus of our assessment at this stage is to confirm the need for the project, by checking that there have been no material changes in technical and/or economic drivers that were established in the INC.

3. **Project Assessment (PA)** - If the FNC is approved, the TO will then need to apply for a PA Direction. The focus of our assessment at this stage is the assessment of the proposed costs and delivery plan that the TO has in place for the project, with a view to potentially specifying in the TO's licence a new LOTI Output, a LOTI Delivery date, and setting the efficient cost allowances that can be recovered from consumers for delivery of the project.

1.14. We consider it important to consider flexibility in the LOTI process, where appropriate, and recognise that the timing of the overall LOTI process may need to vary from project to

⁸ Part (b) of this criterion used to be either "wholly or partly load related" or "shared-use or sole-use generator connection project related". As a result of a licence modification, which came into effect on 24 July 2021, the "shared-use or sole-use generator connection project" criterion no longer applies.

However, this does not impact the project as this is in part a load related project. For further information on the licence modification, see the [Decision on the proposed modifications to the RIIO-2 Transmission, Gas Distribution and Electricity System Operator licence conditions](#)

⁹ [RIIO-2 Final Determinations](#), NGET Annex (REVISED), section 3.60

¹⁰ [Large Onshore Transmission Investments \(LOTI\) Re-opener Guidance](#)

project. Given the relatively tight delivery date for Dinorwig-Pentir of 2024-2026 and the urgency to meet the project drivers, we approved a combined FNC and PA submission to facilitate timely progression of the project and to mitigate delays that could be detrimental to consumers. We also, after careful consideration, relieved NGET of the requirement to obtain approval of eligibility to apply and to submit an INC for Dinorwig-Pentir on the basis that we already completed an initial assessment of the eligibility, scope and needs case for Dinorwig-Pentir as part of our assessment of NGET’s RIIO-2 business plan. We also issued a direction to this effect which will be published alongside this consultation.

1.15. NGET submitted its combined FNC and PA in December 2021. This consultation covers our assessment of the FNC and explains our findings.

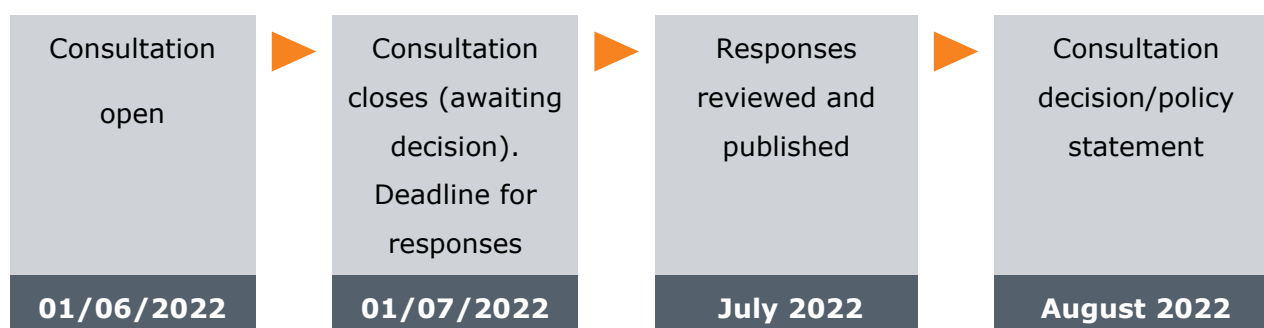
Related publications

RIIO-2 Final Determinations - Core Document REVISED: [Ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator](https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator)

RIIO-2 Final Determinations - NGET Annex REVISED: [Ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator](https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator)

LOTI Reopener Guidance document: [Ofgem.gov.uk/publications-and-updates/large-onshore-transmission-investments-loti-re-opener-guidance](https://www.ofgem.gov.uk/publications-and-updates/large-onshore-transmission-investments-loti-re-opener-guidance)

Consultation stages



How to respond

1.16. 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.

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

1.18. We will publish non-confidential responses on our website at [Ofgem.gov.uk/consultations](https://www.ofgem.gov.uk/consultations)

Your response, data and confidentiality

1.19. 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.

1.20. 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.

1.21. 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 1](#).

1.22. 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

1.23. We believe that consultation is at the heart of good policy development. We welcome any comments about how we have run this consultation. We would 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?

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

How to track the progress of the consultation

1.25. You can track the progress of a consultation ([consultation stages](#) for the Dinorwig-Pentir project) from upcoming to decision status using the 'notify me' function on a consultation page when published on our website Ofgem.gov.uk/consultations

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

2. Dinorwig-Pentir Final Needs Case assessment

Section summary

This chapter sets out the key decisions NGET has made to date on the Dinorwig-Pentir project. It also describes our assessment of this approach, and explains our findings on the technical need, options and CBA for this project.

Questions

Question 1: Do you agree with the technical need for investment on the transmission network?

Question 2: Do you agree with our conclusions on the technical options considered?

Question 3: Do you agree with our conclusions on the CBA and the appropriateness of the option taken forward?

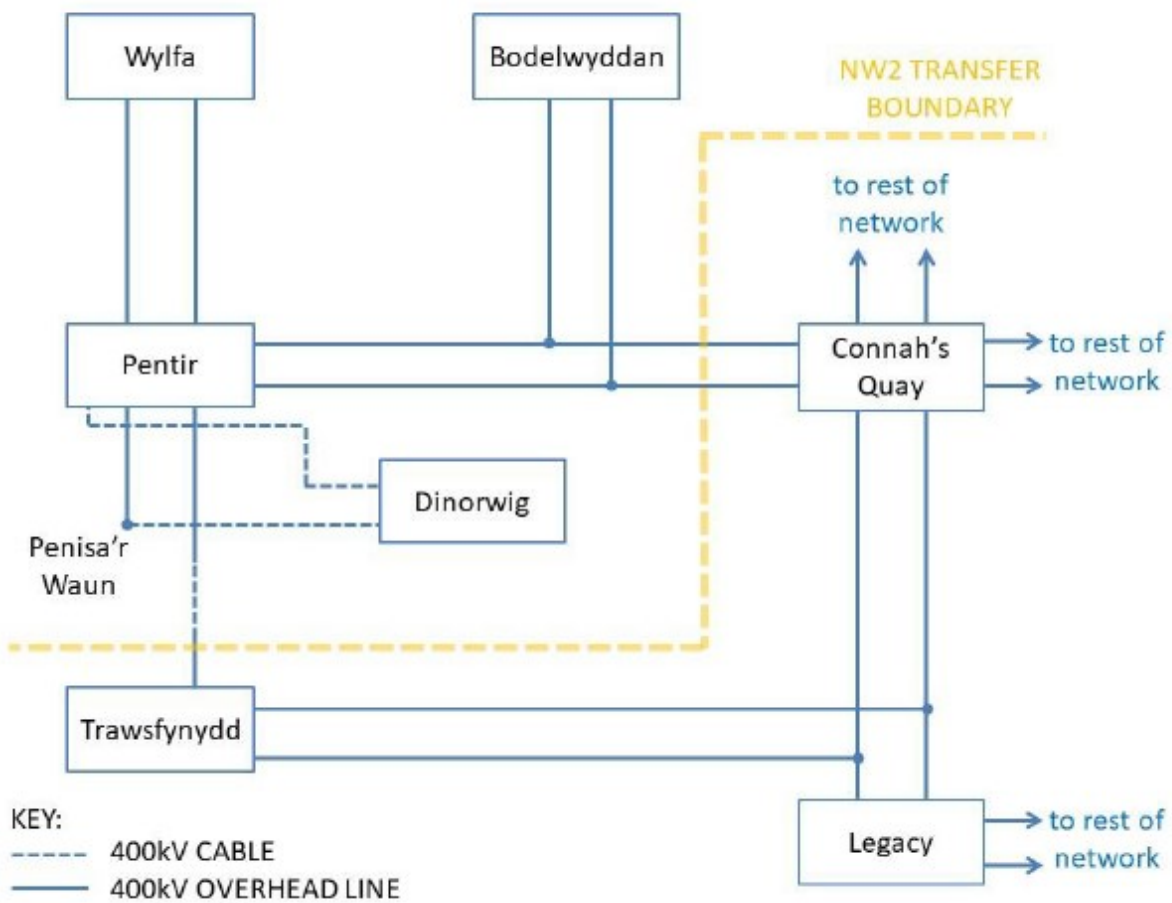
Overview of NGET's proposal

2.1. Dinorwig Power Station¹¹ in Snowdonia, North Wales, is a pumped storage generation facility owned by Engie providing energy to the market, system critical response, and balancing services to the system operator. It is located inside a man-made cavern within the mountain of Elidir Fawr.

2.2. The manmade cavern also contains the Dinorwig substation. Dinorwig substation is connected to the wider transmission network via two 400kV cable circuits to Pentir substation. Figure 1 below outlines the Dinorwig-Pentir cable circuits within the 400kV network in the North Wales area.

Figure 1: Outline diagram of the 400kV network in North Wales

¹¹ Dinorwig Power Station will continue to operate for the foreseeable future. The Electricity System Operator's (ESO) [Future Energy Scenarios \(FES\)](#) demonstrates that in all four FES, the power station will remain in operation until 2050



2.3. Both the Dinorwig substation and the two existing 400kV cable circuits between the Dinorwig and Pentir substations are the subject of this LOTI assessment and are collectively referred to as the 'Dinorwig-Pentir project'.

Cable condition

2.4. The Dinorwig-Pentir cable circuits were installed in 1980 and are the connection between Dinorwig Power Station and the wider transmission network.

2.5. NGET has outlined that over a ten-year period to December 2019, the Dinorwig-Pentir cable circuits have been out of service for a total of 989 days on circuit 1 and 759 days on circuit 2. These figures, covering both planned and unplanned outages, represent an average time in operation of 77%. These outages are linked to known condition and route-specific issues associated with the cables.

2.6. NGET has cited that the key issues with the cable condition are:

- Cable duty factor – the cables routinely experience thermal cycling and high loads. This is known to have a bearing on cable condition and anticipated asset life.
- Joint failures – thermo-mechanical forces have accelerated the rate of cable degradation and affected cable joints.
- Cable over-sheath – the cables have incurred a significant number of sheath faults given their type and age. This deterioration leads to damage and defects of the metallic sheath leading to oil leaks and increased cable failures.
- Circuit proximity – the existing circuits run side by side in a single cable trench for significant parts of the route. This means that any maintenance, repair, or replacement of one cable would require both cable circuits to be out of service.
- Civil installation of cable – the cable route is installed in a cement rich mixture. This mixture presents problems for identifying and repairing cable faults as it is time consuming, requires specialist equipment, and is thought to be a contributing factor in causing cracking in the outer sheath of the cables.
- Cable cooling system reliability – water cooling pipes laid between, and parallel to, the cables are surrounded by the same cement rich mixture mentioned above. This makes performing repairs both difficult and time consuming.
- Stakeholder engagement – the cable route sits just outside Snowdonia National Park and runs alongside a Site of Special Scientific Interest¹². Natural Resources Wales had raised a concern of oil leaks associated with the cables posing an environmental risk, especially when they are removed. These concerns have been substantially alleviated by the contracting of a specialised company by NGET to carry out the works.

Asset health scoring

¹² Sites of Special Scientific Interest form a set of nationally important natural areas in the UK. See the Scottish Government website for further details: [Sites of Special Scientific Interest](#)

2.7. NGET has used the approach detailed within its Network Asset Risk Annex (NARA)¹³ to identify and prioritise assets in need of intervention across its network. This employs a mechanistic assessment methodology for asset health condition using standardised measurement for all cables across NGET’s network area. This standardised measurement is called the End of Life (EoL) modifier.

2.8. The EoL modifier is a score ranging from 0 to 100. An asset with a high EoL score is considered to be close to requiring replacement. The EoL modifier is a proxy for the Probability of Failure (PoF) value. Where the PoF of the asset will reach 10% in the next twelve months, the asset has come to its “end of life” as defined in the NARA.

2.9. NGET reported EoL modifier scores for both cables in its December 2019 RIIO-2 Business Plan submission. These scores were revisited by NGET in 2020, at Ofgem’s request, to reflect known issues (i.e. that historical asset health condition was not being captured by NARA scoring) into the proposed changes to NARA scoring to ensure a consistent asset health assessment for NGET’s cable population. Table 1 below summarises the asset health scores of the Dinorwig-Pentir cable circuit assessments from December 2019 and September 2020.

Table 1: Asset health scores of the cable circuit assessments from December 2019 and September 2020

Circuit	2019/20 Asset health scoring (December 2019 evaluation)	2020/21 Asset health scoring (September 2020 evaluation)
	EoL modifier score	EoL modifier score
Cable 1	40/100	70/100
Cable 2	25/100	55/100

2.10. NGET also highlighted the equivalent age values for the cables as set out below in Table 2.

Table 2: Probability of Failure and Equivalent age of cables

Circuit	Assessed in March 2020		Projected to March 2026	
	PoF score	Equivalent age	PoF score	Equivalent age
Cable 1	4.8%	60.5	9.9%	66.5
Cable 2	2.9%	56.4	6.2%	62.4

¹³ NGETs [Network Asset Risk Annex \(NARA\) Consultation](#)

2.11. For Cable 1, EoL will be reached around 2026; for Cable 2 this value is expected to be reached around 2029.

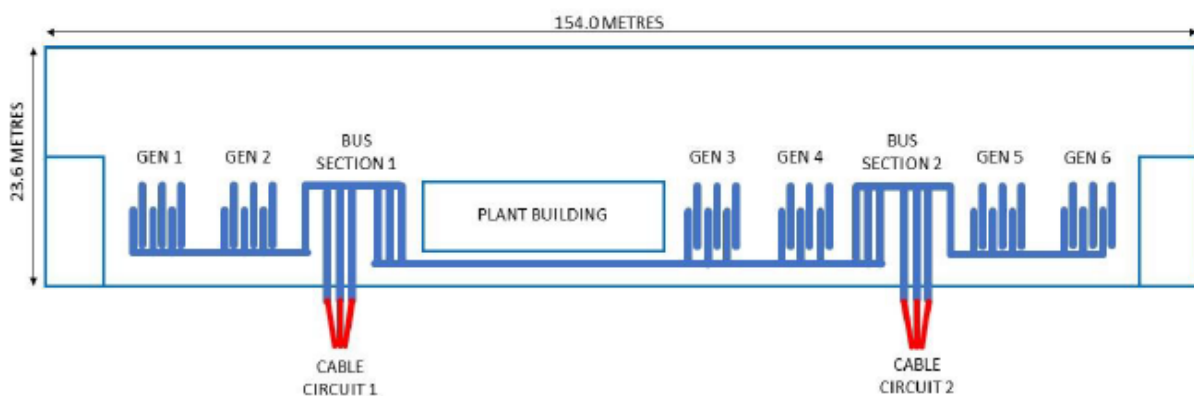
Substation condition

2.12. Dinorwig power station represents the single largest demand loss on the system during pumping. Looking forward there is a large amount of offshore wind and tidal generation proposed over the next decade in North Wales.

2.13. There is a need for the Electricity System Operator (ESO) to hold generation reserve to mitigate the negative effects of the loss of circuit(s) on the wider system. This represents a cost for end consumers which historical data shows at worst case can reach c.£500k per day meaning that outages on either or both cable circuits must be carefully managed. The introduction of a third cable would help alleviate the level of constraint costs and improve the availability of power to provide greater resilience for managing load balancing services.

2.14. Dinorwig 400kV substation is a single bus substation with gas insulated switchgear (GIS) built in 1984. There are three substation sections, each connecting two generator circuits from Dinorwig Power Station, totalling six generator units. The substation has a single busbar and comprises six generator bays, two cable feeder bays, and two bus section bays. The basic layout is shown in Figure 2 below:

Figure 2: Dinorwig substation layout



2.15. The majority of the equipment at Dinorwig substation is 40 years old and has a history of known issues associated with hydraulic leaks on some of the circuit breaker mechanisms.

2.16. Several circuit breakers of the GIS substation have been reconditioned, enabling their asset life to be extended to 2032, as set out in Table 3 below. NGET has highlighted that the

ability to complete further reconditioning is limited by the support available from the original equipment manufacturer to supply components and technical expertise beyond 2028.

2.17. There have been a number of defects on the Dinorwig GIS. The most common defect has required SF6 ‘top-up events’ due to high leakage rates and there have also been other defects involving hydraulic mechanisms and control systems.

Asset health scoring

2.18. Table 3 below shows that the EoL scoring process (EoL modifier) presently puts the forecasted EoL for circuit breakers X120 and X205 sometime before the end of RIIO-2 (on 31 March 2026). This is driven by age versus expected life and SF6 emissions.

Table 3: Reconditioned GIS substation circuit breakers enabling asset life to 2032

Circuit breaker	Asset life	EoL modifier score	PoF (March 2021)	Equivalent age (March 2021) ¹⁴	PoF (March 2026)	Equiv. age (March 2026)
X105	2032	36/100	0.5%	37.9 / 50	2.0%	42.9 / 50
X120	EoL reached ¹⁵	100/100	10.7%	27.7 / 30	19.8%	32.7 / 30
X205	2032	75/100	5.0%	46.7 / 50	14.5%	51.7 / 50
X220	2032	33/100	0.4%	37.0 / 50	1.4%	42.0 / 50

2.19. NGET stated that to maintain the PoF of all circuit breakers below 10% through the expected remaining life of the substation (2032), reconditioning works of circuit breakers X120 and X205 and SF6 leak repairs would need to take place.

SF6 emissions and ongoing intervention

2.20. SF6 ‘top-up’ events have been recorded for both of the circuit breakers, switchgear, and GIS busbar. The volume of gas top-ups required has fluctuated from 332kg in 2013 to 62kg in 2018.

¹⁴ The expected life of the circuit breakers X105, X205 and X220 is 50 years, whereas X120 is only 30 years

¹⁵ For circuit breaker X120 this PoF value has already been reached. For circuit breaker X205 this value will be reached in the year 2025 and for X105 and X220 this value will be reached around 2030

2.21. The SF6 emission sources are predominantly from the seals between flanges. The known emission sources are being addressed through interventions which are taking place during the RIIO-2 period to target the worst affected components at Dinorwig until asset replacement in 2026. NGET predicts that without SF6 intervention measures, asset leakage rates at Dinorwig will continue to increase annually until appropriate intervention or a full substation replacement is completed.

Our view on the asset replacement drivers

2.22. We agree with NGET that the project has clear drivers requiring intervention, particularly in terms of asset health and SF6 emissions.

Optioneering

2.23. NGET has considered, through a three-stage process, a range of options to address the issues set out above.

1. Options identification – ensures NGET considers a wide range of possibilities. Solutions were considered independently for the cable and substation assets before shortlisting credible options to take forward for further consideration and development.
2. Shortlist appraisal – evaluates the viability and high-level merits of each of the shortlisted options against a defined set of criteria to ensure its suitability to the requirements of the technical need.
3. Economic assessment – considers the scope, timing, and consumer value of the whole solution as part of a detailed CBA.

2.24. Options were filtered based on shortlisting criteria such as consumer value, system requirements, operability, third party impact, responsible business (e.g. socio-economic and environmental impact), and deliverability.

Options identification and shortlisting

Cables

2.25. NGET identified the cable options based on the following principles:

- Do nothing – undertaking no intervention and avoiding any additional expenditure, e.g. just continuing basic maintenance.

- Do minimum - undertaking the minimum level of intervention such that any associated expenditure is minimised, e.g. enhanced maintenance through the replacement of specific sections or cable joints to extend asset life.
- Do something – undertaking intervention to meet the identified technical need, e.g. replacement of the existing cable circuits.

2.26. The cable options were considered against system considerations including constraint costs associated with construction outages, outage availability (options will require outages of varying duration) and circuit ratings (circuits will need to meet the minimum rating requirements based on system studies). All three considerations were included in the economic analysis.

2.27. The cable route options were also considered against a number of factors including whether overhead or underground lines is more suitable, how to pass obstacles such as mountainous terrain, and alternative connections points. The circuit technology was also considered by looking at whether oil filled cables, gas insulated lines, or cross-linked polyethylene cables are appropriate.

Substation

2.28. NGET assessed the substation options according to the following principles:

- Do nothing – undertaking no intervention and avoiding any additional expenditure, e.g. with the exception of reconditioning two circuit breakers and SF6 leak repairs, Dinorwig substation can remain operational in its current condition until end of life in 2032.
- Do minimum - undertaking the minimum level of intervention such that any associated expenditure is minimised, e.g. allowing the connection of an additional third circuit by replacing part of the substation to cater for this.
- Do something – undertaking intervention to meet the identified technical need, e.g. replacing the substation to allow for either a two or three circuit option.

2.29. The substation options considered whether an offline build or in situ build would be appropriate, taking into account the practicalities of constructing within the existing cavern, the civil works that would be required, and the option to construct the substation in stages. The substation options were also considered in relation to timing, particularly in respect of

whether the substation replacement should be “deferred” and replaced at the end of life in 2032 and therefore not align with the cable replacement options or whether the substation replacement should occur earlier to align with cable works¹⁶.

Shortlisted circuit and substation whole solution options

2.30. Table 4 below sets out NGET’s consideration of the viable options identified for the cable circuits and substation (note: option 1-A was not considered viable due to there being several clear asset health drivers requiring intervention but is included in table 4 for comparison purposes).

Table 4: Options considered

Option	Description
1-A	<p>Do nothing</p> <p>Though discounted at the shortlisting stage, the “do nothing” option has been included in elements of the analysis for comparison purposes.</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Undertaking no intervention on the cable circuits, just the continuation of basic maintenance. ▪ Undertaking no intervention at the substation, except for the reconditioning of circuit breakers X205 and X120 and SF6 leak repairs. ▪ Continuation of basic maintenance.
5-D	<p>Two circuits with deferred substation replacement</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Two circuits, introduce an additional cable circuit in 2024, then replace one of the two existing cable circuits between 2025 and 2026. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace one third of Dinorwig substation to accommodate new cables with maintenance of the existing substation assets continuing until replacement is completed in 2032. ▪ Return in 2040s to replace circuit breakers in the earlier replaced third of the substation with SF6-free technology.
5-E	<p>Two circuits with early substation replacement</p>

¹⁶ This would mean the substation replacement is brought forward by 6 years from 2032 to 2026 to align with cable works

Option	Description
	<p>Comprises:</p> <ul style="list-style-type: none"> ▪ Two circuits, introduce an additional cable circuit in 2024, then replace one of the two existing cable circuits between 2025 and 2026. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace Dinorwig substation in line with cable replacement works. ▪ Return in 2040s to replace circuit breakers in the earlier replaced third of the substation with SF6-free technology.
6-D	<p>Three circuits with deferred substation replacement</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Replace two existing circuits between 2025 and 2026. Introduce an additional new cable in 2024. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace one third of Dinorwig substation to accommodate the third cable circuit, with maintenance of the existing substation assets continuing until replacement is complete in 2032. ▪ Extend Pentir substation to accommodate the additional circuit. ▪ Install an additional shunt reactor on the network. ▪ Return in 2040s to replace circuit breakers in the earlier replaced third of the substation with SF6-free technology.
6-E	<p>Three circuits with early substation replacement</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Replace two existing circuits between 2025 and 2026. Introduce an additional new cable in 2024. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace Dinorwig substation in line with cable replacement works. ▪ Extend Pentir substation to accommodate the additional circuit, ▪ Install an additional shunt reactor on the network. ▪ Return in 2040s to replace circuit breakers in the earlier replaced third of the substation with SF6-free technology.

Our view on optioneering

2.31. We are satisfied that NGET’s optioneering process has followed a logical approach; however, we identified several options that we consider had been inappropriately excluded.

2.32. Through further engagement following submission of the FNC, NGET provided further supplementary information and analysis which included a broader range of options. Option 1 (i.e. option 6-E from Table 4) was part of this broader options set as it performed best in the initial CBA when considering early substation replacement and therefore, we asked NGET to compare this option to SF6-free substation replacement options as part of NGET’s supplementary information. These SF6 and SF6-free options, as summarised in Table 5 below, were directly compared to each other in the supplementary CBA analysis.

Table 5: Options considered in the supplementary CBA

Option	Description
Option 1 (as per 6-E in the FNC submission)	<p>Three circuits with early substation replacement</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Replace two existing circuits between 2025 and 2026. Introduce an additional new cable in 2024. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace Dinorwig substation in line with cable replacement works. ▪ Extend Pentir substation to accommodate the additional circuit. ▪ Install an additional shunt reactor on the network. ▪ Return in 2040s to replace circuit breakers in the earlier replaced third of the substation with SF6-free technology.
Option 2	<p>Delay by 2 years: three circuits with SF6-free substation replacement</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Delay the entire project (both circuit and substation works) by two years to allow a SF6-free technology option to become commercially available. ▪ Replace two existing circuits; introduce an additional new cable. ▪ Use XLPE cables, one cable per phase, partly new routeing, terminating at existing connection points. ▪ Replace Dinorwig substation in line with cable replacement works. ▪ Extend Pentir substation to accommodate the additional circuit. ▪ Install an additional shunt reactor on the network.
Option 3	<p>Delay substation works by 2 years: three circuits now with SF6-free substation replacement later</p> <p>Comprises:</p> <ul style="list-style-type: none"> ▪ Delay substation works by 2 years to allow a SF6-free technology option to become commercially available.

Option	Description
	<ul style="list-style-type: none"> ▪ Replace two existing circuits; introduce an additional new cable. ▪ Use XLPE cables, one cable per phase, partly new routing, terminating at existing connection points. ▪ Replace Dinorwig substation after cable replacement works. ▪ Extend Pentir substation to accommodate the additional circuit. ▪ Install an additional shunt reactor on the network.

2.33. We consider that NGET should have included a SF6-free solution in its original December 2021 FNC submission. NGET's contracting strategy saw early contractor involvement which resulted in NGET being tied to a preferred contractor ahead of our assessment. We considered that NGET's choice not to include a SF6-free solution at the start of its procurement process meant that consumers may have potentially missed out on greater environmental benefits. We consider this inappropriate and through further engagement with NGET, we instructed NGET to include a broader range of options including a SF6-free solution in its CBA. NGET complied with this request through the addition of Option 2.

2.34. We consider it important that the option of proceeding with a SF6-free substation at Dinorwig-Pentir is fully considered and we are now satisfied that the range of options included in the supplementary CBA, as set out in Table 5, is appropriate.

CBA process and methodology

2.35. For the majority of submissions under the LOTI mechanism, the relevant TO (in this case NGET) works with the ESO to develop and run a CBA to assess the performance of each shortlisted network design option in order to support the optioneering decisions presented in the FNC submission. The ESO is involved in this process as it has visibility about the impact of local electricity transmission network designs on the rest of the GB electricity transmission network.

2.36. The ESO is primarily concerned with the optimisation of constraints at a network level rather than the stability implications of a single plant. The reinforcement of the Dinorwig-Pentir network presents some challenges to the ESO's standard CBA modelling approach adopted to date. As such, operational expenditure for Dinorwig-Pentir has been derived from

the Frequency Risk and Control Report (FRCR)¹⁷ analysis. This analysis is based on historic 'Bid Offer Actions' profiles and network wide inertia values and thus better serves to account accurately for both ancillary services and the dynamic generating and pumping behaviour of Dinorwig. To confirm, boundaries are not considered in this analysis because the boundary capability is not affected.

2.37. The CBA for Dinorwig-Pentir included in the FNC submission compares the net present value (NPV) of the total expenditure (TOTEX), made up of capital expenditure (CAPEX) and operational expenditure (OPEX), for each of the options brought forward for assessment. As such, there is no least worst regret (LWR)¹⁸ analysis as the Future Energy Scenarios (FES)¹⁹ were not used. This is because none of the costs are scenario specific and are therefore either based on historic data (for example the FRCR) or on capital costs from NGET.

2.38. The CBA model considers several key elements:

- CAPEX budgets – the CAPEX assumptions for the different engineering options.
- Capitalisation rate²⁰ – determines the split of investment to be funded within period by consumers versus that which will be recovered over the regulatory asset life.
- Circuits installed – to calculate the number of outage days which in turn feeds into the operational costs incurred by the ESO for frequency control under a single circuit operation²¹.

¹⁷ The FRCR analysis [approved](#) by Ofgem on 12 May 2021 details the costs of the four main controls associated with mitigation transient frequency deviations. This model more accurately represents the costs associated with the dynamic pumping and generation behaviour of Dinorwig which cannot be captured within the current BID3 system (i.e. the traditional network constraint model)

¹⁸ LWR is a decision-making tool that makes recommendations based on which options/strategy produce the least 'regret' across all analysed scenarios

¹⁹ The FES is the ESO's representation of a range of different, credible ways to decarbonise the energy system to strive towards the 2050 target

²⁰ There are some judgements required in setting capitalisation rates in a price control where the level of totex (and therefore the split of capex to opex) cannot be predicted with certainty at the outset. The split capitalisation rate with one rate applying to baseline (for NGET RIIO-2 this is set to 78%) and one rate applying to uncertainty mechanisms, such as LOTI projects, (for NGET RIIO-2 this is set to 85%) goes some way to alleviating concerns that setting the capitalisation rate on the basis of one potential totex scenario could lead to significant and persistent under or over capitalisation during RIIO-2

²¹ The number of single circuit days is 213 days for option 5-E and 334 days for option 5-D. None of options 1-A, 6-E, or 6-D result in any single circuit days occurring

- Outages – during the construction phase outages are required and these vary in duration depending upon the work involved. The cost of outages is included within the operational expenditure estimates.
- Scope element selection - for each option, scope packages have been priced enabling all engineering solutions to be carried forward to the point of CBA analysis.

CBA Results

2.39. Table 6 shows the CBA results²² for the four shortlisted options that were tested. Based on this, the three cable circuit options are found to have the least regret.

Table 6: CBA results

Option	TOTEX (£m)	Regret (£m)
5-E: 2 cable circuits, early substation replacement	302.29	62.48
5-D: 2 cable circuits, deferred substation replacement	262.18	22.37
6-E: 3 cable circuits, early substation replacement	239.81	0.00
6-D: 3 cable circuits, deferred substation replacement	241.71	1.89

2.40. NGET stated that the construction programme for the options considered has been optimised and streamlined to minimise the construction outage periods; however, an unavoidable single circuit risk exists at certain times in the programme for the two-circuit options (5-E and 5-D) which does not occur in the three-circuit options (6-E and 6-D). This drives a differential in the operational costs associated with the two-circuit options over the three-circuit options because the ESO would need to procure additional system balancing services to protect against a potential fault on a single circuit.

2.41. NGET recognised the close outcome between options 6-D and 6-E; however, NGET considers that its preferred option 6-E reduces the overall SF6 inventory by 68% whilst reducing the leakage at Dinorwig substation. NGET considers that deferring the substation works, as per option 6-D, results in a second construction phase being required in 2032 when

²² To note: the CBA does not capture specific operational loads on the circuits, operational outage costs due to circuit failures, detail from the ESO’s NOA Pathfinder Stability Phase 3 tender, or variations in SF6 leakage rates

the assets reach end of life which results in additional outages and disruption to Dinorwig Power Station.

Our view on the CBA

2.42. Our view is that the CBA supports the need for investment on this part of the network and supports NGET’s progression of a reinforcement option for the Dinorwig-Pentir project. However, as referenced in paragraph 2.35, we were not satisfied that NGET included an appropriate number of options in its December 2021 FNC CBA submission and as such required further analysis by NGET.

2.43. The results of this further analysis which offered a broader range of options for consideration in the supplementary CBA carried out by NGET are outlined in Table 7 below.

Table 7: CBA results: supplementary analysis

Description	Option 1	Option 2	Option 3
	Three circuits with early substation replacement	Delay by 2 years: three circuits with SF6-free substation replacement	Delay substation works by 2 years: three circuits <u>now</u> with SF6-free substation replacement later
Total NPV (£m)	286.96	297.13	309.60
tCO2e SF6 (kg)	37,570	45,930	48,062
Total forecast expnd. (£m)	194.91	198.93	188.91
NPV regret (£m)	0.00	10.25	22.16

2.44. Based on the supplementary CBA, NGET concludes that option 1 (i.e. 6-E) remains the optimum solution, echoing the results of the CBA originally included with the FNC submission.

2.45. NGET highlights that it considers progressing either option 2 or 3 would present a number of risks centred around the use of SF6-free technology and the impact on delivery of the Dinorwig-Pentir project, both in terms of costs (predominately associated with outage durations and associated constraints) and timing. NGET considers there are key timing risks associated with moving away from the current programme of works associated with option 1

and that this would mean outages no longer align with the planned maintenance outages Engie has highlighted for the Dinorwig Power Station²³.

2.46. In general, we are satisfied that the supplementary CBA considers a suitably wide range of options. However, we note that NGET has proposed including some areas of additional project costs for options 2 and 3 which are associated with terminating current procurement contracts²⁴. Removing these costs produces the CBA results set out in Table 8 below.

Table 8: CBA results: supplementary analysis with contract costs removed

Description	Option 1	Option 2	Option 3
£m	Three circuits with early substation replacement	Delay by 2 years: three circuits with SF6-free substation replacement	Delay substation works by 2 years: three circuits <u>now</u> with SF6-free substation replacement later
Total NPV	286.96	288.32	308.19
Total forecast expenditure	194.91	189.53	187.41
NPV regret	0.00	1.36	21.23

2.47. We do not consider it appropriate for procurement costs associated with NGET progressing option 1 to be included within the supplementary CBA as this would suggest that consumers would be exposed to costs associated with NGET progressing procurement activities in advance of receiving project need confirmation. As shown in Table 8, applying this sensitivity means the NPV results of the supplementary CBA are marginal between options 1 and 2.

2.48. We also consider it important to note that the supplementary CBA does not include any balancing costs as a result of the ESO needing to secure associated with additional outages

²³ NGET considers there would be additional balancing costs associated with the misalignment of works between options 2 and 3 and the planned works by Engie on the Dinorwig Power Station. NGET highlighted that delaying works would lead to higher constraint costs; these costs are not included within the supplementary CBA

²⁴ Procurement activities for the Dinorwig-Pentir project are relatively advanced. Tendering took place in 2019 with the contract being awarded in 2020. This occurred because NGET had progressed the project in advance of the RIIO-2 Final Determination that it be considered through the LOTI re-opener mechanism

for options 2 and 3 due to programme misalignment with the planned Engie works. If these costs were included in the CBA, then the impact would be to increase the regret associated with options 2 and 3 in relation to option 1 thereby making it more favourable.

2.49. We note that there is a range of major interactive elements in the future constraint cost assumptions in the CBA. We observe that the Dinorwig Power Station will, on commissioning of Hinckley Point C Nuclear Power Plant, no longer need to be secured for the loss of infeed risk. Therefore, we consider it reasonable to assume the benefits of these works will be reduced over time. We also note the historic and near future contributions that Dinorwig Power Station provides to system stability and frequency response; however, we consider that these will likely be supplemented by similar additional services in the future.

2.50. NGET highlights in its FNC submission that optimal timing should be a key consideration in the assessment of the Dinorwig-Pentir project. NGET considers that the cables and substation replacement should be aligned and that the timing of its preferred option, option 1, addresses the reliability of the cables and offers the most economic and efficient cost for consumers as well as reducing the SF6 inventory and leakage at Dinorwig substation.

Costs

2.51. NGET's current costs for the three shortlisted options are set out in Table 7; the cost of its preferred option, option 1, is £194m. The project costs are at a mature stage; this provides us with a high level of cost certainty due to a proportion of the costs having been incurred to date and a significant proportion of the costs having been contracted.

2.52. The cost of each of the options considered in the CBA and associated sensitivity tests are based on capital and operational expenditure as well as on the cost of future SF6 replacement.

Our view on costs

2.53. We consider these costs provide an appropriate basis against which to robustly compare the options at this stage and we are satisfied that the costs have been applied in a consistent manner that allows for the shortlisted options to be objectively compared.

2.54. We note that there has been a significant increase in costs from NGETs RIIO-ET2 business plan submission and we will carefully consider this during the PA stage so that the final allowed costs are economic and efficient.

Our minded-to view

2.55. Given that the CBA results are finely balanced, we have considered a number of broader factors in assessing the costs and benefits to GB consumers. The key factors we have considered are outlined in Table 9 below.

Table 9: Additional considerations

Considered	Details
Asset health	<ul style="list-style-type: none"> We agree that the Dinorwig-Pentir cables require replacement; however, we note EoL is forecast as 2026 (cable 1) and 2029 (cable 2). The Dinorwig substation has a forecast EoL of 2032. Early replacement of the substation is driven by the interaction with the cables works.
Cumulative tCO ₂ e ²⁵ emissions	<ul style="list-style-type: none"> Overall, NGET forecasts that option 1 would result in the lowest cumulative tCO₂e being emitted. This is due to the work taking place for option 1 earlier than for options 2 and 3 in the supplementary CBA. However, option 1 would result in SF₆ technology being added to the network, which could compromise NGETs Net Zero ambitions. We also have limited visibility of how any future technology containing SF₆ will perform in terms of future leakage rate.
Outages and associated constraint costs	<ul style="list-style-type: none"> NGET forecasts that the programme of works associated with option 1 would minimise the number of outages required to carry out the Dinorwig-Pentir project, in part due to alignment of works with Engie’s planned refurbishment works for Dinorwig Power Station. We have no visibility of how likely it is that option 1’s programme of works would remain on track ensuring that outages are minimised. We have no visibility of whether there may be future outages that are required which are associated with other reinforcement works needed on the network nearby. This would result in further outages for the Dinorwig Power Station and further constraint costs.

²⁵ tCO₂e stands for tonnes (t) of carbon dioxide (CO₂) equivalent (e). ‘Carbon dioxide equivalent’ is a standard unit for counting greenhouse gas (GHG) emissions regardless of whether they are from carbon dioxide or another gas, such as methane

Considered	Details
Procurement process	<ul style="list-style-type: none"> ▪ While we note that NGET has already substantially progressed the procurement process for its preferred option, option 1, we do not consider that this should be a factor in our decision making. ▪ NGET has chosen to take procurement activities to a relatively advanced stage prior to its FNC. We consider that consumers should not bear the risk and costs associated with this decision. ▪ We are aware that there may be risks associated with procuring an SF6-free technology when there are limited suppliers available. However, we would encourage NGET to engage proactively with a range of contractors to ensure it has full visibility of the market.

2.56. In our RIIO-2 Final Determinations,²⁶ we agreed that the Dinorwig-Pentir cable circuits are in poor health and recognised that intervention is required.

2.57. We agree that a three-circuit solution would be optimal because of the expected reduction in constraint costs as a third cable are generally accepted to comfortably offset the cost of installation during the asset’s life.

2.58. We are disappointed that it took our suggestion for NGET to instigate the NARA update to facilitate this LOTI submission. The reported cable risk suggested that intervention was not necessary when historical performance during RIIO-1 suggested otherwise, and we are therefore unconvinced by NGET’s decision to delay the works from RIIO-1 until RIIO-2. We have considered NGET's narrative around its RIIO-ET1 cable asset management decisions and are concerned at the responses given regarding asset health scoring decision making and circuit intervention need; however, we believe the risk of a prolonged review to understand NGET’s historic asset management decisions would not be in consumers’ interests. It is important to note that the NARA is a decision support tool and not a decision-making tool, and in future NGET should consider the need to align the identified risks with the reported risk score in its narrative as well as take a more proactive overall approach to asset health intervention. We will review NGET’s scoring changes as part of our RIIO-ET1 performance report.

²⁶ [RIIO-2 Final Determinations](#), NGET Annex (REVISED), section 3.60, page 53

2.59. We have also carefully considered NGET’s long-term SF6 strategy and the interaction with these works. We accept that there is a potential risk to consumers of the costs being higher than currently estimated for this project in relation to implementing a future SF6-free solution; however, we consider that there is greater benefit to consumers from this work going ahead now rather than delaying it. Nevertheless, for the avoidance of doubt, our expectation on SF6 use going forward is that all TOs should thoroughly consider SF6 alternatives for every project given the imminent arrival of SF6 alternatives to the market. We note that others within the transmission sector, as well as NGET’s itself in other projects, have provided commitments to utilise SF6-free technology in 400kV projects.

2.60. The increased probability of failure caused by a two-year delay, higher forecasted overall cumulative tCO2e emissions, higher outage costs due to greater constraint costs because of a misalignment with Engie’s work, and stakeholder management issues around changing delivery partners and trying to still ensure timely project delivery suggests a greater level of risk associated with option 2 versus option 1. Option 1 goes some way to alleviating these risks by forecasting the lowest cumulative tCO2e emissions, avoiding misalignment costs by aligning to Engie’s programme of works, and by keeping the procurement and delivery partner in line with NGET’s existing programme strategy.

2.61. Overall, we believe option 1 presents marginally lower risk for consumers when compared against option 2.

3. Delivery model considerations

Section summary

This chapter summarises our assessment of whether the Dinorwig-Pentir project meets the criteria for competition and explains our minded-to decision on whether to apply a late competition model to Dinorwig-Pentir.

Questions

Question 4: Do you agree with our minded-to decision to retain the Dinorwig-Pentir project within the LOTI arrangements under RIIO-2?

Background

3.1. Competition in the design and delivery of energy networks is a central aspect of the RIIO-2 price controls. Competition has a key role to play in driving innovative solutions and efficient delivery that can help meet the decarbonisation targets at the lowest cost to consumers. We set out in our Final Determinations²⁷ for RIIO-2 that during the RIIO-2 period, all projects that meet the criteria for competition and are brought forward under an uncertainty mechanism²⁸ will be considered for potential delivery through a late competition model.

Does the Dinorwig-Pentir project meet the criteria for competition?

3.2. Our criteria for a project to qualify for late model competition²⁹ are that the project is:

- New
- Separable
- High value: projects of £100m or greater expected capital expenditure.

²⁷ [RIIO-2 Final Determinations](#), Core Document (REVISED), chapter 9

²⁸ [Large Onshore Transmission Investments \(LOTI\) Re-opener Guidance](#), pages 9-11

²⁹ [Guidance on the criteria for competition](#)

3.3. We consider that the Dinorwig-Pentir project meets all of these criteria.

Delivery model considerations

3.4. Since we consider that the Dinorwig-Pentir project meets the criteria for late model competition, we have also considered whether it would be in the interests of consumers for the project to be delivered through a late model of competition rather than via the prevailing LOTI mechanism under the RIIO-2 arrangements.

Relevant consideration of models

3.5. The late competition models that are available for consideration for the Dinorwig-Pentir project are:

- i. Competitively Appointed Transmission Owner (CATO) Model
- ii. Special Purpose Vehicle (SPV) Model
- iii. Competition Proxy Model (CPM)

3.6. Below we set out details of each of these models and our views on how applicable each might be to the Dinorwig-Pentir project.

CATO Model

3.7. Under the CATO model, a competitive tender would be run for the financing, construction, and operation of the proposed assets that make up the Dinorwig-Pentir project, with a transmission licence provided to the winning bidder setting out the outputs, obligations, and incentives associated with delivering the project.

3.8. NGET's procurement activities for the Dinorwig-Pentir project are relatively advanced. Tendering took place in 2019 and the preferred bidders were selected in 2020. While the merits of such an approach is debatable, the high-level delivery plan for the Dinorwig-Pentir project indicates that NGET's preferred option would have works needing to be completed between 2024 to 2026 to meet its required delivery dates.

3.9. The CATO model requires legislative changes to allow for new parties to be able to be awarded a transmission licence following a competitive tender. The government has set out

its intention to introduce the required legislation³⁰ to enable competitive tendering but it is currently uncertain when that will be in place. Given this, and the required delivery dates set out by NGET, we do not consider it feasible to apply the CATO model to the Dinorwig-Pentir project in a manner that delivers benefits to consumers without impacting on the delivery dates of the project.

SPV Model

3.10. Under the SPV model, NGET would run a tender to appoint an SPV to finance, deliver and operate a new, separable, and high-value project on the licensee's behalf through a contract for a specified revenue period. The allowed revenue for delivering the Dinorwig-Pentir project would be set over the period of its construction and a long-term operational period (currently expected to be 25 years). The SPV model was originally developed for consideration for projects where the CATO model had been discounted due to a clear expectation that underpinning legislation would not be in place in time to allow the delivery of specific projects.

3.11. Given the additional work needed to finalise the SPV model and that NGET has tied itself to a preferred contractor ahead of our FNC assessment, we do not consider that the SPV model can be applied to this project without leading to delays. For this reason, we consider that the SPV model is not an appropriate model to utilise for this project.

CPM

3.12. The CPM involves setting a largely project-specific set of regulatory arrangements to cover the construction period and a 25-year operational period for an asset (in contrast with setting arrangements for a portfolio of assets under a price control settlement). It is intended to replicate the efficient project finance structure that tends to be used in competitive tender bids for the delivery and operation of infrastructure projects.

3.13. Importantly, NGET would retain the delivery of the Dinorwig-Pentir project under CPM. This means that there is not the requirement to allow for the running of a full tender for delivery of the Dinorwig-Pentir project in the same way as the CATO or SPV models, and the CPM assessment stages follow the same process as the LOTI mechanism.

³⁰ [Energy White Paper: Powering our Net Zero Future](#), December 2020, pages 76-77

3.14. In the RIIO-2 Final Determinations³¹, we explained that due to recent market conditions and our allowed financing arrangements for RIIO-2, we may not have sufficient confidence that the application of the CPM to projects that need to start construction at the start of the RIIO-2 period would deliver benefits to consumers. This position was informed by our decision on the Hinkley-Seabank project in May 2020³².

3.15. Since our decision on Hinkley-Seabank and RIIO-2 Final Determinations in 2020, we have seen some variability in the cost of debt benchmarks used to set the financing arrangements under CPM. However, at this stage, we have not seen movements that give us confidence that CPM is likely to deliver a benefit to consumers relative to the counterfactual LOTI arrangements under RIIO-2.

3.16. There is some scope for potential market movements between now and the point at which the financing arrangements would be finalised for CPM, in parallel to the final setting of the cost allowances for the project. Notwithstanding this, we do not have sufficient confidence at this stage that application of the CPM to the Dinorwig-Pentir project would deliver benefits to consumers.

Our minded-to view

3.17. We do not consider implementing either the CATO or SPV model for the Dinorwig-Pentir project is possible without causing delay to its delivery, and we do not have sufficient confidence in the benefits to consumers that would be delivered by applying the CPM. In light of this, we are minded to retain the Dinorwig-Pentir project within the LOTI mechanism of the RIIO-2 framework.

³¹ [RIIO-2 Final Determinations](#), Core Document (REVISED), Chapter 9, section 9.8

³² [Hinkley - Seabank: Updated decision on delivery model](#)

4. Large project delivery

Section summary

This chapter sets out the large project delivery options for the Dinorwig-Pentir project and our proposed approach.

Questions

Question 5: Do you agree with our proposed approach to LPD for the Dinorwig-Pentir project?

Background

4.1. In the RIIO-2 Final Determinations,³³ we set out our approach to late delivery of large projects (>£100m). The aim of this approach is to ensure a network company does not benefit financially from a delay to delivery of such projects by using one of the following options:

- i. If a project is delivered late, we will re-profile the allowances to reflect actual expenditure to avoid the network company benefitting from delayed expenditure; or
- ii. Milestone-based approach – we will set project allowances based on the delivery of specific, pre-agreed, milestones. The allowances would only be provided following confirmation that a milestone had been delivered.

4.2. We aim to ensure consumers are protected from any delay in delivery. To this end, we will consider setting a Project Delivery Charge (PDC) for each day a project is delivered late.

4.3. We will take into account a range of factors when considering a PDC, including:

³³ [RIIO-2 Final Determinations](#), ET Annex (REVISED), page 32 onwards

- i. Estimates of potential consumer detriment;
- ii. Industry benchmarks for delay clauses on similar projects; and
- iii. The delay clause(s) that the network company negotiates with its contractor(s) for that project, which would be shared with Ofgem through the PA submission.

Our view

4.4. We note that delivery of the project will include distinctive milestones that need to be followed. For example, the replacement of the two existing cables will only be carried out after a new cable will be introduced. We therefore consider that a milestone-based approach should not be ruled out at this stage in favour of reprofiling.

4.5. We will continue our engagement with NGET to better understand its contracting strategy and the potential benefits and risks of applying the milestone-based approach in this case. We will also consider the practicality and potential complexity associated with this approach in comparison to reprofiling.

4.6. We remain of the view that there is a need to protect the interests of existing and future consumers from the impact of a delayed delivery to the project because a delay in delivery may lead to additional constraint costs as well as environmental costs as a result of inefficient outage plan and ongoing leakage of SF6 respectively.

4.7. As such, we are considering the application of a PDC for the project. We expect any decision on the appropriate level of PDC to be made as part of the PA stage. We invite NGET to continue to engage with us on the matter.

5. Next steps

Section summary

This chapter sets out the next steps in our assessment of the Dinorwig-Pentir project under the LOTI mechanism.

5.1. Our consultation on the positions set out within this document will close on 1 July 2022. We currently anticipate publishing our FNC decision around mid-summer 2022.

5.2. Once the FNC stage is complete and a decision has been made, the next phase will be the PA stage.

Appendices

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Appendix 1 – 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

N/A.

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 Dinorwig-Pentir project is 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](#)".