

# Guidance



## CUMULATIVE EFFECT OF WINDFARMS

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## **Introduction**

1. This note provides guidance on the issue of cumulative effects of windfarms for use by staff when responding to consultations on proposed developments, either in the Town & Country Planning system or electricity licensing consultations under section 36 of the Electricity Act 1989. The advice may also be helpful when considering other forms of development.

## **Consideration of cumulative effects**

2. The overriding principle applied by planning authorities when determining planning applications is that each case must be determined on its “individual merits”, and that there is a presumption in favour of development which accords with the development plan, although other ‘material considerations’ may outweigh the plan’s policies. However, recognition is increasing, both within planning authorities and within government guidance (e.g. NPPG 6 and 15) that such ‘material considerations’ may include cumulative effects. For example, while individual supermarkets may not threaten the viability of a town centre or the capacity of the road network, their combined effect could exceed local spending power or the threshold of existing infrastructure (roads, sewerage etc). The potential for cumulative effects is also recognised as a matter to be included in Environmental Impact Assessment under the terms of the EIA regulations 1999, as explained in Circular 15/99 and PAN 58. Consideration of cumulative and synergistic effects is also a requirement under the Strategic Environmental Assessment Directive which is to be implemented in Scotland by 2004.

**Appendix 1** lists the key references to cumulative effects contained in Government guidance.

3. Recent and increasing pressure for on-shore windfarms has raised concerns over cumulative effects, primarily because of the visibility of windfarms and their ancillary development such as tracks and grid connections and their effects on the landscape. This has resulted in a heightened interest by planning authorities and developers over how and when to assess the cumulative effects of windfarms. The Scottish Executive’s statement ‘Securing a Renewable Future - Scotland’s Renewable Energy’ highlights the likelihood that cumulative impacts may present an eventual limit to the extent of onshore wind development and the need to attach increased importance to consideration of cumulative impact in specific areas. In due course, it is possible that cumulative effects may also arise from a number of offshore wind proposals.
4. SNH’s policy position on renewable energy is set out in Policy Statement 01/02 and is expanded by 02/02 *Strategic locational guidance for onshore wind farms in respect of the natural heritage*. The latter identifies three broad based zones of sensitivity to wind farms. The zone of lowest natural heritage sensitivity is described as that with “*the greatest opportunity for development within which overall a large number of developments would be acceptable in natural heritage terms, so long as they are undertaken sensitively and with due regard to cumulative impact.*” For the zone of medium natural heritage sensitivity, the guidance says “*by careful choice of location...there is often scope to accommodate development of an appropriate scale, siting and design (again having regard to cumulative effects) in a way which is acceptable in natural*

*heritage terms*". In this way the SNH guidance already points firmly to the need to consider cumulative effects.

5. As an emerging issue, Government guidance on the assessment of cumulative effects is limited, though the need to undertake such assessment is reflected in references in NPPG 6 and PAN 45. Planning authorities and developers are increasingly looking to SNH for advice as to how such assessments should be carried out.
6. Although the term "cumulative impact" is often used to refer only to landscape and visual effects, cumulative effects of wind energy development can relate to a wider range of social and economic, as well as environmental effects, and may be positive as well as negative.
7. The most detailed guidance currently available is contained in the report "Cumulative Effect of Wind Turbines" 2000 prepared for DTI by ETSU, the Government's advisers on renewable energy technologies, and referred to within PAN 45. This Report concentrates on landscape and visual cumulative effects, and to a lesser extent also examines such effects on birds. It should be noted that the ETSU report does not constitute formal Government guidance, though it was considered as evidence at the conjoined Public Inquiry in 2001 into multiple wind power proposals in Mid Wales.
8. This guidance sets out SNH's perspective on cumulative effects in relation to windfarms. In preparing it, we have drawn upon the ETSU report, though it should be noted that SNH does not endorse all of the conclusions in that report and that there are aspects of this guidance which differ from the ETSU line. This guidance also draws upon evidence by David Tyldesley submitted to the An Suidhe Windfarm Public Inquiry (Nov 2002, copied at [Appendix 2](#)), and notes in a Dumfries and Galloway Structure Plan Technical Paper (1999), copied at [Appendix 3](#).
9. The text of this guidance makes extensive reference to SNH's advice to planning authorities who are the decision-making bodies for renewable energy projects below certain power generation thresholds – 50MW for most forms of generation, and 1 MW for hydro schemes. Projects with planned outputs exceeding these require consent from Scottish Ministers under section 36 of the Electricity Act 1989. Such consent normally includes a separate grant of deemed planning permission. The decision-making body is thus the Scottish Executive through its Energy Division, though the role of strategic planning for each area (see paragraphs 22-25) rests with the planning authority. This guidance is equally applicable to SNH's role in giving advice to the Scottish Executive in such cases.
10. The cumulative effect of a set of developments is the combined effect of all the developments, taken together.
11. Imagine two separate developments, A and B. The combined effect of both developments taken together need not simply be the sum of the effect of A plus the effect of B; it may be more, or less. This is best demonstrated using some examples:
  - An isolated house A in the countryside has a visual impact, standing out in its natural setting. Another isolated house B may also have a similar visual impact, taken alone. However if the two houses are sited close together, the

visual impact of the two together may be only a little greater than for either house A or B taken alone, as they will appear as a single cluster.

- A windfarm A sited on a ridge on one side of a valley is highly visible but acceptable, providing a single visual focus on an otherwise unremarkable skyline. A second windfarm B on a ridge on the other side of the valley would have a similar effect, if it were on its own. However, the effect of having two windfarms sited on either side of the valley, may be to make the observer feel uncomfortably 'surrounded' by development. The combined effect of both, taken together, may be vastly greater than the sum of the two individual effects.
  - A windfarm A gives rise to a small but acceptable level of bird mortality, which lies well within the capacity of that bird population for regeneration and hence has little effect on the overall bird population level. The same would apply to a second windfarm B, taken on its own. However, the level of bird mortality occasioned by windfarms A and B taken together may exceed the capacity of the population for regeneration, in which case the bird population would go into decline. Whereas the impact of A and B, each on their own, was not discernible, the impact of A + B is to cause population collapse.
12. Cumulative effects can arise from a mixture of different types of development, for example a wind farm taken in combination with forestry or industrial development. However, here the issue merges with a more general requirement to assess any proposed development within its wider context of existing, approved or proposed development. This guidance focuses on the particular issue of assessing the cumulative effects of more than one wind farm development, which is likely to become an important issue for most new wind farm proposals.
13. The cumulative effect of a set of developments may be in terms of their effect on landscape, visual amenity, species, the local economy, recreation or any other matter. SNH will only be concerned with cumulative effects which are within our natural heritage remit. In this guidance, the cumulative effects of windfarms on landscape and visual amenity, and on bird populations, are singled out for more detailed advice as potentially of critical importance.
14. Cumulative impact is sometimes loosely described as 'positive' or 'negative', but this use is discouraged as there is room for ambiguity as to which represents additional adverse impact. It is preferable to refer to 'an additional cumulative effect', that is additional to the impact to be expected from the developments taken individually.

### **When should SNH take account of cumulative effects?**

15. An assessment of cumulative effects may be undertaken either:
- in **development control**, in the context of a site specific assessment, usually in support of a planning application as part of an EIA; or
  - in **strategic planning**, as part of the preparation of a strategic framework for the future planning of windfarms within a particular geographic area.

Although the two forms of cumulative assessment share common principles it is important that staff distinguish between the role and nature of cumulative assessment within the two distinct processes.

## **Development control**

16. It may be important to assess cumulative effects where a proposed development involves:
  - an existing development and an extension to that development;
  - more than one development proposed at the same time within an area;
  - a new development in combination with one or more existing developments;
  - or any combination of the above.
17. An assessment as part of the development control process is most likely to be carried out by the prospective developer, as part of an Environmental Statement, and reviewed by the determining authority (the planning authority or the Scottish Executive Energy Division, who grant licences for large electricity generators) and consultees (such as SNH).
18. An assessment of cumulative effects associated with a specific development proposal should be limited to the effects of the proposal in combination with:
  - existing development, either built or under construction;
  - approved development, awaiting implementation; and
  - proposals awaiting determination within the planning process, and thus for which design information is in the public domain. Proposals and design information may be deemed to be in the public domain once an application has been lodged, and the decision-making authority has formally registered the application.
19. In some cases it may be thought desirable to include more speculative proposals in the assessment (e.g. where a formal scoping opinion has been provided and thus the principle of a proposal is within the public domain). Nonetheless inclusion of such projects would render the assessment less certain. As explained earlier, planning authorities must determine a single application on its merits, and there is a limit as to how far it would be reasonable for a developer or planning authority to consider other potential developments (e.g. proposals which have been the subject of preliminary discussions or potential sites identified by developers, planning authorities or others), where such proposals are either confidential or unconfirmed as formal applications. Therefore, cumulative assessment should normally be limited to the categories set out in paragraph 18. However, pre-application proposals could be regarded as a material consideration, especially where the proposals are already in the public domain as a result of developer publicity or a formal request for a scoping opinion, and where they are well articulated in terms of location and scale. The weight to be accorded to such speculative proposals is a matter for the decision-making authority. Where a pre-application proposal is to be regarded as a an important material consideration then it is appropriate that it be included within a cumulative assessment.
20. PAN45 indicates that in assessing cumulative effect of windfarms it is unreasonable to expect them to extend beyond schemes in the vicinity that have been built, have permission or are currently undetermined applications. In relation to SNH's consideration of natural heritage matters, the issue of what constitutes 'the vicinity' within which schemes should be included in a cumulative assessment demands careful judgement according to the nature of the cumulative issues. If the major issue is visual or landscape impacts within a particular locale, then it may suffice to include all windfarms (existing and

proposed) which will be visible from that locale. If the issue is one of overall impact on landscape character across an area, it may be appropriate to consider all schemes within or affecting the landscape of the area. Two windfarms need not be intervisible – or even visible from a common viewpoint – for there to be potential for both to impact on landscape experience for those travelling through an area. It may be desirable to consider the cumulative effects of windfarms on users of scenic road routes, or long-distance routes for walkers, along their full length. If the issue is one of impacts on a bird population, the range of assessment may depend on the range and territories occupied by the species. Generally, the area within which a cumulative assessment is required should relate to the issues involved, and should not be limited by local authority boundaries.

21. Cumulative effect assessment can be resource intensive, as it requires knowledge at least in outline of the effects of each existing or proposed development within the vicinity. **SNH should therefore only seek cumulative effect assessments where it considers that the cumulative effect of a proposal, taken with other existing or proposed projects, could be a major factor in determining the acceptability of the development from a natural heritage standpoint and hence may affect the eventual planning decision. In such circumstances, cumulative impact assessments should be sought as part of the EIA for the proposal.**

### **Strategic planning**

22. Strategic cumulative assessment may be undertaken:
  - as part of a planning authority's preparation of its relevant Development Plan policies and strategies;
  - as part of a Strategic Environmental Assessment; or
  - as a tool in capacity assessment.

In all these, the focus is on forward planning and on determining how many developments may be acceptable, where are the most suitable locations, and what might be an appropriate design and scale. In such studies, it is wise to consider not just existing and proposed developments but all potential developments. Often, a strategic study may proceed by postulating a number of specific scenarios, in terms of the numbers, scale and distribution of developments to be accommodated, and then make use of the resulting cumulative impact assessment to draw conclusions as to which of these scenarios is acceptable. Landscape capacity studies may assist by identifying the sensitivity of areas of differing landscape character to windfarm development and indicating the capacity for each area to accommodate certain types or scales of development. It should be borne in mind that where existing developments have a time-limited consent, the option is open for these developments to be decommissioned, as well as for new developments in new locations.

23. The area included within a strategic cumulative assessment need not be constrained by the concept of 'vicinity': often, it will be desirable that such an assessment covers the whole of a region, straddling more than one planning authority, or that of a natural heritage management unit such as a National Park or Firth Partnership area.

24. Cumulative assessment within a strategic planning context is most likely to be led by the planning authority or other public agency, though on occasion a developer may wish to undertake such a study in order to identify the potential for further wind farm development. Planning authorities are already encouraged by NPPG 6 to define broad areas of search suitable for wind and other renewable energy developments, and to guide developers on the criteria they should meet, both within and outwith such areas. Such a perspective will have enhanced value if it is also associated with a view of the capacity of the area for such development, and identification of the critical factors which are likely to present an eventual limit to development. Expansion of renewable energy is taking place rapidly, and renewables technologies are evolving, so there is a need to adopt methodologies for such studies which lead to conclusions within a short timescale. The expectation should be that any such view may need to be updated within only a few years.
25. **SNH should encourage planning authorities to adopt a strategic approach to renewable energy developments, as envisaged by NPPG 6, and to ensure that such strategic approaches are informed by assessments (developed through capacity studies or other regional perspectives) of the likely cumulative effect of multiple developments in the areas of study on the scale proposed.**

#### **New proposals entering the planning system**

26. Planning authorities and developers may be confronted with a situation where a proposal is nearing determination, with an Environmental Statement completed including any necessary assessment of cumulative effects, when a new planning proposal is submitted for a site in the same vicinity. The decision-making authority may regard such a new application as a material consideration which should be taken into account before determining the earlier proposal. It is for the decision-making authority to take into account all material considerations and to apply to each such weight as it deems appropriate. Planning authorities are empowered under EIA Regulation 19 and Article 13 General Development Procedure (S) Order 1992, at any point in the determination of the application, to seek additional information from the applicant, and hence would be entitled to seek an extension to the cumulative impact assessment to include the new proposal. However, such a request at a late stage may conflict with the applicant's right for a decision within prescribed timescales. While it might be preferable for the potentially competing applications to be determined together, a planning authority might conclude that it would be unreasonable to defer determination of an outstanding application as successive new applications are submitted.
27. PAN45 indicates that in assessing cumulative effects, it is unreasonable to take into account schemes other than those in the vicinity that have either been built, have permission or are currently undetermined applications. However, a new windfarm proposal in the vicinity, and its associated potential cumulative impact, may well be regarded as an important material consideration which the planning authority will wish to take into account in arriving at its decision. It is for the planning authority to decide on the weight to be attached to such consideration, in order that it can exercise its duty to undertake environmental assessment, including taking account of potential cumulative effects. In some cases the planning authority may have available a cumulative assessment undertaken by the developer of the new proposal. In such a circumstance it may be considered equitable to allow the original developer the option of submitting his/her own

cumulative assessment, and indeed the original developer may feel it prudent to update his/her environmental statement, lest the planning authority take into account information on cumulative effects provided from the competing developer. Whether such an invitation is made may depend on the remaining timescale before a decision is due.

28. **Once a planning application has been submitted and is accompanied by a complete and satisfactory Environmental Statement, any further assessment to take account of new proposals entering the planning system is likely to occasion delay. In any case, having regard for the advice in PAN 45 the planning authority may consider that it cannot reasonably *require* further cumulative assessment by the applicant. However, in some circumstances a new windfarm proposal in the vicinity may be regarded by the planning authority as an important material consideration which it will wish to take into account in arriving at its decision. SNH may wish to advise on circumstances where this is desirable. In such circumstances the authority might *invite* the original developer to submit a further cumulative assessment to take account of the new proposals. This would be particularly appropriate where the authority has or will have available a cumulative assessment from a competing developer. A degree of practicality must prevail, so as to avoid undue delays in the decision-making process.**
29. This should remain the position where an application becomes subject to Public Local Inquiry proceedings. However, in many circumstances, because of the time delays inherent in the PLI process, a developer may opt to present new cumulative assessment, updated to include all extant proposals at the time of the PLI.
30. There are circumstances where the point at which a complete and satisfactory Environmental Statement has been submitted is not clear cut. Generally, this will be the point at which the planning authority accept that it has an adequate basis to progress towards a decision on the application. In terms of natural heritage interests, staff should consider whether the ES has addressed with reasonable rigour all the natural heritage issues identified at scoping stage. However, SNH may still seek further information in order to come to a view on sensitive natural heritage interests; an ES should not be deemed incomplete on account of the need for that further dialogue.
31. Where an applicant makes a major change to a proposal already within the planning system, such that revised environmental assessment is required, then the planning authority may wish to regard this as if it were a revised application with a new submission date, and requiring refreshed notification of consultees. Therefore, if there are other proposals which have entered the planning system since the original application date, it will be in order to request cumulative assessment where appropriate in combination with these new applications. Changes to a proposal which are minor in terms of scale, design or impacts are however unlikely to be regarded by the planning authority as a resubmission and therefore will not provide that opportunity.
32. Each application must be considered by a planning authority on its merits, and must be determined in accord with the Development Plan unless there are material considerations which indicate otherwise. Such material considerations could include draft and non-statutory policies of the authority (eg a renewable energy strategy) which have yet to be finalised or adopted as part of the

Development Plan. Where such finalisation and adoption is imminent, the authority may defer an application, or refuse it on the grounds that it is premature, pending adoption of the strategy. Similarly, where an application for another similar development has been lodged more recently, the authority may consider it reasonable to defer determination of the first to enable a joint determination of both, such as to involve an appraisal of cumulative effects. If the applicant for the first does not agree to this course of action, the authority might refuse it as premature, or leave the applicant to appeal on the grounds of non-determination.

### **Information from competing developers**

33. Cumulative impact assessment normally requires details to be known of the impacts of each development separately, and difficulties may arise if developer B is unwilling to release impact information to developer A. Environmental Statements, once submitted to the planning authority, are public documents but subject to copyright. Hence, the information may be utilised by other developers, though it may not be copied without permission. There is no compulsion on a developer to release any data supporting the ES, unless the planning authority formally requires that information as part of its assessment.
34. **SNH should ask planning authorities (and the Scottish Executive Energy Division) to encourage developers to cooperate over exchange of information, where cumulative assessment has been identified as important and data outwith the Environmental Statements is needed in order to make such assessments.**

### **Cumulative landscape and visual effects**

35. Cumulative effects are those which occur, or may occur, as a result of more than one wind farm project being constructed. The degree of cumulative impact is a product of the number of and distance between individual windfarms, the inter-relationship between their Zones of Visual Influence (ZVI), the overall character of the landscape and its sensitivity to windfarms, and the siting and design of the windfarms themselves. It is important to recognise that cumulative effects consist of both those upon visual amenity as well as effects on the landscape. The Guidelines for Landscape and Visual Impact Assessment (see [Appendix 4](#)) refer to the changes to landscape or visual amenity caused by the proposed development in conjunction with other developments, or with actions which occurred in the past, present or are likely to occur in the foreseeable future.
36. Such cumulative effects on landscape and visual amenity may also have a bearing on enjoyment of the natural heritage. While wind turbines may provide a focus of interest in some landscapes, in others they may be in conflict with attributes such as remoteness or wildness sought by recreationalists.

### **Cumulative effects on visual amenity**

37. Cumulative effects on visual amenity consist of combined visibility and sequential effects.
  - Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. When considering the cumulative effects arising from combined visibility, it is necessary to consider, for each of the

viewpoints within the ZVI of the windfarm concerned, the combined effect of all windfarms which are (or would be) visible from these viewpoints.

Combined visibility may either be in combination (where several windfarms are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the various windfarms).

- Sequential effects occur when the observer has to move to another viewpoint to see different developments. Sequential effects should be assessed for travel along regularly-used routes like major roads or popular paths.

The occurrence of sequential effects may range from *frequently sequential* (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to *occasionally sequential* (long time lapses between appearances, because the observer is moving very slowly and / or the there are large distances between the viewpoints.)

38. Cumulative visual effects will vary in degree with
- the number and sensitivity of visual receptors;
  - the duration, frequency and nature of combined and sequential views (glimpses or more prolonged views; oblique, filtered or more direct views; time separation between sequential views); and
  - the relative impact of each individual windfarm, with regard to visual amenity

### **Cumulative landscape effects**

39. These affect the physical fabric or character of the landscape, or any special values attached to the landscape.
- Cumulative effects on the *physical fabric* of the landscape arise when two or more developments affect landscape components such as woodland, dykes or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.
  - Cumulative effects on *landscape character* arise from two or more windfarm developments. Windfarms introduce new features into the landscape. In this way, they can so change the landscape character that they can create a different landscape character type, in a similar way to large scale afforestation. That change need not be adverse; some derelict or industrialised landscapes may be enhanced as a result of such a change in landscape character. The cumulative effects on landscape character may include other changes, for example trends or pressures for change over long time periods, which should form part of any consideration of a particular project.
40. Windfarms may also have a cumulative effect on the character and integrity of landscapes that are recognised to be of *special value*. These landscapes may be recognised as being rare, unusual, highly distinctive or the best or most representative example in a given area. This recognition may take the form of

local or national designations, citations in development plans, community plans or other documents.

### **Perceived cumulative effects**

41. These may arise where two or more developments are present but one or more is never seen by the observer, for example, because they are screened, or the observer is unable or unwilling to gain a viewpoint from where they would be seen. The observer is aware that other developments are present because, for example, they may have learnt about them or seen signs to them. This effect may be significant, but can also be mistaken, where the observer's information or interpretation of it is wrong. Suitable methods of surveying public perception are outwith the scope of this guidance note.

### **Assessing cumulative landscape and visual impacts**

42. The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA), which will normally form part of an Environmental Statement, is to describe, visually represent and assess the ways in which a proposed windfarm would have additional impacts when considered together with other existing, consented or proposed windfarms.
43. The focus of the assessment should be the proposed windfarm. The stages in a CLVIA will normally be:
- preparation of a base plan, showing all existing, consented or publicly proposed windfarms within a range of the proposed windfarm. As ZVI analysis is normally undertaken out to 30km from a windfarm, it is recommended that this base plan includes all proposals out to 60km from the proposed windfarm, so that any potential cumulative effects towards the edge of a 30km zone of influence can be identified.
  - ZVI analysis, identifying separately the areas where two, three or more windfarms would be visible
  - selecting appropriate viewpoints at which to assess the nature and significance of combined visibility effects, and appropriate routes or journeys through the area for which to assess sequential visibility effects
  - preparing photomontage or wireline representation to describe and illustrate the nature and degree of cumulative effects
  - describing and assessing the nature and significance of cumulative visual effects
  - describing and assessing the nature and significance of cumulative landscape effects. In particular any effects on the following should be considered:
    - landscape designations
    - designed landscapes
    - landscape character
    - sense of scale
    - sense of distance
    - existing focal points in the landscape
    - skylining
    - sense of remoteness or wildness
    - other special landscape interests
44. Appendix 5 sets out the above process as recommended by SNH in fuller detail. This is generic guidance only. The number of proposals in an area, and the timing of applications, may give rise to development scenarios of varying complexity. Professional judgement should always inform the scope of the study

to be undertaken. All CLVIA should accord with the methodology outlined in 'Guidelines for Landscape and Visual Impact Assessment' (LI and IEMA, 2002).

### **Cumulative Effects on Birds**

45. The assessment of cumulative effects on birds is a complex and specialised process, and a high degree of uncertainty can be introduced at a number of stages. Broadly, there are five stages:

- Define the species to be considered
- Consider the limits or 'search area' of the study
- Decide the methods to be employed
- Review the findings of existing studies
- Draw conclusions on cumulative effects within the study area

46. Target species will usually be:

- species considered of high conservation importance; and/or
- species considered to be vulnerable to wind farms by virtue of their behaviour or ecology

47. A cumulative assessment can apply at a number of levels, for example:

- an individual pair, or birds occupying a single breeding site;
- the qualifying interest of a Special Protection Area
- a regional or local population
- a national population

Assessing cumulative effects on a national population would require widespread consideration of wind farm developments nationally, and this would normally be too onerous a task to expect of the developer in one proposal which on its own is unlikely to have more than a marginal effect. Therefore, assessment of impacts on national populations is best undertaken by appropriate agencies in the context of strategic planning, and should not be required in the context of assessing a single proposal.

48. Assessing cumulative effects on birds involves the same methods as those to assess effects on an individual proposal. Where available, use should be made of any post-construction monitoring studies on any existing development, which can reduce the uncertainty in any conclusions. Cumulative assessments require more information than individual assessments, and may require relevant authorities and developers to share data and monitoring studies which otherwise might be considered as commercial-in-confidence.

49. Conclusions on cumulative effects at a regional or local population level will usually involve a form of Population Viability Assessment (PVA) which will appraise how added mortality or loss of habitat due to the windfarms is likely to affect the viability and size of the bird population. PVAs are highly sensitive to the demographic data used in the modelling process. Obtaining good data on reproductive success, baseline mortality and immigration and dispersal is a clear requirement if the outcome of a cumulative assessment is to be reliable.

50. It would be ideal if there were a regional conservation framework for each target species to provide a context against which any cumulative assessment of impact could be judged. However, such regional frameworks are rare. The simplest form of objective will be to maintain a regional population at its current level. On SPAs, the objective will be to maintain the integrity of the site which will include

maintaining the population at least the levels present when the site was designated.

51. The conservation status of the species is likely to determine the degree of uncertainty which is acceptable. For example, in Argyll, due to forestry, golden eagles have been lost in several territories, and have suffered reduction in breeding success. The status of this species in this south-western extremity of its breeding range is therefore more fragile than in other parts of the Highlands. Such differences should be taken into account in drawing conclusions from cumulative assessments.

### **When should cumulative effects be judged unacceptable?**

52. In relation to landscape and visual impacts, it may often be cumulative impact which will determine an upper limit to an acceptable level of development. Cumulative impacts on a bird species may also imply a limit to development, where a single population is subject to impacts from a number of windfarms in the same vicinity (e.g. concern has been expressed in Liverpool Bay, on the basis of the cumulative impact of a number of offshore windfarms on the Bay's population of common scoter).
53. A crucial element in identifying the potential for adverse cumulative impact is the concept of a "threshold" beyond which wind farms in a particular area become unacceptable. In other words the effect of the present proposal is limited, but when added to the effect of what has already been allowed or to new proposals which have been submitted for planning permission, it becomes unacceptable in planning terms. The principal difficulty in applying such an argument will be the identification and then justification for that threshold - particularly in the case of the cumulative impact on the landscape. The quantification of a cumulative impact on a road system or on other infrastructure is often simpler, whereby the authority may have an established methodology for determining an upper limit or capacity which further development must not breach. In the case of windfarms, assertion of a capacity or limiting threshold for windfarm development is more likely to be based on a well-considered judgment, informed by an analysis of landscape sensitivities, or a wind farm capacity study or other strategic perspective, on the limits in extent, scale and distribution of wind farm development which could be accepted within an area. It is unlikely that such thresholds or capacities can be simply expressed in terms of turbine numbers or power output; they are more likely to be expressed in terms of acceptable limits of change.
54. In order to justify a threshold based on natural heritage factors, there needs to be clarity over natural heritage objectives. Without such clarity, there is little value in seeking a cumulative impact assessment in the first place. Thus, for example, in relation to cumulative landscape impacts, one needs to be clear whether the landscape objective in the area is
  - to maintain the integrity and quality of the landscape (as may be appropriate within a designated landscape);
  - to maintain the landscape character; or
  - to accept landscape change.Development plans may provide an indication of landscape objectives. SNH's locational guidelines for windfarms indicates a need to accept change to some of Scotland's landscapes in order to accommodate sufficient renewable energy

development, but such change should be within landscapes of low natural heritage sensitivity.

55. In relation to cumulative impacts on a bird population, one needs to be clear whether the species objective in the area is
- to maintain the population at the existing level;
  - to ensure continued presence of the species in the area; or
  - to accept that loss of this species in this locality.

Where a strategic study has been undertaken of the potential for multiple developments, or a capacity assessment undertaken, such objectives should be considered as part of the study.

56. Cumulative effects may also be judged unacceptable on the basis of incompatibility in design between windfarms in the same vicinity. While two windfarms of similar design on adjacent hills may be judged acceptable in landscape terms, two windfarms which contrast in size, turbine height, or layout may give rise to a visual conflict and be judged unacceptable. This may be so even if either of the designs would be suitable if replicated on both. This same issue is likely to arise frequently in relation to proposals for windfarm extensions, where because of progress in turbine technology, developers may favour larger turbines in a more widely spaced array for the proposed extension than were utilised in the original development.

57. There is no prescribed method for determining when a significant adverse cumulative impact might warrant an objection from SNH. **Such assessment should form part of the usual judgements to be exercised when responding to consultations on planning applications** as set out in the Local Authorities Handbook ( Appendix V), Environmental Assessment Handbook and PGN 99/4 "SNH's involvement in the Town & Country Planning System". **SNH should also encourage planning authorities to promote forums or discussions aimed at securing a consensus of view on the extent and type of renewables development which should be considered acceptable in an area, as a help to the identification of appropriate thresholds.**

### **SNH's advice to decision-making authority**

58. Given the possibility that cumulative impacts may in due course present a constraint on wind farm development, it is important that SNH's advice to planning authorities (and to the Scottish Executive Energy Division) conveys not only our views on the acceptability of a proposal in terms of its individual impacts, but also (if we have formulated one) our view on cumulative effects.
59. Five examples may serve to illustrate how advice on cumulative effect may be best presented to the planning authority or other decision-maker. These examples do not set out preferred model wordings, but indicate the logic underlying the advice.
- (a) A is an existing wind farm. B is proposed. B would be considered acceptable (in natural heritage terms) on its own, but in combination with A, the cumulative impact is judged unacceptable.  
*SNH objects to B on the grounds of the cumulative natural heritage impact of B when combined with A.*

- (b) A is an existing wind farm. B is proposed. B is not considered acceptable (in natural heritage terms) on its own. Moreover, in combination with A, the cumulative impact of A and B is not considered acceptable.

*SNH objects to B on the grounds of*

- (i) *the natural heritage impacts of B; and*
- (ii) *the cumulative natural heritage impact which would result from the combined presence of A and B.*

In such a circumstance, it will be important to clarify whether the cumulative impact involves any *additional* impact, further to the impacts of A and B taken separately. Clearly, if B is unacceptable, it is likely that the combination of A and B will also be unacceptable. Clause (ii) should only be included if there is an additional layer of judgment being made, for example in relation to the overall capacity of the area to accommodate development.

- (c) A and B are proposed windfarms. Individually, each would be considered acceptable (in natural heritage terms). However, the combined effect of A and B is judged unacceptable.

*SNH does not object either to development A on its own or development B on its own; however SNH would object to both A and B being given consent, on the grounds of the cumulative natural heritage impact of A and B.*

- (d) A is a proposed windfarm. B is a windfarm at design stage, not yet a planning application but in the public domain, ie not regarded by its developers as in confidence. SNH would find A acceptable in natural heritage terms. Early appraisal suggests however that B would be preferable, but that the cumulative impact of A + B would not be acceptable.

*SNH does not object to development A, though we highlight any natural heritage impacts. SNH notes that the cumulative impact of A + B would be unacceptable. SNH may recommend that there is a need for a strategic view of preferred areas and appropriate scales of renewables development within the area.*

The terms of any advice by SNH should be based solely on the natural heritage impacts of the proposed development, with reference as relevant to the supporting policy context. Given that development B is in the public domain, it may nonetheless be regarded as a material consideration, and the weight to be accorded to it by the planning authority will depend upon how advanced that proposal is. It is open to SNH to encourage a more strategic view by the planning authority as a basis for decisions.

- (e) A is a proposed windfarm. Before A is determined, a second windfarm proposal B is lodged as a planning application. SNH would find A acceptable in natural heritage terms. Appraisal suggests however that B would be preferable, but that the cumulative impact of A + B would not be acceptable.

*SNH does not object to development A, though we highlight any natural heritage impacts. SNH may recommend that decisions on A and B should be taken concurrently.*

The terms of any advice by SNH should be based solely on the natural heritage impacts of the proposed development, with reference as relevant to the supporting policy context. SNH should not object (even a holding objection) to a proposed development on the grounds of prematurity unless

there are significant uncertainties over natural heritage impacts which remain to be resolved (see Local Authorities Handbook Appendix V). In particular, SNH should not object to an application as a means of seeking deferral of a decision on the grounds that the later proposal, yet to be considered by the planning authority, might be preferable in natural heritage terms. However, the new application is a material consideration, and the potential cumulative effect of the two proposals should be considered by the authority. It is open to SNH to encourage the planning authority to consider both applications together: at which point SNH would confirm its position regarding cumulative effects and should indicate any preference between A and B in terms of natural heritage impacts.

60. These five examples are not intended to be comprehensive. For example, in some situations there may be more than two developments with a potential cumulative effect. In other situations, the respective developments may be subject to decision by different decision-making bodies – for, example, adjacent planning authorities or one planning authority and the Scottish Executive. However the examples illustrate how SNH should consider and comment on cumulative effects in situations where the cumulative effect is with existing windfarms or those at proposal stage.
61. **In general terms SNH should aim to be clear as to its views on the current proposal, taken in association with existing windfarms or any already with planning approval. SNH should also advise, where it is able to do so, on its view of the cumulative effects of the current proposal in association with new proposals in the planning system, and should be clear as to any preference between such proposals in terms of natural heritage impacts.**

### **Further information and advice**

62. The issues of landscape capacity for windfarms and the cumulative effects of windfarms on landscape character and birds are discussed in more detail within ETSU's report, though as stated above SNH does not necessarily endorse all the recommendations in that report and this guidance should be regarded as taking precedence. Detailed advice relating to the cumulative effects on landscape and birds associated with specific proposals should be obtained from Advisory Services Landscape and Species Groups.

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**Versions**

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## Appendices

### Appendix 1 - References to cumulative impact contained in Government guidance

Guidance and policy issued by Government in the form of National Planning Policy Guidelines (NPPG), Planning Advice Notes (PAN) and Circulars makes reference to the potential material nature of such effects, particularly in relation to renewable energy and to environmental impact assessment. You should also check the relevant Local and Structure Plan policies since these national policy references have been reflected in some of the more recent Development Plans (e.g. Dumfries & Galloway Structure Plan and Ayrshire Joint Structure Plan).

The first explicit reference to cumulative impact was made in 1999 in NPPG 15 "Rural Development", and followed by references with respect to the Environmental Impact Assessment (Scotland) Regulations 1999 in PAN 58 and Circular 15/99 and later in terms of renewable energy in NPPG 6 "Renewable Energy Developments" and the associated PAN 45 "Renewable Energy Technologies". The most recent reference is contained in the revised NPPG1, now entitled Scottish Planning Policy 1 "The Planning System". Quite specific guidance is offered on consideration of the cumulative landscape impacts of Marine Fish Farming in recent guidance by the Scottish Executive. All are as follows:

- SPP1, para 15 states that *"Environmental justice requires us to recognise the cumulative impact of environmental disbenefits and work towards ensuring people do not have to live in degraded surroundings."*
- NPPG 15, para 59 indicated that Councils in rural areas should *"use planning conditions to regulate the impact, particularly the cumulative and incremental impact, of developments; and refuse consent where such regulation is unable to satisfactorily resolve any environmental conflicts, unless refusal is clearly outweighed by social or economic benefits of national importance"*;
- NPPG 6, para 36 recognises that in relation to the visual impact of windfarms *"the cumulative impact of neighbouring wind developments may in some circumstances be relevant."* This statement is repeated and expanded in PAN 45, paras 89 – 91 as follows, which notes that

*"The nature and character of the location, and the landscape in which a development is located, will in part determine the acceptability or otherwise of siting proposals in proximity to each other."*

*A number of factors have influenced the current geographic distribution of windfarm proposals in Scotland, for example: the distribution of the variable wind resource; technical and economic constraints to the viability of exploiting different wind speeds; electricity grid access constraints; protected areas; and planning policy. These have tended to focus developments in a relatively limited number of areas. However there have been few instances where cumulative effect has had to be addressed but with more proposal coming forward this could change.*

*The cumulative effects of wind farm development can arise as the combined consequences of: an existing wind energy development and a proposed extension to that development; proposals for more than one wind energy development within an area; proposal(s) for new wind energy development(s) in an area with one or more existing development(s); and any combination of the*

above. In assessing cumulative effects, it is unreasonable to expect this to extend beyond schemes in the vicinity that have been built, those which have permissions and those that are currently the subject of undetermined applications.” (The latter clearly excludes reference to proposals of which SNH and the planning authority are aware through confidential pre-application discussions and perhaps more public scoping exercises).

- Schedule 4 of the EIA(S) Regulations 1999 specifies matters to be included in an Environmental Statement, and includes under item 4 “ a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development...” This is repeated in Circular 15/99, para 85 and PAN 58 para 65.
- The EC Habitats Directive 92/43/EEC, in Article 6(3), says “Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives.”
- In the Conservation (Natural Habitats &c) Regulations 1994, section 24 requires SNH to undertake an appropriate assessment of a plan or project which is likely to have a significant effect on a Natura site, “either alone or in combination with other plans or projects”.
- ‘Securing a Renewable Future: Scotland’s Renewable Energy’, published by the Scottish Executive (March 2003) says: “The cumulative impact of on-shore wind farms, coupled with the scarcity of suitable remaining hydro sites, make it unlikely that Scotland could achieve a substantially increased target by 2020 based on these technologies alone.” “The planning process already provides for issues of cumulative impact to be taken into account in considering applications for consent. As the pace of on-shore wind developments in particular increases we would expect increased significance to be attached to consideration of cumulative impact in specific areas.”
- Scottish Executive Advice Note ‘Marine Fish Farming and the Environment’ (SEERAD, January 2003) says:

*“Where there are existing aquaculture facilities, both new proposals and extensions to existing developments may be difficult to accommodate within the landscape. Landscape character assessments indicate which landscape character types cannot easily accommodate cumulative aquaculture development... The impact of one well designed, perhaps relatively small-scale proposal, may be absorbed by the scale of the landscape. Sometimes a future extension or additional developments may dominate the space within which they are sited. Several developments together can attract more attention, creating a strong focus within the landscape. Whereas one individual development may act as a landscape feature, a number of developments can create a key characteristic of the landscape, altering the landscape character. When a number of developments that occupy the same loch are not coordinated in terms of siting, layout and design, the effect can be muddled and visually confusing. Where a number of small inlets or bays are gradually filled up with development, the important indentations along the coastline become obscure, resulting in a change of landscape character.”*

None of the above guidance contains a definition of cumulative impact. The following, as contained in the National Environmental Policy Act, USA may be of interest:

*“The impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes other actions”.*

## **Appendix 2 - David Tyldesley's definition of cumulative landscape and visual impact presented to the An Suidhe PLI (November 2002)**

*“In respect of both landscape and visual amenity, cumulative effects are those which occur, or may occur, as a result of more than one project being constructed. The effects of two or more developments may cumulate to such an extent that, whilst each project on its own may be an acceptable change, perhaps in terms of its localised effects on landscape character, in combination with other changes (whether or not they are the same type of project) would so change the landscape character that its distinctive character is significantly diminished. These accumulating changes to landscape character could include past changes, for example trends or pressures for change over long time periods, as well as present and future changes that may be under consideration in any particular project decision.*

*In respect of visual impacts, there are (at least) four types of cumulative effects in this context:*

- a) ***in combination*** - where two or more features are seen together at the same time from the same place, in the same (arc of) view where their visual effects are combined;
- b) ***in succession*** - where two or more features are present in views from the same place (viewpoint) but cannot be seen at the same time, together because they are not in the same arc of view - the observer has to turn to see new sectors of view whereupon the other features unfold in succession;
- c) ***in sequence*** - where two or more features are not present in views from the same place (viewpoint) and cannot, therefore, ever be seen at the same time, even if the observer moved round the arc of view, the observer has to move to another viewpoint to see the second or more of them, so they will then appear in sequence. The frequency of occurrence in the sequence may be highly variable, ranging from ***frequently sequential*** when the features keep appearing regularly and with short time lapses between (clearly speed of travel influences this as well as distance between the viewpoints) down to ***occasionally sequential*** where there may be long time lapses between appearances, because the observer is moving very slowly and / or there are large distances between the viewpoints (even if not between the features);
- d) ***perceived*** - where two or more features are present but one or more is never seen by the observer, for example, because they are screened, or the observer is unable or unwilling to attend a viewpoint from where they would be seen. However, the observer is aware that others are there because, for example, they may have read or heard about them or seen signs to them; this is an apprehended or perceived effect but can be strongly felt; it could also, nevertheless, be mistaken because the observer's information or interpretation of it is wrong.” (David Tyldesley for SNH at PLI – Proposed Windfarm, An Suidhe, Inveraray, Argyll. November 2002).

### **Appendix 3 - Extract from Dumfries and Galloway Structure Plan Technical Paper (1999)**

“As more windfarm developments are considered, the issue of cumulative impact becomes increasingly important. Cumulative impact refers to the combined impact of two or more windfarms on the surrounding landscape. It arises when a new proposal will result in a progression from a landscape which contains one windfarm which forms an individual, isolated feature, to a landscape in which two or more windfarms are evident and form a significant or dominant characteristic of that landscape.

Cumulative impact is a complex issue. It may be experienced as two or more windfarms being visible within the same view, from the same general location, or sequentially along routes, and will vary in degree with

- the number and sensitivity of receptors (settlements, viewpoints, routes etc) from which the windfarms are visible together or sequentially;
- the duration, frequency and nature of combined and sequential views (glimpses or more prolonged views; oblique, filtered or more direct views; time separation between sequential views); and
- the relative impact of each individual windfarm, with regard to landscape character.

The degree of cumulative impact is thus a product of the number of and distance between individual windfarms, the inter-relationship between their Zones of Visual Influence, the overall character of the landscape and its sensitivity to windfarms, and the siting and design of the windfarms themselves. Less valued landscapes, and those with more limited views, may be able to accommodate two or more sensitively designed and sited windfarms at closer spacing and with less overall impact than widely separated proposals within more highly valued landscapes....”

## **Appendix 4 – extract from Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute and Institute of Environmental Management and Assessment)**

### **Cumulative Effects**

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future. They may also affect the way in which the landscape is experienced. Cumulative effects may be positive or negative. Where they comprise a range of benefits, they may be considered to form part of the mitigation measures.

Cumulative effects can also arise from the intervisibility of a range of developments and/or from the combined effects of individual components of the proposed development occurring in different locations or over a period of time. The separate effects of such individual components or developments may not be significant, but together they may create an unacceptable degree of adverse effect on visual receptors within their combined visual envelopes. Intervisibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance, as this affects visual acuity, which is also influenced by weather and light conditions.

## **Appendix 5 – Guidance on Cumulative Landscape and Visual Impact Assessment for windfarm developments**

### **1. Introduction**

This guidance seeks to define requirements for the assessment of significant cumulative landscape and visual effects under EIA regulations. It offers guidance on how proposed developments should be illustrated in landscape and visual analysis. Annex A summarises the process.

This is generic guidance only. The number of proposals in an area and the timing of applications gives rise to development scenarios of varying complexity. Professional judgement should inform the scope of the study to be undertaken. SNH and Planning Authorities may also require different or additional information to assist in their assessment of cumulative landscape and visual impacts.

### **2. General**

The proposed windfarm should form the focus of the study. The CLVIA should describe, visually represent and assess the ways in which the proposal would have additional impacts when considered together with other existing, consented or proposed windfarms.

All cumulative landscape and visual impact assessment (CLVIA) should be carried out in accordance with the methodology outlined in 'Guidelines for Landscape and Visual Impact Assessment' (LI and IEMA, 2002).

### **3. Base plan of all public domain proposals**

The purpose of the base plan is to portray a clear picture of all the issues which are likely to be relevant for the subsequent CLVIA and to select those projects which will go forward to be considered in the subsequent assessment.

A suitably clear and legible base plan should be produced to show any of the following, where they are located within 60 km from the windfarm under consideration:

- any constructed or consented windfarm;
- any undetermined windfarm application;
- any windfarm proposal which has been subject to an EIA scoping request to the relevant authority; and
- any other windfarm proposal that the Planning Authority and/or SNH considers relevant for study and which is within the public domain as a result of a public announcement or community meeting.

The 60km radius for the base plan is informed by University of Newcastle's *Visual Assessment of Windfarms: Best Practice* (where a radius of 30km is recommended for ZVIs in the LVIA of turbines of 100m and above). A 60km radius will enable the consideration of the scenario where, for example, an exceptionally important receptor is located midway between proposal A and proposal B at 30km from each.

The base plan should show, as a minimum, the footprint of all developments as shown by the relevant application or EIA scoping document. A 30km radius should be drawn around each proposal (these radii are best shown in different colours).

#### **4. Zone of visual influence studies**

Cumulative ZVIs should be produced for all **existing or consented developments or undetermined Section 36 or planning applications** within a 30km radius from the centre point of the current proposal. SNH or the Planning Authority may request the inclusion of additional projects outwith the 30km limit.

Cumulative ZVIs should clearly show those areas from where one or more windfarms are likely to be seen. In the case of three windfarms it will be possible to illustrate the overlapping areas using e.g. red, blue and yellow shading to represent each development (with corresponding overlaps of orange, green, purple etc.). Where four or more windfarms are involved, ZVIs may become difficult to interpret and additional cumulative ZVIs may be required to show the cumulative effects clearly.

*Early draft ZVIs can help the Planning Authority and SNH to advise on the selection of viewpoints for stationary cumulative impact assessment and routes for sequential cumulative impact assessment. These should be brought to pre-application meetings and included in scoping requests where possible.*

#### **5. Selection of viewpoints and study of fixed positions for cumulative visual effects**

The selection of viewpoints should be based on an analysis of the draft cumulative ZVIs. They should be chosen to represent the following fixed position cumulative visual impact scenarios:

- *Combined or simultaneous visibility* occurs where the observer is able to see two or more developments from one viewpoint, without moving his or her head. A 90 degree arc of view should be shown and the effects represented as described below in section 5.0; and
- *Successive or repetitive visibility* occurs where the observer is able to see two or more windfarms from one viewpoint but has to move his or her head to do so. Visualisations, such as 180 or 360 degree arc of view wirelines, will be useful in assessing these effects. Supporting text or tables to describe the effects will be needed.

Exact locations for viewpoints should be agreed with the Planning Authority in consultation with SNH.

More detailed guidance on the general principles that SNH recommend for viewpoint selection is contained in *Guidance on Scoping Issues for EIA* (SNH 2003).

## 6. Sequential visual assessment and selection of routes for analysis

*Sequential effects on visibility* occur when the observer has to move to another viewpoint to see other developments or a different view of the same development.

The study of such effects is a new and emerging field of EIA. The following suggests a framework to allow such effects to be consistently described and the significance of impact determined.

Routes to be assessed should be defined and agreed with the Planning Authority. The extent of these study routes should be informed by the 60km baseplan drawing and the cumulative ZVIs.

The assessment should clearly describe the baseline conditions and then describe to what extent the proposal would add additional visual impacts. This information could be presented in a table or other suitably clear presentation. The description should be informed and depicted by supporting wireline drawings and, where relevant, photomontages. Computer generated moving images or videomontage techniques may also be appropriate. Alternatively, a series of static images could be produced and viewed in time sequence.

The “journey scenario” should clearly describe the notable points along the route where impact occurs and should be described and assessed in terms of:

- direction of view (‘direct’, ‘oblique’, ‘aligned on route’, or ‘looking NW of route’ etc.);
- distance from nearest turbine;
- the number of turbines visible at each windfarm development; and
- which parts of the turbines are visible at each development (e.g. blade tips, hubs, upper towers or full towers).

The duration of effect should also be described. For example, ‘assuming an average driving speed of ‘x’, this effect will be apparent for approximately ten minutes between 12 and 8 km from the nearest turbine’. Whether views are aligned on direction of travel or oblique to the development also needs to be made clear.

## 7. Photomontage and wireline representation

The visual effects should be clearly portrayed in accordance with GLVIA guidelines and informed by existing and forthcoming University of Newcastle studies. Developments at different stages in the planning process should be shown in the following way:

- For **installed or consented** windfarms, and **as yet undetermined Section 36 and planning applications**, the turbines from the previously submitted layout drawings shall be shown on the photomontages and/or wireline views (in addition to those turbines proposed<sup>\*\*</sup>). The drawings should be clearly annotated to interpret the different proposals. The dimensions of the “existing” turbines [hub and blade] should also be clearly stated.

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<sup>\*\*</sup> Within 15km of the viewpoint it is usually a realistic requirement to illustrate individual turbines. Beyond this distance windfarms may be shown as an annotated array.

- For Section 36 and planning proposals which have been **subject to a formal scoping request**, the likely lateral extent of the array of turbines should also be shown, colour-coded to distinguish this information from the above. The purpose of including these, as with the base plan, is to provide contextual information as to how the proposal relates to other proposals which may potentially arrive within the planning system; this information will not form part of the cumulative assessment itself. Again, clear annotation of the wireline drawings will be needed. The extent of the array should be based on the footprint of the development as shown on the base plan. Where known, the dimensions of the proposed turbines should be given. An image of a single turbine, positioned centrally or prominently on the site, will assist in the portrayal of likely effects.

For all wireline and photomontage representations the following information should be clearly stated:

- arc of view (in degrees);
- dimensions (in metres) of all turbines;
- distance of site[s] from viewpoint (in metres or kilometres);
- status of “existing” developments i.e. installed / consented / scoping etc.; and
- camera format, focal length and viewing distance<sup>\*\*\*</sup>

*Numbering of all proposed turbines or annotation of key turbines or clusters of turbines on the wireline drawing is strongly recommended. However, annotation should be carefully executed in order not to become so complex as to obscure the clarity of the image. A separate appendix showing wirelines with numbered turbines may be appropriate.*

*To allow adequate assessment and interpretation of the photomontages and wireline images it is likely that it will be desirable to produce images at larger than standard A3 size. Such images should usefully be included in loose leaf format in plastic pockets within the EIA or in ‘fold out’ format.*

## **8. Description and assessment of cumulative landscape effects**

The study of potential cumulative landscape impacts should include the description and assessment of the following issues:

### **Effects on landscape designations**

Effects of additional development on the qualities and the integrity and objectives of any relevant landscape designation should be analysed and described.

### **Effects on designed landscape interests**

Effects of additional development on the character and integrity of any relevant designed landscape interest should be considered. Issues such as the landscape setting of the designed landscape and the impact on key views from the designed landscape will be important considerations requiring analysis

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<sup>\*\*\*</sup> Viewing distance of the photomontage and wireline is ‘most comfortable’ at between 30 and 50 cm.

## **Effects on landscape character**

The effect of development on existing landscape character should be described. It is likely that as more windfarms are developed and at closer distances to each other they will begin to be perceived as a key landscape characteristic and will therefore change landscape character. These effects should be objectively assessed in accordance with standard landscape character assessment guidelines (LUC for SNH and CA, 2002, GLVIA 2002).

## **Effects on sense of scale**

Tall structures are likely to dominate and alter the perception of vertical scale in the landscape. This will be the case particularly when larger turbines are seen in comparison with developments using smaller turbines or when proposed turbines are viewed in comparison with other landscape features.

## **Effects on sense of distance**

Effects on distance may be distorted with additional windfarm development. For example, if larger turbines are located in the foreground of smaller turbines or vice versa.

## **Effects on existing focal points in the landscape**

An existing windfarm development may act as a focal point in the landscape and the effects of other windfarm development on this should be considered.

## **Effects of skylining**

A viewer's eye tends to be drawn towards the skyline. Where an existing windfarm is already prominent on a skyline the introduction of additional structures along the horizon may result in development that is proportionally dominant. The proportion of developed to non-developed skyline is therefore an important landscape consideration.

## **Effects on sense of remoteness or wildness**

The existing experience of remoteness and wildness should be described and the cumulative effects of development analysed. Useful reference can be made to SNH's policy on Wildness in Scotland's Countryside (SNH, 2003).

## **Effects on other special landscape interests**

Effects of additional development on other interests in the landscape should be considered. For example, this may include consideration of the effects on the landscape setting of settlement or other cultural interests and associations with the landscape (LI and IEMA, 2002).

Other issues that are not identified above may also be relevant for assessment of cumulative landscape effects.

## 9. Timing of studies

The above requirements for cumulative landscape and visual assessment of all public domain proposals should run until the application is lodged. SNH recommends that any windfarm application should be assessed against any other constructed or consented windfarm *and* any other undetermined planning application. Paragraphs 16-21 and 26-32 of the main guidance provide further detail.

## 10. Other notes

Information on other sites subject to applications and scoping opinions should be obtained from the relevant planning authority and/or the Scottish Executive. SNH may be able to help identify such projects but cannot guarantee the accuracy of the information provided. SNH encourages Local Authorities and the Scottish Executive to log all existing, consented, applied for or formally scoped windfarm proposals on a GIS system. This should allow public domain information to be readily copied and handed over to developers and/or neighbouring Planning Authorities to allow for study and consideration of cumulative effects.

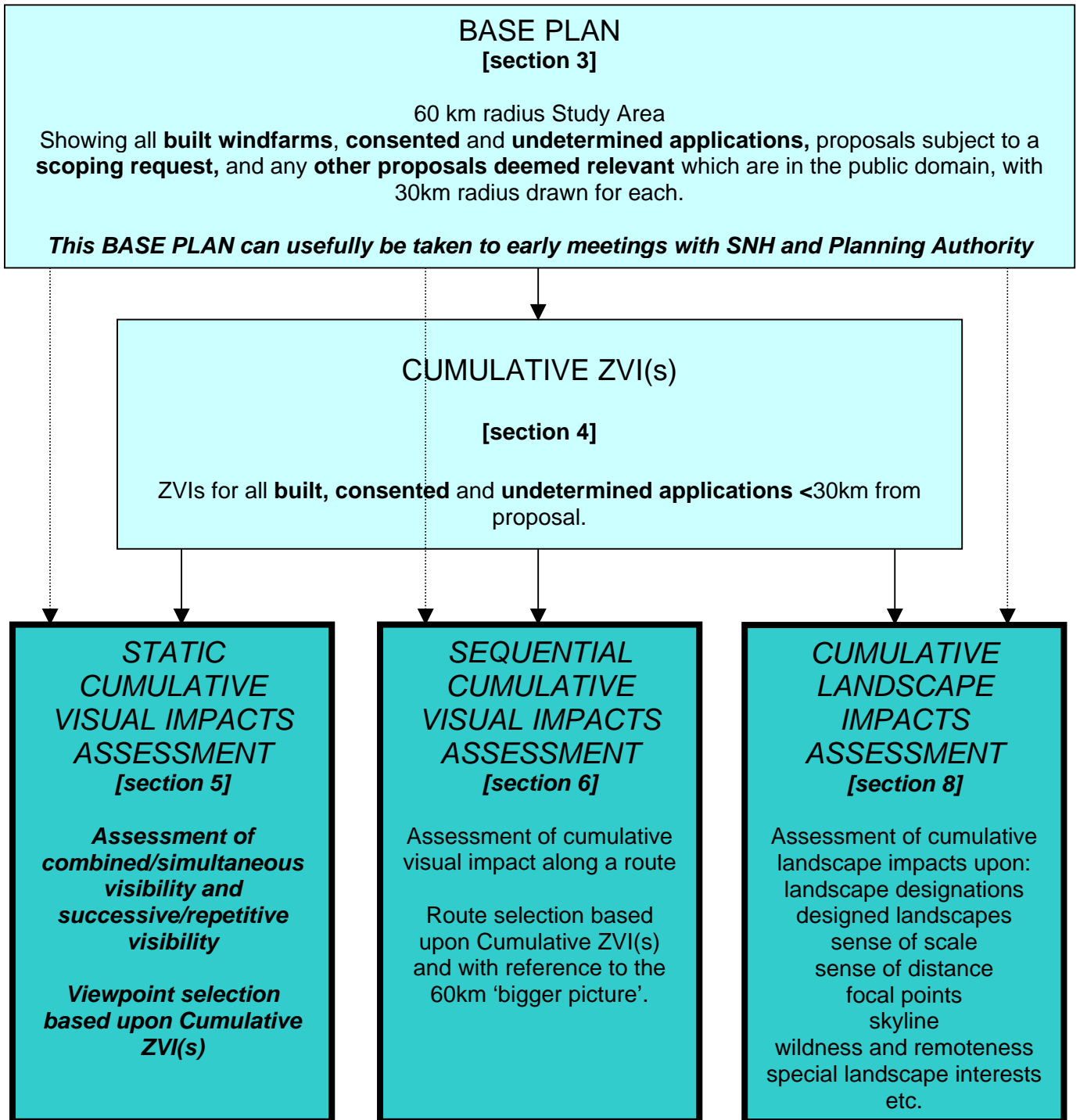
SNH is preparing best practice guidelines on Visual Impact Assessment for windfarms, in association with the University of Newcastle, local authorities and the Scottish Renewables Forum. When finalised these should be used in conjunction with this guidance note.

## References for Appendix 5

- Land Use Consultants on behalf of SNH and the Countryside Agency (2002) *Landscape Character Assessment: Guidance for England and Scotland*
- Scottish Executive Development Department (revised 2002) PAN 45 *Renewable Energy Technologies*
- Scottish Natural Heritage (2001) *Guidelines on Environmental Impacts of Windfarms and Small-Scale Hydro Electric Schemes*
- SNH (2003) Policy Statement 02/03: *Wildness in Scotland's Countryside*
- SNH (Nov 2003) *Guidance on Scoping Issues for EIA 3<sup>rd</sup> draft*
- The Landscape Institute and Institute of Environmental Management and Assessment (2002) *Guidelines for Landscape and Visual Impact Assessment 2<sup>nd</sup> Edition* Spon Press
- University of Newcastle (2002) *Visual Assessment of Windfarms: Best Practice. Scottish Natural Heritage Commissioned Report F01AA303A*
- SNH (in preparation) *Visual Impact Assessment for Windfarms Guidance*



## ANNEX A



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