

Report

RIIO-ET1 price control policies relating to transmission infrastructure impacts on visual amenity

Publication date: 31 January 2019

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This report reviews and summarises the policies in the current RIIO-ET1 electricity transmission price control for transmission infrastructure and visual amenity. It is intended for stakeholders who would like to know more about Ofgem's policies in relation to addressing the impacts of transmission infrastructure on visual amenity, including when a transmission owner is developing proposals for new transmission infrastructure.

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Executive Summary

The UK's energy supply is being transformed with the increase of new low carbon generation such as wind, solar and new nuclear power stations. As a result, new transmission projects are needed to transport the power from where it is generated to where it is needed in homes and businesses across the UK.

Developing proposals for new transmission lines is a complex and sensitive process. Some stakeholders are particularly concerned about the impacts that the high voltage transmission grid can have on the visual amenity of landscapes and the socio-economic well-being of local communities. Some stakeholders have also told us they feel frustrated about how the visual impacts of the grid infrastructure are taken into account.

Some stakeholders have asked whether Ofgem's policies in the current RIIO-ET1 price control appropriately take into account all the relevant factors and set the right incentives on the transmission owners to mitigate visual amenity impacts.

We have carried out a stocktake of our RIIO-ET1 policies¹ on transmission infrastructure and visual amenity. In the stocktake, we look at how the transmission owners have responded to the visual amenity policies in the price control over the course of RIIO-ET1. In addition, we also look at policy approaches taken to grid developments in other countries, including Denmark, Netherlands, Germany and Ireland.

Based on our review, we believe that the RIIO-ET1 policies for facilitating the development of transmission infrastructure and addressing visual amenity impacts are broadly appropriate for RIIO-ET1. There is an inherent tension between the desire of some stakeholders to preserve visual amenity (usually at greater cost), a transmission owner's statutory duty to develop new transmission projects in an economical and efficient way and to meet national planning policy requirements. Ultimately the details of such infrastructure is a matter for a transmission owner to determine balancing its statutory duties and planning requirements, subject to obtaining planning consent. Our policies are intended to allow the transmission owners to mitigate visual amenity impacts where this can be justified as being in the interests of energy consumers.

Over the coming year we will be working with the transmission owners and stakeholders to consider the transmission sector policies for the next price control, RIIO-ET2, which starts in 2021. As part of this, we will also be looking at the provisions for transmission infrastructure and visual amenity that are appropriate over the RIIO-2 price control period. We encourage interested stakeholders to look out for opportunities to provide input to this policy area.

¹ For the avoidance of doubt, the electricity transmission visual amenity policies as they are set out in RIIO-ET1 Final Proposals and electricity transmission licence take precedence over the description contained in this document in the event there are any inconsistencies.

1. Introduction

Transmission lines and visual amenity impacts

- 1.1. Improving the nation's infrastructure is one of the government's top priorities, with energy identified as a key area. The supply of energy in the UK is being transformed with the significant growth of new low carbon generation such as wind, solar and new nuclear power stations. A number of these sites are located in parts of the UK where there is little or no existing transmission network or which are remote from consumption. As a result, new transmission projects are needed to transport the power from where it is generated to where it is needed in homes and businesses across the UK.
- 1.2. The most efficient way of transporting power over long distances is using a high voltage network. In the UK, the high voltage grid infrastructure primarily comprises overhead lines, supported on steel towers, as well as substations which connect generation and demand and interconnect the whole power system.
- 1.3. The prominent visual nature of the network infrastructure can have impacts on the landscape. In addition, the effects can be spread across a wide area because of the linear nature of the overhead lines.
- 1.4. Developing proposals for new transmission lines is a complex and sensitive process. Proposals for new electricity transmission projects often lead to stakeholder concerns about impacts on the landscape and on the socio-economic well-being of local communities. For example, some say that new towers and lines detract from the host landscape's natural beauty, negatively affect visitors' experiences, harm local tourism and reduce employment opportunities in local communities.
- 1.5. Some stakeholders have asked whether Ofgem, as regulator of the energy industry, is setting the right incentives on the transmission owners to mitigate the visual amenity impacts of grid infrastructure. Mitigation options potentially include installing transmission circuits underground, deploying alternative tower designs, landscaping and planting to screen or direct views etc.
- 1.6. In response to this question, we have carried out a stocktake of Ofgem's policies in the current RIIO-ET1 electricity transmission price control on transmission infrastructure and visual amenity.

Scope of stocktake

- 1.7. In this stocktake we consider:
 - Ofgem's duties as economic regulator of the energy industry and the specific price control policies introduced in the RIIO-ET1 price control;
 - the response of the three electricity transmission owners to the visual amenity policies during the RIIO-ET1 price control; and
 - a high-level review of approaches to grid development taken in Denmark, Netherlands, Germany, and Ireland.

Your feedback

1.8. If you have any feedback or comments about this report please send these to:
anna.kulhavy@ofgem.gov.uk

1.9. We'd also like to get your answers to these questions:

- Do you have any comments about the tone and content of this report?
- Was it easy to read and understand? Or could it have been better written?
- Are its findings balanced?

2. Ofgem’s role and the visual amenity policies in the RIIO-ET1 price control

Section summary

This section briefly outlines Ofgem’s principal objective and environmental duties as economic regulator of energy industry. It also explains how we apply our principal objective and environmental duties through the policies we set in the transmission price control.

Introduction

- 2.1. There are several legal provisions that control new extensions to the transmission grid in the UK. The first of these is the Electricity Act 1989. It establishes a licensing regime that authorises private companies to transmit electricity in a given geographical area. The second is the planning system through which decisions are taken about land use developments in the UK.²

Network companies' duties

- 2.2. Licensed transmission owners have a duty under section 9 of the Electricity Act 1989 to develop and maintain an efficient, coordinated and economical system of transmission. In formulating relevant proposals, licence holders or persons authorized to participate in the transmission of electricity are to have regard to the desirability of preserving natural beauty, conserving flora, fauna and geological and physiographic features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest, and they are to do what they reasonably can to mitigate any effect the proposals may have on such (paragraph 1(1) of Schedule 9 to the Electricity Act 1989).³
- 2.3. The purpose of the planning system is to balance the competing demands of new proposals for land use and environmental protection in the public interest. Transmission owners must obtain the necessary planning consents from the relevant planning authorities for all development of the transmission network.⁴

² Each of the four nations in the UK has a planning system to manage land use, although these differ in detail. Under the Planning Act 2008, transmission infrastructure projects in England and Wales are classed as Nationally Significant Infrastructure Projects (NSIP) and the UK Secretary of State is the decision maker.

³ In addition, transmission companies have several other statutory duties, provided for in Section 11A(2) of the National Parks and Access to the Countryside Act 1949 (Duty of certain bodies and persons to have regard to the purposes for which National Parks are designated) (as inserted by the Environment Act 1995); Section 5 of the National Parks and Access to the Countryside Act 1949 (National Parks); Section 17A of the Norfolk and Suffolk Broads Act 1988 (General duty of public bodies etc.); Section 85 of the Countryside and Rights of Way Act 2000 (General duty of public bodies etc.); Section 40 of the Natural Environment and Rural Communities Act 2006 (Duty to conserve biodiversity).

⁴ Transmission companies will also need to obtain consent and agreement of relevant landowners to construct transmission infrastructure.

- 2.4. In England and Wales, a new transmission line project is classed in the Planning Act 2008 as a National Significant Infrastructure Project (NSIP) and requires a Development Consent Order (DCO). Accordingly, National Grid – the licensed transmission owner in England and Wales – must submit a DCO application to the Planning Inspectorate for a proposed project. The Planning Inspectorate will make a recommendation to the Secretary of State for Business, Energy and Industrial Strategy, who will make the final decision whether to grant or refuse consent for the project.⁵
- 2.5. In Scotland, the two licensed transmission owners - SP Transmission and SHE Transmission - must apply for a Section 37 consent from Scottish Ministers for any new transmission line.
- 2.6. It is for network companies to identify what investment is needed in their networks; they are responsible for designing any works and obtaining the relevant planning authority, where appropriate, to plan and construct electricity networks.
- 2.7. In 2011, the UK government published a suite of national policy statements (NPS) on energy infrastructure for energy-related NSIP applications in England and Wales.^{6,7} The policy statements form the planning policy framework against which consent applications are tested. These inform planning applicants, the Planning Inspectorate and other interested parties on the need for energy infrastructure, and greater clarity about what forms of development are, or are not, in line with Government policy.
- 2.8. Ofgem does not have a direct role in the planning process, which manages development. Our role is to ensure compliance with the price control framework, which enables companies to address, where justified, the impacts of developments on natural beauty.

Ofgem's role

- 2.9. As explained above, as the economic regulator of the energy industry, we do not decide on the particular routing and technology of new transmission projects. This is the subject of the network company's development proposals and the planning process.
- 2.10. Our principal objective is to protect the interests of existing and future consumers in carrying out our functions. One way in which we do this is by regulating the network companies through price controls. Consumers all pay for the high voltage network through their energy bills so we use the price control to cap the revenues the transmission owners receive to ensure that consumers pay a fair price for the cost of building and maintaining the network.
- 2.11. To fulfil our principal objective in respect of investments in the transmission system, we must be satisfied that the transmission investment is economic and efficient. This

⁵ The Planning Act 2008 also sets out requirements proposers of a NSIP must follow. These include a statutory duty to consult stakeholders and take account of feedback received on proposals.

⁶ The suite of NPS documents comprise an overarching statement on energy (EN-1) and five technology specific statements including one on energy networks (EN-5).

⁷ Scottish Ministers decide on energy infrastructure consent applications in Scotland. However, as energy policy is generally a matter reserved to UK Ministers, the NPS may also be a relevant consideration in planning decisions taken in Scotland.

typically involves assessing a number of factors, for example, network users' requirements, the security and quality of supply standards, cost benefit analysis of the proposed project and alternatives, and efficient project costs, including the efficiency of the costs of any visual impact mitigation.

- 2.12. We also have statutory duties, when carrying out our functions, to have regard to the effect on the environment of energy network activities and to the purposes of National Parks, The Broads and Areas of Outstanding Natural Beauty, to conserving biodiversity, and the interests of individuals residing in rural areas.⁸
- 2.13. Our principal objective and environmental duties are applied through the price control policies we set, as well as the decision-making on individual projects.

Price control policies for transmission infrastructure and visual amenity

- 2.14. The price control has an influence on the work areas the transmission owners focus on. Therefore, the framework should assist the companies to fulfil their statutory obligations, obtain any necessary consent for development and deliver outputs that consumers value.
- 2.15. We have two policies in the RIIO-ET1 price control in respect of mitigating the impacts of transmission infrastructure on visual amenity. The first of these is that the transmission owners efficiently meet the planning requirements for new infrastructure. To support the objective of this policy we have a flexible funding framework for new transmission projects.
- 2.16. The second policy allows transmission owners to efficiently reduce the impacts of existing infrastructure on the visual amenity of national parks, areas of outstanding beauty and national scenic areas. There is a fixed amount of funding for the transmission owners to deliver mitigation projects over the price control period.

Efficiently meet planning requirements for new transmission projects

- 2.17. Our price control policy for new transmission projects allows the transmission companies to efficiently address a new transmission project's impacts, including visual, as needed to obtain planning consent. We adopted this policy position for the price control because it is consistent with:
- the transmission owners' obligation under the Electricity Act 1989 to maintain and develop its transmission system in an efficient, coordinated and economical manner, and
 - the UK Government's planning policy guidance⁹ to developers to design new transmission lines on the basis of its specific circumstances, and to balance the

⁸ Ofgem's statutory duties are provided for in: Section 3A(5) of the Electricity Act 1989; Section 11A(2) of the National Parks and Access to the Countryside Act 1949 (National Parks), (as amended by the Environment Act 1995); Section 17A of the Norfolk and Suffolk Broads Act 1988 (The Broads); Section 85 of the Countryside and Rights of Way Act 2000 (AONBs); Section 40 of the Natural Environment and Rural Communities Act 2006; and Section 3A(3)(d) of the Electricity Act 1989 as amended.

⁹ In 2011, the UK government published a suite of national policy statements (NPS) on energy

visual, environmental and other impacts of grid infrastructure, along with the overall cost to UK consumers.

- 2.18. To support the delivery of this policy objective we adopted flexible funding arrangements for new transmission projects. The arrangements also cover the efficient costs of alternative installation methods e.g. underground cables (which are more expensive than conventional overhead lines), alternative tower design, landscaping measures etc, if these are needed to obtain planning consent.
- 2.19. The funding arrangements adjust the baseline allowances depending on whether they deliver a greater or smaller amount of outputs than expected when the baseline funding was set at the start of the price control period. We decided a flexible approach was appropriate because:
- There is a large amount of uncertainty about which transmission projects are needed over the price control, and the efficient cost of delivering these is dependent on a range of factors which vary widely across individual projects.
 - The route and design of new transmission projects is subject to securing planning consent, including whether what is proposed is, or is not, acceptable in planning terms, and whether or not any additional mitigation measures are needed i.e. alternative installation methods such as an underground cable.
 - Setting a fixed funding rule in the price control about the efficient level of mitigation measures would most likely result in an inefficient outcome for consumers i.e. the amount set would be too large or too little.
- 2.20. Given the uncertainty, we decided that a flexible funding approach is likely to be more efficient than any pre-conceived assessment of the efficient level of mitigation for new infrastructure.
- 2.21. There are two mechanisms to provide a flexible framework for funding new transmission projects in the price control. The first of these is the Strategic Wider Works (SWW) process in which we assess directly the efficient costs of a new project. Our SWW cost assessment is reliant on a project reaching a certain maturity which will depend on the company's ongoing development and procurement work, stakeholder engagement on the project and also the outcome of the planning consent process.
- 2.22. The second mechanism is a volume driver mechanism which automatically adjusts the allowed funding for a project when additional mitigation is required to obtain planning consent. This is calculated using the length of mitigation (i.e. underground cabling) and the cost per km of the installation method taken from the Institution of Engineering and Technology's report '*Electricity Transmission Costing Study*'.¹⁰
- 2.23. To adjust the funding for a project, through either of the two price control mechanisms above, a transmission owner will need to justify that the mitigation

infrastructure for energy-related nationally significant infrastructure project applications in England and Wales. The suite of NPS documents comprise an overarching statement on energy (EN-1) and five technology specific statements including one on energy networks (EN-5).

¹⁰ A copy of the report is available on the IET's website:

measures are in the overall interests of consumers. Suitable justification could include:

- A strategic need to include additional mitigation measures to address adverse impacts that are not acceptable in planning terms. This might be evident from existing policy or guidance or it may become apparent, through the statutory stakeholder consultation process in the planning process, that there is a need to adopt mitigation in order to gain consent.
- Evidence that GB electricity consumers are willing to pay for the additional cost of mitigation measures to reduce or avoid adverse impacts on visual amenity in circumstances similar to the proposed project.¹¹

Reduce the visual impacts of existing infrastructure in highly valued landscapes

2.24. Our second price control policy allows transmission owners to reduce the impacts of existing infrastructure on the visual amenity of designated areas. In doing so, the transmission owners should seek to maximise the benefit to consumers from delivering these outputs efficiently using the fixed amount of funding allowed in the price control.

2.25. This policy was introduced in RIIO-ET1 for the electricity transmission sector because some stakeholders told us GB consumers will likely benefit from a reduction in the visual impacts of existing transmission lines in areas with the highest designations. Stakeholders thought that consumers would value such projects because existing transmission lines may have highly adverse visual impacts, which would likely be considered unacceptable by today's standards. Stakeholders suggested that the price control should include a defined allowance to reduce the impacts in areas with the highest national landscape designations.

2.26. One of the issues we had to address in setting this policy for RIIO-ET1 was deciding on the amount of the allowance to make available in the price control for the transmission owners to deliver these outputs. At that time, there was limited evidence about the value consumers place on mitigating the visual impacts of existing transmission lines in national parks, areas of outstanding natural beauty and national scenic areas. We decided that the transmission companies should survey consumers to inform the amount since the cost of funding for these projects would be recovered from all GB consumers.

2.27. In 2012 we set an allowance of £500m (2009/10 prices) in the RIIO-ET1 to mitigate the impacts of existing infrastructure. The amount of the allowance was informed by a National Grid survey of GB consumer willingness to pay¹² for measures to reduce

¹¹ Consumers' valuation of mitigating the impacts of transmission infrastructure on visual amenity cannot be established with certainty because it is not a market good or service. For that reason, it is estimated. This is commonly done either by 'stated preference' surveys or the 'revealed preference' method. In stated preference surveys, consumers are asked how much money they would be willing to pay for alternative installation methods that have fewer visual impacts. In the revealed preference approach, consumers' valuation of visual amenity is derived from consumer behaviour or market prices for other goods/services that also have visual amenity attributes. For example, travel costs are used to estimate how much people value the visual and landscape qualities of the destinations that they visit. One limitation of the revealed preference approach is that it only captures consumers' 'use' valuation. Some consumers, who do not visit particular landscapes, also place a value on avoiding harm to the visual amenity of these areas.

¹² Please see National Grid's website for the willingness to pay survey report:

the impacts through measures such as replacing overhead lines with underground cables, re-routing of existing lines and softer engineering works, e.g. tree screening and landscaping.

- 2.28. The £500m allowance is available to any of the three electricity transmission owners to reduce visual impacts of transmission lines in national parks, areas of outstanding beauty and national scenic areas. To use the allowance, a transmission company must first develop and submit to us a policy for delivering visual amenity outputs in designated areas. Each TO's policy must fulfil certain requirements set out in its licence. This includes proposing a method for evaluating opportunities to reduce the effect of its transmission network in designated areas, considering cultural, historical and ecological factors, involving stakeholders in project selection and economic efficiency.

Summary

- 2.29. Ofgem's primary objective is to protect the interests of existing and future consumers. One way we do this is by regulating the transmission network companies using the price control framework. We use the price control to cap the revenues the transmission owners receive to ensure that consumers pay a fair price for the cost of running the network.
- 2.30. The current price control, RIIO-ET1, includes two policies for mitigating the impacts of transmission infrastructure on visual amenity. The first policy allows the transmission owners to efficiently to deal with any issues in planning terms of new transmission infrastructure projects. There is a flexible funding mechanism in the price control to support this. The funding adjustment is triggered when the transmission owner can demonstrate that the mitigation measures are needed to obtain planning consent, and/or that they are in the overall interests of GB consumers.
- 2.31. The second price control policy allows the transmission owners to mitigate the visual impacts of existing transmission lines in landscapes with the highest national landscape designation. There is up to £500 million of funding that can be used for the delivery of these outputs in the current price control. The transmission owners must involve stakeholders in the evaluation and selection of projects in order to maximise the consumer benefit of the mitigation outputs that are funded under the price control.

3. Experience of the RIIO-ET1 price control visual amenity policies

Section summary

This section looks at the operation of the RIIO-ET1 visual amenity policies since the start of the price control in April 2013. It summarises the related activities undertaken by the three transmission owners, and Ofgem’s involvement in implementing the visual amenity price control policies.

New transmission projects

- 3.1. In section 2 we described that the price control policy for new transmission projects allows the transmission owners to efficiently meet the relevant UK planning requirements for new transmission projects. To support this policy, we introduced flexible funding mechanisms. These adjust the transmission owners’ cost allowances if mitigation measures are necessary in planning terms, and/or if they are in the overall interests of consumers.
- 3.2. One of the mechanisms is the Strategic Wider Works (SWW) arrangements. Under the SWW arrangements, a transmission company is required to submit to us information about its project when it is developing a new large transmission project.¹³
- 3.3. The development of transmission projects is both a complex and long process (often lasting more than five years). A transmission owner typically starts with scoping a wide range of strategic options to meet the requirements of network users and the network technical standards, and filters and refines these over time, taking into account planning policy and guidance, environmental factors, feedback from public consultation, and efficient project costs.
- 3.4. There are three stages in our SWW assessment. These are the initial needs case, the final needs case and an assessment of the efficient project costs.¹⁴ We’ve adopted a staged approach so that we can review, in real time, decisions taken by a transmission owner to refine the project at key points in the development lifecycle and to assess the efficient costs of the final project design.
- 3.5. In our SWW assessment, we do not decide on the particular routeing and technology of new transmission projects. This is the responsibility of the transmission owners, subject to obtaining the necessary planning consent. The focus of our assessment is on reviewing the transmission owner’s key project design decisions to ensure that the transmission owner is meeting its duties under the Electricity Act 1989. In doing

¹³ The SWW arrangements only apply to new transmission projects if the total project cost is expected to exceed a value threshold specified for each TO in the RIIO-ET1 price control. The value thresholds are: £500m for National Grid; £100m for SP Transmission; and £50m for SHE Transmission.

¹⁴ We added the initial needs case stage to our SWW assessment in 2017. Prior to 2017, SWW projects were subject to a two stage assessment. For further information about our SWW assessment is on our website: <https://www.ofgem.gov.uk/ofgem-publications/125277>

so we also take into account relevant obligations on the transmission owner, such as planning guidance to have regard to amenity considerations and the efficiency of its proposed project.

- 3.6. Since the start of the RIIO-ET1 price control, we’ve assessed SWW submissions from National Grid and SHE Transmission on five new transmission projects.¹⁵ Four of these include explicit consideration of the projects’ impacts on the visual amenity of the host landscape. The following table summarises the project specific visual amenity issues and the consideration of these as part of the SWW assessment.

SWW projects and visual amenity considerations

Project overview	Visual amenity impacts	Ofgem’s position and views
<p>2013</p> <p><i>SHE Transmission: Beaully-Mossford</i></p> <p>Replacement of an existing single circuit transmission line with a new double circuit 132kV overhead line between Corriemoillie substation (near Mossford) and Dunmore, and 3.5km underground cable between Dunmore and Beaully.</p> <p>Project assessment of efficient costs</p>	<p>The underground cable section was originally the subject of a planning condition for a related reinforcement project between north and south Scotland, known as the Beaully-Denny project. The cable section was required to reduce the number of overhead lines extending north of the substation in Beaully. The subsequent need for a larger capacity circuit between Beaully and Mossford meant that the cable section was larger (and more expensive) than originally planned. As a result, SHE Transmission proposed that the underground cable section be included as part of the Beaully-Mossford project.</p>	<p>We transferred the cost allowance for the cable and associated works that were in the Beaully-Denny construction costs to the Beaully-Mossford project as a contribution to the cost of this element of the project, on the basis that it would be increasing the original planning capacity.</p>
<p>2015</p> <p><i>SHE Transmission: Caithness-Moray</i></p> <p>A new 1,200MW (160km) subsea cable between Spittal and Blackhillock in northern Scotland</p> <p>Final needs case decision</p>	<p>A cost benefit analysis of reinforcement options included a valuation of the visual amenity impacts that would be avoided by a subsea cable option compared to an onshore option. The value of avoided visual amenity impacts was based on a study that estimated consumer willingness to pay to mitigate residual visual amenity impacts of the Beaully-Denny project (i.e. after taking into account the mitigation measures implemented on the latter project).</p>	<p>We agreed that a valuation of residual visual amenity impacts that arise from an onshore reinforcement is a relevant consideration for assessing the overall consumer benefit of the different options. The addition of this strengthened the net benefit of the Caithness-Moray subsea cable over an onshore reinforcement.</p>
<p>2017</p> <p>Final needs case</p>	<p>Replacing the existing distribution line with a higher capacity line would require larger towers, and would have an</p>	<p>We considered that National Grid’s plans to underground a section of the new circuit through the Mendip Hills AONB are reasonable, given its</p>

¹⁵ Additional information on the projects assessed under the SWW mechanism is on our website: <https://www.ofgem.gov.uk/electricity/transmission-networks/critical-investments/strategic-wider-works>

Project overview	Visual amenity impacts	Ofgem’s position and views
<p><i>National Grid: Hinkley Seabank connection</i></p> <p>Replace an existing 132kV distribution overhead line with a 400kV double transmission circuit between Bridgewater and Seabank. This would include installing T-pylons along 47km of the route instead of lattice towers, and installing 8km of underground cable in the Mendip Hills Area of Outstanding Natural Beauty (AONB).</p>	<p>impact on the visual amenity of the host landscape. National Grid and local stakeholders considered that T-pylons, which are shorter than lattice towers, would have a smaller impact on visual amenity of the local landscape. National Grid also considered that a new high capacity line through the Mendip Hills Area of Outstanding Natural Beauty would not be acceptable in planning terms, due to the high amenity value of the designated landscape. Therefore, it proposed to install underground cable for this section of the project. In 2016 National Grid obtained a Development Consent Order (DCO) from the Secretary of State for its proposed project design of the Hinkley Seabank connection.</p>	<p>duties relevant to AONB as well as planning guidance to give substantial weight to designated areas and avoid, if possible, these areas. However, we considered that National Grid is yet to provide justification that using T-pylons is in consumers’ overall interests. We have asked for evidence that National Grid used to:</p> <ul style="list-style-type: none"> - Decide to use T-pylons i.e. what is the merit of the T-pylon compared to a traditional lattice tower; and - Quantify the visual benefit of T-pylons is commensurate with the additional costs compared to the traditional lattice towers. <p>Alternatively, National Grid could provide evidence of consumer willingness to pay the additional cost of T-pylons compared to traditional lattice towers. We will consider the new evidence that National Grid provides as part of its submission for the next stage in the SWW process (the project assessment of the efficient costs).</p>
<p>2016 Initial needs case</p> <p><i>National Grid: Northwest coast connection</i></p> <p>Replace existing 132kV distribution line with a new 400kV double circuit OHL heading north to main integrated transmission system (MITS) at Harker substation. Also build a 400kV double circuit south to MITS substation in Heysham. The southern circuit to include 23km of underground cabling through the Lake District National Park, and a 22km tunnel under Morecambe Bay.</p>	<p>The location of the Moorside site, to the west of the Lake District National Park, meant that mitigating the impacts of the project on the park and its setting was a key consideration in obtaining planning consent. National Grid proposed to underground the full 23km section which goes through the national park on basis that undergrounding less than all 23km would be difficult to justify in terms of impact on the park, and that this would be unlikely to receive planning consent.</p>	<p>We looked at National Grid’s justification for the proposed mitigation. In our view, National Grid’s proposal represents a reasonable initial position for public consultation on the project given its duties to have regard to the purpose of national parks as well as planning guidance to avoid installing new overhead lines in these areas if possible. Noting that further changes to the final design could result from the public consultation process on the project, we consider that the planning process, overseen by the Planning Inspectorate and the Secretary of State, is the appropriate way of refining the final design of the project that is acceptable in planning terms.</p>

3.7. The above table illustrates some of the different circumstances in which visual amenity issues have arisen across new transmission projects during RIIO-ET1. It shows that the transmission owners typically evaluate each project on a case by case basis, to ensure visual amenity impacts are acceptable in planning terms. Proposals include mitigation in their design, for example, OHL routeing to avoid sensitive areas. Where such measures are insufficient to make proposals acceptable in planning terms, proposals have also included additional mitigation, such as putting the new line underground or alternative installation methods, where these are justified by strategic need or consumer willingness to pay.

Mitigating the visual amenity impacts of existing infrastructure

- 3.8. In section 2 we outlined the price control policy for transmission owners to reduce the impacts of existing infrastructure on the visual amenity of designated areas. To support this policy objective, up to £500 million is available during RIIO-ET1 for the delivery of these outputs. Before requesting funding, a transmission owner must involve stakeholders in the evaluation and selection of projects.
- 3.9. Over the course of RIIO-ET1, we have reviewed and approved a policy from each of the transmission owners that details how they will identify and prioritise mitigation projects for existing infrastructure. These policies must fulfil certain requirements set out in the transmission licence. These include a method for evaluating opportunities to reduce the effect of its transmission network in designated areas, considering cultural, historical and ecological factors, involving stakeholders in project selection and promoting economic efficiency.¹⁶
- 3.10. All three transmission owners have been working with stakeholders over the course of RIIO-ET1 to shortlist mitigation projects within designated areas.¹⁷ The types of mitigation considered include replacing sections of existing overhead lines with underground cable, as well as landscape enhancement projects to reduce the impact of existing lines on people’s experience of the designated area.
- 3.11. Based on the progress made with stakeholders on project selection to date, we expect all the TOs to submit funding requests for mitigation projects over next two to three years, that in total value will be equal to the £500 million provision allowed for RIIO-ET1.¹⁸

Summary

- 3.12. This section has briefly summarised the experience of the current price control RIIO-ET1 visual amenity related policies. Generally, the policies are working satisfactorily, and are facilitating TOs to deliver new grid developments that efficiently deal with any issues in planning terms, or address the adverse visual impacts of existing infrastructure in areas with the highest value amenity.

¹⁶ Further detail on the transmission owners’ policies is available on our website:

<https://www.ofgem.gov.uk/electricity/transmission-networks/network-price-controls/visual-amenity>

¹⁷ More information about the shortlisted mitigation projects is available on each TO’s website:

<https://www.nationalgrid.com/planning-together/visual-impact-provision-vip>

<https://www.ssen-transmission.co.uk/sustainability-and-environment/vista/>

https://www.spenergynetworks.co.uk/pages/view_project.aspx

¹⁸ To date we have approved approximately £82 million (2009/10 prices) for mitigation projects.

Further detail on these is available on our website:

<https://www.ofgem.gov.uk/electricity/transmission-networks/network-price-controls/visual-amenity>

4. Approaches taken to grid development in other countries

Section summary

This section briefly highlights approaches taken in Denmark, The Netherlands, Germany and Ireland in relation to grid development and visual amenity. The purpose of this section is to provide an international comparison to the UK arrangements discussed in the previous sections of this document.

Denmark

- 4.1. In recent years there has been a strong political will for underground cabling in preference to overhead lines. In 2007, the Danish parliament established a committee to carry out technical analysis of network requirements with landscape analysis and visualisation. It investigated whether a larger proportion of the network could be underground. This resulted in guidelines in 2008 from the Danish parliament to the national transmission system operator, Energinet, on the principles for network expansion in Denmark. These were:
 - Underground new and existing 132/150 kV lines by 2030;
 - Lay new 400 kV lines as underground cables if technically possible;
 - "Beautification" of the existing 400 kV overhead lines through partial undergrounding or measures such as new transmission towers with lower impact on the surrounding landscape.
- 4.2. In 2009 Energinet developed a cable action plan following the political agreement on the guidelines for transmission grid expansion. The cable action plan was developed to underground 3,200 circuit kilometres of 132-150kV overhead lines when they came up for renewal over a period of 20 years. It also identified six projects on the 400kV grid to reduce the visual impact in areas of special interest.
- 4.3. However, in 2017, the Danish parliament decided to adapt the 2008 guidelines to reduce costs of the cable action and beautification plans. The guidelines to Energinet now require that:
 - the existing 132/ 150 kV overhead lines are maintained (rather than be replaced with underground cables); and
 - new 400 kV lines will be established as overhead lines, possibly with shorter sections being laid as cables in scenic areas, near cities.
- 4.4. There is the possibility of undergrounding parts of the 132 - 150kV grid in the vicinity of 400kV overhead lines to lessen the overall impact on the landscape. Under the new cable plan all new transmission lines at 132-150 kV level must still be underground.

- 4.5. Although the new policy regarding undergrounding has been revised, the cable plan to underground existing 400 kV lines at six locations has been retained. To date, three of six projects to replace overhead lines with underground cables to reduce visual impact have been completed.

Germany

- 4.6. The German government has put in place several policies to modify the planning and construction regulation to facilitate the rapid expansion of the electricity grid.
- 4.7. The Energy Line Development Act (EnLAG) was introduced in 2009 to accelerate grid expansion and facilitate the increasing production of renewable energy. The EnLAG identifies 24 projects for development. Of these, the EnLAG identified four projects as pilots where the transmission system operator could consider partial undergrounding in order to overcome challenging planning constraints. The extent to which sections of the pilot projects are to be placed underground is to be established for each project on a case-by-case basis.
- 4.8. In January 2016, the German government also introduced the Act to Change Provisions of Law on Energy Cable Construction to increase the use of underground High Voltage Direct Current (HVDC) cables. The legislation establishes that priority will be given to building new electricity highways (using HVDC transmission lines) as underground rather than overhead lines.
- 4.9. Although it is more expensive, the German government deem that undergrounding is a one-off investment cost, and that it increases the level of public acceptance, as the impact on the landscape is much smaller.

Netherlands

- 4.10. In 2010, the Dutch government decided to cap the total length of the overhead transmission and distribution network. This is not a law but an understanding with the regulator, and has been included in the Dutch government's policy as set out in the third Electricity Supply Structure Plan (Structuurvisie Elektriciteits Voorziening III).
- 4.11. In effect, the policy means that if a new overhead 380 kV line is installed, an existing connection (with a lower voltage level) will need to be transferred below ground at another location or combined in existing pylons. Therefore, the total number of kilometres of overhead electricity lines remains the same.

Ireland

- 4.12. In contrast to the other three countries, the Irish government does not have a specific stated policy regarding the circumstances in which electricity transmission infrastructure must be undergrounded. Similar to the UK, it has policies in place that require developers to undertake specific environmental assessments of a project's impacts, through the development process.
- 4.13. EirGrid, Ireland's transmission system operator, follows a project-by-project evaluation when considering overhead/undergrounding cables.

Summary

- 4.14. The brief summary of approaches taken in some European countries shows that stakeholder concerns about new grid projects are common. In Denmark, Germany and the Netherlands this has resulted in clear political guidance to underground some of the new transmission network required to accommodate additional renewable energy.
- 4.15. Nonetheless, the higher costs of undergrounding compared to overhead lines are also an important consideration. Political guidelines in Denmark, Germany and the Netherlands balance the benefit of undergrounding a new grid project (in terms of increasing public acceptability) with its costs either by limiting undergrounding to segments of a project, to be decided on a case-by-case basis, or by requiring underground cabling of a lower voltage line.