RIIO T1

nationalgrid

Consumer Willingness to Pay research

National Grid
Electricity Transmission

June 2012

Target audience

All stakeholders

About this report

This report sets out the results of the research undertaken with consumers to understand their willingness to pay to address the visual impact of existing electricity transmission infrastructure in nationally designated landscapes in Great Britain (National Parks, Areas of Outstanding Natural Beauty and National Scenic Areas). The report summarises the findings and sets out a recommendation for the size of an allowed fund to cover such mitigation over the RIIO-T1 period.

Consumer Willingness to Pay research

Table of contents

Overview

1 Building on our previous research conducted prior to our July 2011 RIIO-T1 submission, between January and May 2012 we undertook a piece of research to establish how willing electricity household consumers are to pay for mitigating the visual impact of existing transmission infrastructure in nationally designated landscapes in Great Britain, i.e. National Parks, Areas of Outstanding Natural Beauty in England and Wales, and National Scenic Areas in Scotland.

2 This report summarises the findings from this research and sets out a recommendation for the size of a potential allowance for the RIIO-T1 period, from which Transmission Owners (TOs) in Great Britain can fund schemes which will help to mitigate the visual impact of their existing infrastructure in these designated landscapes. More information regarding Ofgem's approach to setting this allowance can be found in their Factsheet 109[1].

3 This piece of consumer research consisted of a two stage approach encompassing a qualitative phase (10 focus groups across mainland Great Britain) followed by a quantitative phase (1,002 nationally representative telephone interviews). Following a formal tender process, Accent, a market research agency, were appointed to carry out the research on our behalf. Accent specialise in Willingness to Pay (WTP) consumer research. To derive consumers' views on their WTP, Accent utilised a stated preference choice experiment exercise in the quantitative phase of the research, in line with accepted current best practice and as endorsed by London Economics in their report on this topic[2].

4 Consumers told us that financial pressures have increased over the past two years and affordability is an issue. Household bills have been going up and at the same time over half of respondents have seen their household income either falling or remaining the same. Over 70% of respondents felt these changes would last for at least another two years. Only 14% of respondents have seen their household income increase sufficiently to match or exceed price increases.

5 Most respondents said that electricity transmission infrastructure is necessary and unavoidable, although they also think it is ugly. 41% of respondents do not feel strongly about electricity transmission infrastructure and 42% do not notice it. Overall, consumers think there is a need to lessen the visual impact of transmission infrastructure (59%) and that the countryside would be improved by doing so (64%). However, 44% believe this is not a good use of

[1] http://www.ofgem.gov.uk/Media/FactSheets/Documents1/109%20visual%20amenity%20factsheet.pdf

[2] http://www.ofgem.gov.uk/Networks/Trans/PriceControls/RIIO-T1/ConRes/Documents1/visualamenity.pdf

money at this time and nearly a half (47%) would find it difficult to pay more on their electricity bill.

6 When it comes to addressing the visual impact of the transmission infrastructure, undergrounding was the first choice of just over half (55%) of the respondents. This was followed by screening (by planting trees) at 25%. This was also reflected in the outcome of the stated preference exercise with consumers placing undergrounding first followed by or on a par with screening (depending on the scenario).

7 In the qualitative phase of the research there was very little willingness to pay across all the groups. Where consumers did provide WTP figures it was among the ABC1 socio-economic groups and rural groups but these people were still in a minority.

8 In the quantitative phase nearly 80% of respondents indicated a willingness to pay to mitigate the visual impact of transmission infrastructure. The different scenarios provided in the choice experiment have resulted in a range of mean WTP figures.

9 Accent applied a hypothetical bias scaling factor of 0.74 to the inferred WTP estimates to account for consumers potentially overvaluing their answers against what they would actually pay. Please see Accent's report (Appendix A) for details of how this scaling factor was derived.

10 In considering what allowance to recommend, we sought to strike a balance between the contrasting feedback regarding affordability and willingness to pay received through the qualitative and quantitative phases of the research. Taking all of this feedback into account, we have recommended the following approach for an allowance to be made available for all TOs:

a) The size of the available allowance should be in the region of £1.1bn (in 2009/10 prices) for the eight year period (2013/14 to 2020/21). This takes into account consumers' preferences for undergrounding and screening as their favoured forms of mitigation. It is at the bottom of the range of values suggested by the quantified research in relation to these two forms of mitigation, recognising consumers' concerns about affordability. However, it would be sufficient to fund around 45 miles of undergrounding, which is close to the top end of the scenarios for which WTP was sought (50 miles of undergrounding).

b) The available allowance should be set as a total for the eight years rather than being divided into annual limits because projects will take a number of years to design and build, so costs are likely to be spread across a number of years. It also seems likely that the construction phases of any such projects (when the majority of costs are incurred) are likely to take place in the second half of the RIIO-T1 period.

11 Whilst we are recommending an allowance of £1.1bn for Great Britain, we recognise that this would provide a cap on expenditure rather than an absolute investment level. For National Grid specifically, the actual level of

investment in practice would be driven strongly by stakeholders' views on priorities as well as technical considerations associated with specific project options and any constraints arising from our broader investment plan. On the first point, the majority of respondents in the survey said that the priority for this type of investment (in addition to new transmission lines) is existing infrastructure once the infrastructure is coming to the end of its life and is planned to be replaced. Our RIIO-T1 business plan[3] includes the refurbishment of elements of the infrastructure within designated landscapes during the period to 2021, rather than their full replacement. Given respondents' views on priorities, we would expect these lines to be amongst the candidates to be funded by any such allowance.

12 It is our intention to update our stakeholders on the findings from this research and discuss with them how we develop an approach to identify schemes which will be funded by any subsequent allowance which may be granted by Ofgem.

13 Accent's report covering the research undertaken and the resultant findings can be found in Appendix A.

[3] Our plan is available via http://www.talkingnetworkstx.com/electricityplan/

Research methodology undertaken

14 We commissioned Accent, a market research company which specialises in consumer WTP research, to carry out this piece of research. We have aimed to follow best practice in this area and undertook two stages of research. The first stage comprised a qualitative phase of ten focus groups followed by a quantitative survey of 1,002 consumers which included a stated preference choice experiment exercise.

15 Full details of the research undertaken can be found in Accent's report in Appendix A.

Qualitative

16 The qualitative stage investigated consumers' attitudes towards transmission infrastructure, the terminology most easily understood by participants and the usefulness of the supporting materials which we were proposing to use for the following stage of research. It also established the broad parameters for WTP that were used in the subsequent quantitative stage.

17 Ten focus groups were held across mainland Great Britain. Locations were selected to provide coverage of urban and rural locations in England, Wales and Scotland. Across these locations the group structure included a range of ages, socio-economic groups and gender, and each group included at least two respondents who were 'users' of the countryside.

18 Each focus group lasted for two hours, which is slightly longer than normal practice, as we wanted to make sure consumers had the time to fully understand the topics and provide us with their views.

A breakdown of the location and makeup of the focus groups

Region	Urban/Rural	Location	Age	SEG
Midlands	Urban	Birmingham*	40-59 yrs	C2DE
South West	Urban/rural	Plymouth	16-39 yrs	ABC1
South	Rural	Arundel	60+ yrs	ABC1
London	Urban	Central	60+ yrs	C2DE
East of England	Urban/rural	Ipswich	40-59 yrs	C2DE
North East	Rural	Scarborough	16-39 yrs	C2DE
North West	Urban	Manchester	16-39 yrs	ABC1
Wales	Rural	Carmarthen	40-59 yrs	ABC1
Scotland	Urban	Glasgow**	40-59 yrs	C2DE
Scotland	Rural	Perth	60+ yrs	C2DE

*viewed by National Grid ** viewed by Scottish Power

Quantitative

19 The quantitative stage consisted of interviewing 1,002 consumers from across Great Britain. The interviews were carried out over the telephone with consumers receiving the supporting material either via e-mail or through the post. Nationally representative quotas were set for the profile of those interviewed and any discrepancies were weighted to the 2001 Census statistics on Household Reference Person (used as a proxy for bill paying).

20 The survey consisted of a series of questions covering topics including use of the countryside, electricity bills and household finances, electricity infrastructure, as well as diagnostic and classification questions. Within the questionnaire there was a stated preference choice experiment exercise. Details of this exercise can be found in Accent's report in Appendix A. The questionnaire used for this research can be found in Appendix B and the data tables from the survey can be found in Appendix C.

21 An initial pilot of the questionnaire was carried out to test its length, the terminology used, the supporting material and the stated preference design. Following the pilot, the length of the survey was reduced by making a number of the questions more concise, the supporting show material was refined and the values in the stated preference choice experiment exercise revised.

22 The stated preference exercises were found to be working well in the pilot and respondents reported good understanding of the task.

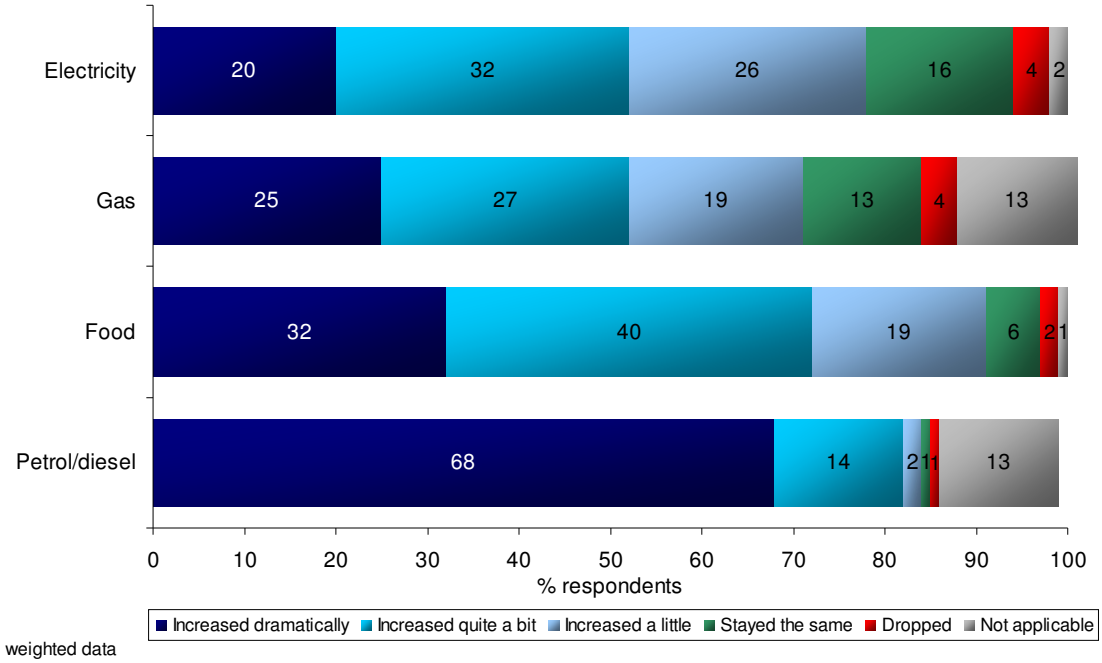
Summary of the findings

23 The research has provided a wealth of information through both the qualitative and quantitative phases. This section provides a summary of the main findings under the headings of affordability, use of the countryside, attitudes to infrastructure and mitigation, and willingness to pay. Full details of the findings can be found in the Accent report in Appendix A.

Affordability

24 Consumers told us that household finances have been under pressure for the past two years as bills have increased and incomes for many have either remained static or reduced.

Increase in the past two years in household bills

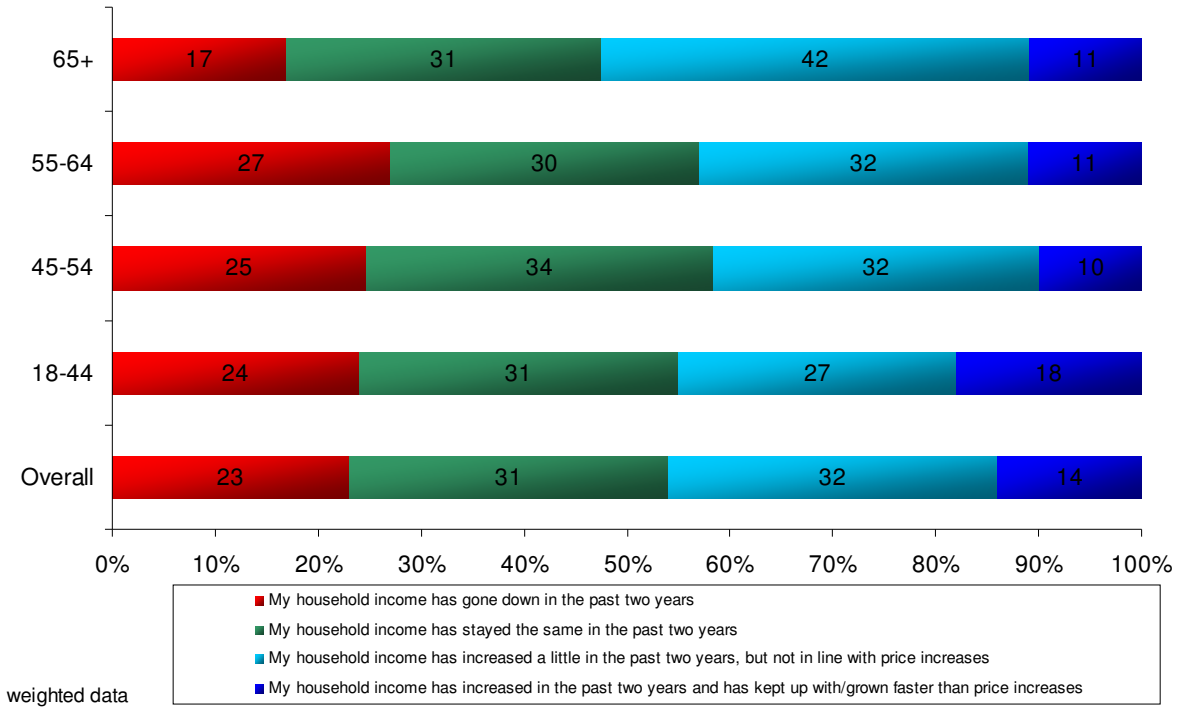


weighted data

25 Total household incomes (before deductions) have fallen or remained the same over the past two years for 54% of respondents. For a further third (32%), total household incomes have risen over the past two years but not in line with price increases.

26 Most of those consumers who have experienced a change in their total household incomes over the past two years think these changes will last for some time, with 35% thinking they will last at least another two to five years, and 38% thinking they will last even longer.

Household income status over past two years, by age



Use of the countryside

27 The majority of consumers who took part in the survey visited the countryside. Over half of the consumers who took part in the questionnaire who do not live in an AONB or NSA visited one at least three or four times a year, with a further 28% visiting at least once or twice a year.

28 Thirty-nine percent of respondents who do not live in a National Park visited one at least three or four times a year with a further 32% visiting at least once a year.

29 Nearly three quarters (72%) of those who live in urban or town and fringe areas visit a non-designated rural area at least three or four times a year with a further 11% visiting at least once or twice a year.

Attitudes to infrastructure and mitigation

30 Most consumers said electricity transmission infrastructure is necessary and unavoidable (62%) but ugly (55%).

31 Nearly half (48%) think it is important to invest in lessening the visual impact of existing electricity transmission infrastructure compared to:

a) 90% who think that investing in making homes more energy efficient is important

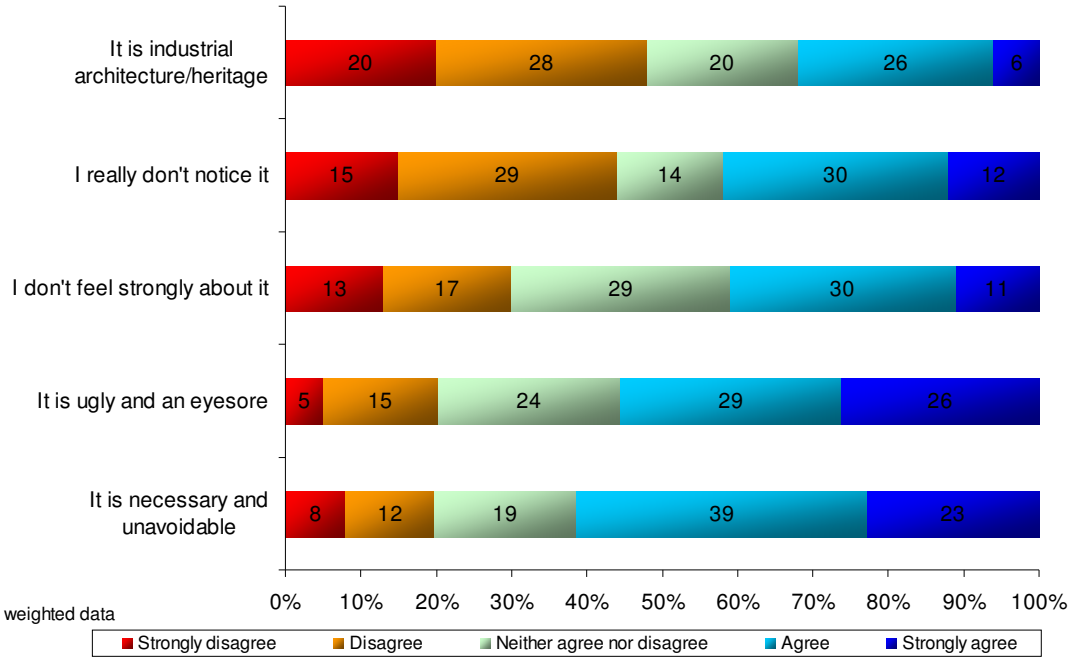
b) 83% saying investing in renewable energy sources is important, and

c) 80% thinking that cleaning rivers and other waterways is important

32 Investment in transport infrastructure is considered to be less important, with 32% saying building roads is important and 35% saying that investing in high speed rail links is important.

33 Two-fifths of respondents do not feel strongly about electricity transmission infrastructure (41%) and 42% said they do not notice it.

Attitudes towards electricity transmission infrastructure



34 In a straightforward ranking question, undergrounding is the first choice for more than half (55%) of respondents as a method of lessening the visual impact of transmission infrastructure on the countryside. Screening with trees was second with 25% of respondents placing this as their first choice. The new design T-pylon[4] was third and rerouting of a transmission line fourth. This order was also reflected by consumers in the stated preference exercise.

35 Overall consumers think there is a need to lessen the visual impact of transmission infrastructure (59%) and that the countryside would be improved by doing so (64%).

36 When asked about paying for mitigation, 44% believe this is not a good use of money at this time whereas 40% think that it is. There is a similar split as to whether it is fair to ask consumers to pay for these improvements. Forty

[4] http://www.ribapylondesign.com/

percent think it is fair but 41% disagree. Nearly half (47%) said they would find it difficult to pay more on their electricity bill at the present time.

37 Regarding the prioritisation of work, the majority of respondents (63%) would prioritise the mitigation of both existing and future infrastructure, with the most widely held preference (45%) being the prioritisation of existing infrastructure when it needs replacing, together with future infrastructure. An additional 25% would prioritise only existing infrastructure when it needs replacing.

Willingness to pay

38 In the qualitative phase of the research there was very little willingness to pay across all the focus groups. At six of the ten focus groups, participants were not willing to see any increase in their bills to mitigate the impact of existing transmission lines in designated areas. Of the four groups that did indicate some willingness to pay, the majority were made up of socio-economic groups ABC1 and the groups were held in more rural locations. Within these groups it was only a minority of people who indicated any willingness to pay, and this was mainly focused on future work or on existing infrastructure when it has come to the end of its life and needs replacing.

39 In the quantitative phase consumer estimates for WTP were derived through a stated preference choice experiment based on the best-worse ranking of alternatives arranged in choice sets for respondents. Details of the exercise undertaken and an explanation of the methodology used can be found in Accent's main report and their appendix (see Appendices A and B).

40 Nearly 80% of respondents selected costed scenarios from the stated preference exercise from which the WTP figures were estimated. The c.20% who had a zero WTP were less likely to see the need for mitigation, felt generalised payment was unfair and said they had economic constraints to paying more.

41 Undergrounding is the most highly valued mitigation measure, followed by screening with trees. Replacement with T-pylons and rerouting are less valued. Short length mitigation projects of 5 and 10 miles do not show significant sensitivity to either location or length. For programmes of 20 miles, consumers are more sensitive to location and value mitigation in AONBs/NSAs higher than in National Parks or other rural areas.

42 The scenario with the highest WTP is a 50 mile programme of undergrounding in AONBs/NSAs. Consumers are willing to pay an additional £20.33 per annum on average to achieve this level of mitigation (marked as 'A' in the table below). The same scenario in National Parks is also similarly valued at £18.43 ('B', with no statistically significant difference to AONBs/NSAs), while in other rural areas it is lower at £14.81 (C).

Inferred WTP estimates for different mitigation scenarios from choice data (£ per household, per year, for eight years)

Measure	Location		
	in other rural areas	in National Parks	in AONBs/NSAs
at least 5 miles			
T-pylons	1.75	1.75	1.75
rerouting	0.70	0.70	0.70
screening	8.65	8.65	8.65
undergrounding	13.40	13.40	13.40
at least 10 miles			
T-pylons	1.75	1.75	1.75
rerouting	0.70	0.70	0.70
screening	8.65	8.65	8.65
undergrounding	13.40	13.40	13.40
at least 20miles			
T-pylons	1.75	1.75	4.62
rerouting	0.70	0.70	3.57
screening	8.65	8.65	11.52
undergrounding	13.40	13.40	16.27
at least 50 miles			
T-pylons	3.16	5.54	6.03
rerouting	2.11	4.49	4.98
screening	10.06	12.44	12.93
undergrounding	C 14.81	B 18.43	A 20.33

2012/13 price base

43 Accent applied a hypothetical bias scaling factor of 0.74 to the inferred WTP estimates to account for consumers potentially overvaluing their answers against what they would actually pay (please see the Accent report in Appendix A for details of how this scaling factor was derived). The outcome following the application of the scaling factor is summarised in the table below.

Inferred WTP estimates for different mitigation scenarios from choice data (£ per household, per year, for eight years) – scaled by 0.74

Measure	Location		
	in other rural areas	in National Parks	in AONBs/NSAs
at least 5 miles			
T-pylons	1.30	1.30	1.30
Rerouting	0.52	0.52	0.52
Screening	6.40	6.40	6.40
undergrounding	9.92	9.92	9.92
at least 10 miles			
T-pylons	1.30	1.30	1.30
Rerouting	0.52	0.52	0.52
Screening	6.40	6.40	6.40
undergrounding	9.92	9.92	9.92
at least 20miles			
T-pylons	1.30	1.30	3.42
Rerouting	0.52	0.52	2.64
Screening	6.40	6.40	8.52
undergrounding	9.92	9.92	12.04
at least 50 miles			
T-pylons	2.34	4.10	4.46
Rerouting	1.56	3.32	3.69
Screening	7.44	9.21	9.57
undergrounding	10.96	13.64	15.04

2012/13 price base

Considerations for a national allowance

44 Ofgem has said there is to be a national allowance to enable the Transmission Owners to apply for money to fund schemes which address the visual impact of their existing infrastructure in designated landscapes. Our understanding is this will be a 'use it or lose it' allowance which means any funding will only be triggered when a suitable project is proposed and approved.

45 Through this research consumers have provided WTP estimates for a number of types of mitigation which could be used to help inform the size of any allowance.

46 Consumers have also said throughout both phases of this research how their household finances have, for the majority, changed for the worse and that they do not expect their financial situation to improve in the foreseeable future.

47 We spoke to Accent regarding the apparently conflicting views given by consumers that times are difficult financially yet the majority of consumers appear willing to pay for mitigation work. Accent said this is not an unusual outcome, given that the stated preference exercise is designed to reveal consumers' real views on value through the trading of options, rather than a single response to a one-off question.

48 Having said this, the current economic situation being faced by consumers has to be taken into account when considering the size of any allowance. Consideration should also be given to the findings that the majority of consumers view the existing infrastructure as necessary and unavoidable with 42% saying they do not notice it, although consumers also felt the countryside would benefit from mitigation.

49 Similarly, we intend to take into account consumers' views regarding prioritising mitigation work on existing infrastructure in designated landscapes when the infrastructure needs replacing. Within our RIIO-T1 business plan we are not intending to replace stretches of our infrastructure within designated landscapes. Our approach in the business plan is to refurbish elements of our infrastructure based on the condition of the assets. Given respondents' views on priorities, we would expect these lines within designated landscapes to be amongst the candidates to be funded by any such allowance.

Calculating an allowance

50 In the previous section we provided details of the WTP estimate values that have been derived through this research. To be consistent with our RIIO-T1 submission we have converted these figures to 2009/10 prices (see next table).

51 The table shows the range of estimates across the different mitigation scenarios used in the choice experiment, with a maximum WTP value of £13.22 to underground 50 miles in AONBs and NSAs (D).

52 It is worth noting that rerouting was not viewed as a popular form of mitigation by the focus groups as they saw it as moving the problem to somewhere else. This may also be the reason why it was ranked as the least favourite form of mitigation in the quantitative phase with only 8% of consumers placing it as their first choice of mitigation.

Inferred WTP estimates for different mitigation scenarios from choice data (£ per household, per year, for eight years) – scaled by 0.74 in 2009/10 prices

Measure	Location		
	in other rural areas	in National Parks	in AONBs/NSAs
at least 5 miles			
T-pylons	1.14	1.14	1.14
Rerouting	0.46	0.46	0.46
Screening	5.62	5.62	5.62
undergrounding	8.71	8.71	8.71
at least 10 miles			
T-pylons	1.14	1.14	1.14
Rerouting	0.46	0.46	0.46
Screening	5.62	5.62	5.62
undergrounding	8.71	8.71	8.71
at least 20miles			
T-pylons	1.14	1.14	3.00
Rerouting	0.46	0.46	2.32
Screening	5.62	5.62	7.49
undergrounding	8.71	8.71	10.58
at least 50 miles			
T-pylons	2.05	3.60	3.92
Rerouting	1.37	2.92	3.24
Screening	6.54	8.09	8.41
undergrounding	9.63	11.98	(D) 13.22

53 To derive a potential allowance for the eight year RIIO-T1 period we have multiplied the WTP values by eight (the number of years over which consumers were asked to consider their bill increases) and then by the 25 million households across England[5], Scotland[6] and Wales[7] (see table below).

The WTP estimates, setting a potential allowance over the eight year period (£m 2009/10 prices)

Measure	Location		
	in other rural areas	in National Parks	in AONBs/NSAs
at least 5 miles			
T-pylons	230	230	230
Rerouting	91	91	91
Screening	1,100	1,100	1,100
undergrounding	1,700	1,700	1,700
at least 10 miles			
T-pylons	230	230	230
Rerouting	91	91	91
Screening	1,100	1,100	1,100
undergrounding	1,700	1,700	1,700
at least 20miles			
T-pylons	230	230	600
Rerouting	91	91	460
Screening	1,100	1,100	1,500
undergrounding	1,700	1,700	2,100
at least 50 miles			
T-pylons	410	720	780
Rerouting	270	580	650
Screening	1,300	1,600	1,700
undergrounding	1,900	2,400	2,600

To two significant figures

[5] http://www.communities.gov.uk/documents/statistics/pdf/1937212.pdf

[6] http://www.gro-scotland.gov.uk/files2/stats/household-estimates/he-10/households-dwellings-est-2010.pdf

[7] http://wales.gov.uk/docs/statistics/2011/110126sdr132011en.pdf

54 The table above demonstrates an estimated WTP value for undergrounding at least 50 miles of existing electricity infrastructure of c.£2.6bn in AONBs and NSAs and c.£2.4bn in National Parks. Screening at least 50 miles has a value of £1.6bn in designated areas, with the T-pylon being valued at over £700 million.

55 As discussed earlier, these figures should be seen in the context of the affordability issues raised in both the quantitative and qualitative phases of this research. Although consumers have said that carrying out this work would improve the countryside, many of them do not notice the existing infrastructure and many accept the infrastructure as necessary and unavoidable. Consumers also have different views on their preferred forms of mitigation, for example, 55% favoured undergrounding as their first choice of mitigation whilst 25% favoured screening.

56 Given the above, it may therefore be too simplistic to take the largest number presented above and establish it as the available allowance.

Our recommendation

57 Accent have already factored in a hypothetical bias (0.74) to address the potential for overvaluing against what consumers may actually pay. To address consumers' differing views on the types of mitigation it is worth noting that 80% of consumers placed either undergrounding or screening as their first choice for mitigation.

58 In reality, these are also the two most likely forms of mitigation. We therefore consider that any allowance should be based on the willingness to pay values associated with screening and/or undergrounding.

59 These values are highlighted in red in the previous table, ranging from £1.1bn to £2.6bn in 2009/10 prices. It is notable that the willingness to pay values for screening are identical for all distances up to at least 20 miles – the highlighted area contains the range of values that we consider to be relevant.

60 Although the stated preference choice experiment exercise is designed to reveal how much consumers are willing to pay, we are still concerned about the strong affordability message we have heard from consumers both in the qualitative and quantitative phases of this research. To take this into account we are proposing an allowance of £1.1bn at the bottom end of the range outlined above.

61 AONBs/NSAs are valued more highly than National Parks, and undergrounding is valued more highly than screening (although the differences are not statistically significant), so by selecting the bottom value from the range (i.e. screening in National Parks), any mitigation carried out 'beyond' this (e.g. undergrounding in an AONB) will still carry consumers' willingness to pay.

62 An allowance of £1.1bn for the eight year RIIO period would provide the Transmission Owners with the opportunity to apply for funding which could

significantly reduce the visual impact of their existing infrastructure in designated landscapes. This would provide a cap on expenditure rather than an absolute investment level – the actual level of investment would be driven strongly by stakeholders' views on priorities, technical considerations and any constraints arising from broader investment plans.

63 An allowance at this level could enable Transmission Owners to use a combination of methods of mitigation on a number of projects. This could include the consumers' favourite choice of undergrounding. For example, such an allowance could enable companies to underground in the region of 45 miles of existing lines (based on a typical average cost of £25m per mile, in 2009/10 prices[8]).

[8] http://www.theiet.org/factfiles/transmission-report.cfm

Next steps

64 The proposal outlined in this report along with the supporting data from Accent's research will be used as a basis for further discussions between Ofgem and the electricity Transmission Owners.

65 It is our understanding that the decision on the existence and size of any potential available allowance will be included in Ofgem's Initial Proposals for RIIO-T1 at the end of July 2012.

Stakeholder input

66 The involvement of stakeholders will be a key part in developing an approach to prioritising and allocating any resources made available by Ofgem to mitigate the visual impact of transmission infrastructure in nationally designated landscapes. A complex series of factors – including landscape and historical value, environmental impacts, engineering challenges, system design, cost and the ability to gain consent for the projects – are likely to be involved in the decision-making process and the input of our stakeholders will be important. At such a time as a visual amenity allowance is identified, a consultation exercise would be undertaken with key stakeholders to inform our approach to using the allowance. In particular, this would focus on:

a) developing a series of guiding principles for the use of the allowance, and

b) prioritising the areas and lines which would benefit most from visual impact mitigation measures.

67 This process will be developed in the ongoing discussions with Ofgem.

Appendix A

Accent WTP final report

Please see separate document

Appendix B

Accent WTP report appendices

Please see separate document

Appendix C

Accent WTP data tables

Please see separate document