Scottish Government
Directorate for Planning and Environmental Appeals,
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Falkirk.
FK1 1XR

9th January 2015

Dear Ms Manson

WIN-270-2 Electricity Act 1989 – Section 36 Application for Strathy South Wind Farm, Sutherland, Highland. Amended proposal for 39 turbines with a ground to blade tip height of up to 135 metres, up to 133MW, and associated development.

Thank you for consulting RSPB Scotland on this amended proposal. This submission should be read in conjunction with our response to the Energy Consents and Deployment Unit, dated 25 October 2013.

RSPB Scotland is a strong supporter of renewable energy. Renewables make an important contribution to reducing the greenhouse gas emissions that are causing climate change and affecting wildlife in Scotland and around the world. However, developments must be located to avoid harm to our most important wildlife sites. To help ensure developments are located appropriately, RSPB Scotland has been involved in almost every major wind farm development in Scotland. The majority of sites developed so far in Scotland pose no significant threat to wildlife. However, international evidence shows that wind farms clearly can have very severe impacts on birds in certain circumstances and this proposal at Strathy South, situated right in the heart of the country's most important places for wildlife, is undoubtedly one of the most concerning proposals we have seen in Scotland.

Whilst we welcome the proposed reduction in turbine numbers and acknowledge that the revised proposal would be slightly less damaging than the previous 47-turbine layout, the impacts of the development would remain unacceptable and we therefore **object,** for the following reasons:

- The proposed development would be likely to result in unacceptable harm to greenshank, hen harrier, red-throated diver, and wood sandpiper.
- Adverse effects of the proposed development on the integrity of the adjacent Caithness and Sutherland Peatlands Special Protection Area (SPA), Ramsar site and the underlying SSSIs cannot be ruled out.
- The proposed development would result in a permanent legacy of turbine bases, roads, hard-standings and damaged peatland hydrology, even after decommissioning. This would permanently constrain not only peatland habitat restoration on the site itself, but also re-establishment of the conservation value of the site to its wider setting in the Caithness & Sutherland Peatlands Special Area of Conservation (SAC) and the SPA. This would be inconsistent with the over-arching objectives of the Habitats and Birds Directives, and could also undermine potential inscription of the Flow Country as a UNESCO World Heritage Site.
- The proposed development would be contrary to the development plan.
- The carbon payback period of the development is likely to have been significantly underestimated.

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Further details of RSPB Scotland's updated objection are provided in Appendix 1 to this submission and will be enlarged upon at the forthcoming Public Local Inquiry.

RSPB Scotland objects to, and urges refusal of, this highly damaging proposal which would result in unacceptable harm to wildlife and habitats. Consent would perpetuate and exacerbate the biodiversity damage caused by the implementation of previous poor land-use policies, and would greatly hamper proper restoration of the Flow Country peatlands. This harm would not be outweighed by renewable energy benefits arising from the development and the proposal is therefore contrary to the development plan and Scottish Government planning policy. By contrast, refusal would lead to long-term environmental and biodiversity gain, aided by processes that currently have wide-ranging practical and policy support.

Yours sincerely

Peter Gordon
RSPB Conservation Planning Officer

Appendix 1. RSPB Scotland Objection

WIN-270-2 Electricity Act 1989 – Section 36 Application Strathy South Wind Farm, Sutherland, Highland
Amended proposal for 39 turbines with a ground to blade tip height of up to 135 metres, up to 133MW, and associated development.

The site

1 Until 1981, the Strathy South forest was in state ownership, as part of the Dalangwell farm run by the Scottish Office Agriculture Department. In 1981 it was sold to Fountain Forestry and then to a number of private investors, for whom Fountain Forestry continued to manage the land as a newly-planted commercial forest. Tree planting was carried out between 1983 and 1994, covering a U-shaped area roughly 5 km north-south by 5 km east-west. The forest is surrounded by the Caithness & Sutherland Peatlands SPA and SAC, here underpinned by four SSSIs: Skelpick Peatlands; Lochan Buidhe Mires; West Halladale; and Strathy Bogs.

2 The proximity of the development site to both European wildlife sites means that there is a likely significant effect of the wind farm on both the SPA and the SAC. Consequently, before any consideration can be given to granting consent, the Scottish Ministers must ensure that there would be no adverse impact on the integrity of either site.

3 The Strathy Bogs SSSI includes the earliest area designated in the Flow Country for its blanket bog interest (in 1960, as a National Nature Reserve, then as an SSSI in 1974, with extensions in 1984 and 1994). Protecting blanket bog in this way was rare before the mid-1980s, and so the original SSSI must therefore have been considered one of the very best examples of blanket bog in the Flow Country. As the surrounding blanket bog units in their original state were under a similar management regime (as part of the Dalangwell farm), it is reasonable to assume that they will also have been of very good quality. This is backed up by NCC's assessment of the quality of the areas as bird habitat in *Birds Bogs & Forestry*[1], and is consistent with the overall topography of the application site. As one of the largest areas of 1980s Flow Country forestry otherwise surrounded by internationally designated peatland habitat, Strathy South forest is a prime candidate site for full restoration to active blanket bog. Such an outcome would restore connectivity to and between the surrounding designated areas, to the long term benefit and enhancement of the integrity of the SSSIs and European sites. However, in our view, for the reasons expanded on below, this outcome would be severely and permanently prejudiced by construction of the proposed wind farm.

Greenshank

4 It is clear from information provided by the Applicant, using either of the two methods of Bellamy's 2009 surveys[2] or that of the 1995 national greenshank survey[3], that there are very many greenshank

[1] Stroud, DA, Reed, TM, Pienkowski, MW &Lindsay, RA (1987) *Birds, bogs and forestry, Nature Conservancy Council*

[2] Bellamy, PE & Eaton, MA (2009) 2009 CSM bird monitoring of Caithness and Sutherland Peatlands SPA. RSPB contract report to Scottish Natural Heritage

territories within and near the proposed wind farm site. Evidence of the extent of the displacement effect of turbines on greenshanks is scant and therefore it cannot safely be assumed that the number of territories potentially lost will not be large.

5 The Achany[4] study quoted involves a single site, appears to have no control, involves few territories and has few or no baseline data. It therefore provides only very limited evidence on the effect of turbines on greenshank displacement.

6 Further support for the argument that greenshank displacement will be minimal is sought by the Applicant from an unreferenced study of redshank at a Central Scotland wind farm. However, this evidence is of questionable relevance: it involves a different (albeit taxonomically closely-related) species, and differences in ecology (in particular, habitats, as well as distances of movements, sizes of areas used for display) could affect displacement. Furthermore, that study also had no baseline data.

7 Site fidelity is an important consideration in relation to understanding wader responses to wind turbines. Any evidence of birds remaining near turbines in the year or two following construction is likely to be affected by site fidelity shown by breeding birds that occupied the area prior to construction. For example, waders can be observed displaying and nesting near and within peatland that has been freshly deep-ploughed for forestry. These are most likely to be birds that chose to breed there before it was damaged because, after a few years, such areas are abandoned. To provide good evidence that greenshanks tolerate wind turbines, we would need to be able to show that numbers are maintained over several years after construction. We would also need robust baseline (pre-construction) data and control data, so that changes in the wind farm impact zone can be properly measured. We are unaware of any such evidence.

8 These greenshanks are part of the qualifying interest of the SPA. The Applicant claims that any birds displaced from the wind farm could be accommodated elsewhere within the SPA over the long term. There is no evidence that this could happen for greenshanks in the peatlands. In fact evidence is lacking, for any territorial species, that displaced breeding birds can be accommodated indefinitely within a nearby population of non-displaced birds. Without such evidence it should be assumed that, as the surrounding SPA and SSSIs are in favourable condition for greenshank, they also support populations of the species at carrying capacity, subject only to natural year-to-year fluctuations.

9 VP survey work in 2014 did not conform to SNH Guidelines, as at none of the VPs was the recommended 36 hours minimum of survey effort met. As VP work in 2014 concentrated on red-throated diver, which are later in moving inland than greenshank, no observations were made before 24 May. Significantly, this means that the early part of the season, when greenshank display activity is at its most intense, was excluded[5]. 2014 greenshank collision rate predictions should therefore be discounted from further consideration or given only very limited weight.

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[3] Hancock, MH, Gibbons, DW and Thomson, PS (1997) *The status of breeding Greenshank in the United Kingdom in 1995*. Bird Study 44:290-302

[4] Strathy South Environmental Statement Addendum 2013, Technical Appendix A11 Birds, Appendix 5 – Ornithological Surveys at Forsinard, Modsary and Achany 2009-2013

[5] Cramp, S (1983) *Birds of the Western Palaearctic*, **3**, 553. Oxford.

10 VP coverage in other years is scarcely better. In 2003, 6 hours on 26 April were followed by a long gap until 20 May; in 2004, 27 hours coverage in April across 4 VPs included little effort at dawn or dusk, although it is known that display-flight activity is particularly intense between 03.00 and 07.00[5]; in 2007, coverage started on 29 April but recommenced on 24 May; total coverage in April 2010 was better but included no dusk or dawn watches; in 2012, although coverage was satisfactory until 13 April a long gap which followed until 7 May spanned a period when display-flighting is particularly intense[6]. An initial impression gained of adequate effort across many years is, therefore, misleading and collision risk is likely to have been considerably underestimated.

11 Greenshanks can be difficult to detect at a distance, particularly if they are silent. They are rather small birds and, unless they are flying directly away from the observer when their white rump and back markings will be conspicuous, can easily be overlooked. In RSPB Scotland's response of 25 October 2013, we pointed to the likelihood that the difficulty in detecting greenshank activity that occurred distant from the observer was likely to lead to an underestimate of collision risk. We commend the attempt made to correct for distance-detection, notwithstanding the anomalous finding of reduced density of recorded flights in the 0-250m distance band, which may be due to birds avoiding the proximity of observers, even though the fieldworkers attempted to make themselves inconspicuous. However, we still consider there to be an unusually high and unacceptable level of doubt as to the accuracy of predictions of collision mortality.

12 Insufficient evidence has been presented to allow it to be concluded, beyond reasonable doubt, that there would not be an adverse impact on the integrity of the site, taking into account the conservation objectives for the SPA, through displacement or collisions of greenshanks.

13 RSPB Scotland therefore **maintains its objection** on breeding greenshank grounds.

Hen harrier

14 Seven nest locations/territories were noted within 2km of the site boundary with high levels of foraging activity within Strathy South forest. Two km is well-established as a generic foraging radius by breeding hen harriers around their nest sites.[7] Three nest locations were noted within the site although only one breeding pair was recorded in any single year. However, it is very likely that breeding attempts were under recorded in years when surveys were initiated late, such as the Ecology UK surveys in 2003 and 2004, as hen harriers commence breeding in North Scotland from April onwards. .We disagree with the assertion that most adult birds will remain on site after failure, and consequently also with the conclusion that failed breeding attempts would still be detected. In our very substantial experience of hen harrier surveying, birds regularly move away from the site after breeding failure, and therefore failed pairs could have been missed by surveys initiated later in the year. Three records of breeding hen harriers lie within 200m of proposed turbine locations. Notwithstanding reports of hen harrier breeding attempts close to operating turbines, a peer-reviewed study[8] across a number of wind farm sites has shown a substantial lowering of hunting effort in the vicinity of turbines. Consequently, we consider the risk of displacement to be unacceptably high, even without suggested habitat management to actively discourage nesting here if a

[6] Nethersole-Thomson, D and Nethersole-Thomson, M (1979) *Greenshanks* 113 T & AD Poyser , Berkhamstead

[7] Arroyo B, Leckie F, Amar A, McCluskie A & Redpath S (2014). Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. *Bird Study* 61: 48-55

[8] Pearce-Higgins, J.W., Stephen, L., Langston, R.W., Bainbridge, I.P. and Bullman, R. (2009) The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*, **46**: 1323-1331.

wind farm is built. It is likely, therefore that hen harrier nesting activity at this site and the behavioural impact of turbines on hen harriers in general have both been underestimated in the ES and supplementary information, and therefore that the effect of a wind farm on breeding birds which form part of the SPA population will be greater than stated.

15 We are very concerned that collision risk may have been underestimated. We indicated in our 2013 response that 2003 and 2004 results should be discounted as VP work was inadequate. A particular concern is that, on a busy site such as this, much time is spent following individuals of target species outwith the survey area, or within the survey area but beyond the cut-off threshold. That time is not spent scanning and any birds not actually within the narrow field of view through binoculars or telescope will be missed. This would scarcely matter at a site with few individuals of target species but at such a busy site as Strathy South the discrepancy between the time recorded as the length of a VP watch and the time actually spent scanning can be considerable. This leads to an underestimate of flight activity in the wind farm area within the cut-off distance. Time spent following birds outwith the wind farm area or beyond the cut-off distance should be discounted from the survey effort. This shortcoming is exaggerated in this instance by delimitation of the tripartite wind farm area.

16 The assessment ignores the potential for rare but risky flight behaviours, such as displays. It would have been helpful if display flights had been identified on maps or specifically noted in tables, such as Appendix 2 of Technical Appendix A11.1 of the 2013 Environmental Statement Addendum July 2013. It is likely, therefore, that collision risk has been significantly underestimated.

17 Three likely hen harrier collision victims have now been recorded at a wind farm in Perthshire and another possible collision victim at a wind farm in Argyll, confirming the species' potential vulnerability to collision. At the Perthshire site no pre-consent calculation of collision risk was made as it was not considered worthwhile, given the low incidence of recorded flights. Clearly, the potential for numerous collisions at Strathy South cannot be lightly dismissed and, given that birds here are clearly associated with an SPA population, there is an imperative to have certainty as to likely impacts.

18 A Population Viability Assessment (PVA) is used in section A.11.2 of the 2013 Application to demonstrate potential impacts on the SPA population. This is an old PVA from the Camster wind farm application, and insufficient information is given to allow interpretation. The PVA shows a baseline population that is undergoing an exponential population increase, which is clearly not the case for this SPA or the national population[9], and the PVA is not justification for the claim that the wind farm will not have population scale effects. This PVA should be redone using up to date population information.

19 RSPB Scotland **maintains its objection** on hen harrier grounds as an adverse impact, either through displacement or collisions, on the SPA population cannot be ruled out.

Red-throated diver

20 The extent of losses due to turbine collisions is very uncertain. The Applicant's data show that the number of estimated collision fatalities varies strongly from one year to the next. In order to properly understand collision risk, the Applicant should not just take the mean of the values from the four years, which is a sample mean, as what we are interested in is the true mean collision risk - that which we could calculate if we had perfect knowledge of the system. The sample mean, using the 39-Turbine layout for 2007, 2010, 2012 and 2014 is 3.35 over 25 years. From these four years' values we estimate that the 95%

[9] Hayhow, D et al (2013) The status of the hen harrier Circus cyaneus in the UK and the Isle of Man in 2010 *Bird Study*, 1-13

confidence limits are 0 and 8.7 – such a wide confidence interval indicates that true collision risk has been poorly estimated, The upper confidence limit is well above the sample mean of 3.35, implying that the collision fatalities and population impact could plausibly be much higher than estimated**.**

21 Turbine removal near loch 54, where birds were seen in every survey year, including a displaying pair, although no confirmed breeding was recorded, will help safeguard its future use by red-throated divers. Loch 64 however, where breeding was confirmed in 2012, will continue to have turbines located to the south and to the north i.e. between the breeding site and the sea where red-throated divers will commute regularly to feed, posing a substantial collision risk. The likelihood of the loss of this breeding site either by displacement, or because of adult collisions, is considerable. The loss of a single pair from an SPA population recently estimated at 39 pairs would represent an adverse effect on site integrity.

22 RSPB Scotland **maintains its objection** on red-throated diver grounds as an adverse impact on the SPA population cannot be ruled out.

Wood sandpiper

23 Whilst the deletion of the closest turbine (T51) to the Yellow Bog territory will reduce the likelihood of displacement, we consider this to be a wholly inadequate measure for a species which is not only a qualifying feature of the SPA (5 pairs)[10] but is nationally an extreme rarity (11-27 pairs)[11].

24 A number of turbines remain close to the territory which is known to have been occupied at Yellow Bog in both 2010 and 2011. Distances (as measured from maps A11.1.29 and A11.1.30 of the 2013 FEI Report) are as follows: T46 1.3kms, T19 1.3kms, T29 1.6kms, T13 1.6kms, T30 2.2kms and T22 2.3kms. These distances indicate an unjustified precision as the actual nest-site within the territory may be considerably closer to any of these turbine positions. Furthermore, there is an almost complete absence of background evidence available on turbine displacement distance for this species. The assessment of disturbance distances provided by Ruddock and Whitfield[12] is a wholly inadequate basis for determination of the effects of a nearby wind farm on territory occupation. "Expert opinion" considered the effect of an approaching walker, rather than the construction and operation of turbines with associated activity. That paper also acknowledged the lack of reliable evidence "*Of all the species covered by this review the wood sandpiper was the poorest served by empirical data or literature on distances at which disturbance may occur."*

25 While there may be some reduction in likelihood of displacement, the risk of turbine collision would not be appreciably lessened by deletion of this single turbine near the Yellow Bog territory. This species makes particularly extensive display flights, at a height which brings it within sweep of turbine blades:

"Display flights performed by both sexes, but less by female; typically bird flies up with sharply angled-back wings to perform circling flight over particular area; when it reaches a certain height – generally 10-100m but up to 300m recorded – begins typical Tringa switch-back flight in which wingbeats change from regular,

[10] http://jncc.defra.gov.uk/pdf/SPA/UK9001151.pdf accessed 22 December 2014

[11] Musgrove, A et al (2013) Population estimates of birds in Great Britain and the United Kingdom *British Birds* **106**, 64–100

[12] Ruddock, M & Whitfield, D P (2007) A Review of Disturbance Distances in Selected Bird Species A report from Natural Research (Projects) Ltd to Scottish Natural Heritage

clipped movements to a rapid fluttering for 1-2 s, during which bird climbs further, then glides up and forwards on stiffly arched wings, tail spread and legs slightly dangling, and on coming down delivers song.... Observations in Scotland indicate that Display-flight occurs over a particular area, then bird flies straight and fast to another several hundred metres away and performs it again, thus repeating performance at different sites 4-5 times. Birds also leave breeding area to range up to 2km away over woods and marshes, occasionally performing display flight.[13]

26 RSPB Scotland **maintains its objection** to the proposal on wood sandpiper grounds as the risks of displacement and of collision are not known but for such a nationally-rare species which is also an SPA-qualifying feature a highly precautionary approach is merited.

Black-throated diver

27 The deletion of turbines 55, 62, 63, 68, 73 and 74, which were the closest turbines to Loch 54 where most of the flight activity within the development site has been recorded, will substantially mitigate the likelihood of displacement or collision. However, Loch 86 lies within 1 km of turbines T49 and T52. Possible breeding was noted there in 2010 but a bird was also present there in 2007 and 2012 and flights over this loch were recorded in 2003 and 2004, suggesting it may be more important as a breeding site than indicated. Displacement, or reduced breeding success, of this pair as a result of the wind farm cannot be ruled out. No figure is given for collision risk under the 39 turbine layout. However, given turbine deletion around Loch 54 where much of the flight activity was recorded, it will be lower than the 2.25 collisions over 25 years predicted for the 47 turbine layout.

28 RSPB Scotland **no longer objects but remains concerned** about Strathy South's impact on breeding black-throated divers. Should Scottish Ministers decide to issue consent for these proposals, despite RSPB Scotland objections on other grounds as set out in this response, a condition requiring monitoring should be attached to help inform any additional mitigation measures should impacts be greater than predicted.

Golden eagle

29 Golden eagles are prevented from hunting by forest cover at Strathy South although they occasionally fly over the site. Forest removal and site restoration would, ordinarily, improve the extent of land suitable for hunting by eagles, making successful breeding and regular occupation of the third site, referred to in our previous response, more likely.

30 However, evidence from Beinn an Tuirc wind farm in Argyll[14] where turbine presence appears to deter eagles from making use of restored, deforested land, suggests that any such benefit is likely to be reduced. Nevertheless, turbine removal in the NW corner of the site would offer benefit, especially to the third site which appears to be currently unused, or only occasionally occupied.

31 Disturbance from felling and site restoration, especially relatively close to nest sites, could prevent occupation or reduce the likelihood of successful breeding and these operations should be covered by

[13] Cramp, S (1983) *Birds of the Western Palaearctic*, Vol 3, 582. Oxford.

[14] Walker, D, McGrady, M, McCluskie, A, Madders, M & McLeod, DRA (2005) Resident Golden Eagle ranging behaviour before and after construction of a windfarm in Argyll *Scottish Birds* 25: 24–40

planning condition regulating their timing, should this application be consented despite RSPB Scotland objection.

32 Development of a wind farm on this site would increase risk of collision to golden eagle and prevent the benefits that would be provided through site restoration without turbines. However, although RSPB Scotland remains concerned about the impacts of the development, following revisions to the proposals we **no longer object** on golden eagle grounds. A condition requiring monitoring should be attached to help inform any additional mitigation measures should impacts be greater than predicted.

Golden plover

33 The reduction to 39 turbines has led to fewer breeding golden plovers being at risk of displacement. Only Turbine 41 now lies within 500m of a territory centre, cited by the Applicant at 222m from a confirmed territory in 2010 and 355m in 2012. Although the precision of such estimates is questionable, it is clear that very few pairs are at risk of displacement. In the context of an SPA population of 1064 pairs, any potential loss of existing pairs would be negligible. There is a likelihood that turbine presence would prevent the colonisation of the deforested site which we would otherwise expect to see once site restoration has progressed sufficiently. Studies at SSE's Gordonbush wind farm site demonstrate that the construction and operation of a wind farm can lead to site abandonment by golden plovers so the likelihood of re-colonisation of a deforested wind farm site could also be significantly reduced compared to a deforested and restored site without the presence of turbines.

34 Our previous comments on the shortcomings of VP surveys remain. No revised estimate of golden plover collisions is provided but with reduced turbine number the total is likely to be somewhat less. Although an impact on current golden plover distribution and numbers cannot be ruled out, we now consider that, in the context of a large SPA population, any small change which may occur would be unlikely to be of such magnitude as to represent an adverse impact on site integrity.

35 RSPB Scotland remains concerned about the loss of opportunity for enhanced golden plover numbers should this application be consented and prevent proper restoration of the site, but **no longer objects** on the basis of threat to the SPA population. A condition requiring monitoring should be attached to help inform any additional mitigation measures should impacts be greater than predicted.

Dunlin

36 Several studies have shown a displacement effect of turbines on other wader species. Although evidence of such an impact on dunlin is lacking, it would be appropriate to adopt a precautionary approach for an Annex 1 SPA feature. The reduction to 39 turbines has led to fewer breeding dunlins being at risk of displacement. Only Turbine 19 now lies within 500m of a territory centre - at 471m, in 2012 only – although there are a few additional records of single birds within 500m. Again, notwithstanding the misleading precision of such distance estimates, very few pairs are at risk of displacement and, in the context of an SPA population of 1860 pairs, any potential loss of existing pairs would be negligible. However, turbine presence may prevent the colonisation of the deforested site which we would otherwise expect to see once site restoration has progressed sufficiently.

37 A revised estimate of dunlin collisions is not provided but, with a reduced number of turbines, fewer collisions would be expected. Our previous comments on shortcomings of VP surveys remain. Although an impact on current dunlin distribution and numbers cannot be ruled out, we now consider that, in the context

of a large SPA population, any small change which may occur would not be of such magnitude as to represent an adverse impact on site integrity.

38 As for golden plover, RSPB Scotland would regret the loss of opportunity for enhanced dunlin numbers should this application be consented but **no longer objects** on the basis of threat to the SPA population. A condition requiring monitoring should be attached to help inform any additional mitigation measures should impacts be greater than predicted.

Prevention of full restoration – "Opportunity cost"

39 One of the overarching objectives of the Birds and Habitats Directives is the restoration of biotopes, and "habitats and species of community interest". Blanket bog is listed on Annex I of the Habitats Directive; active blanket bog is a priority habitat. It is also a UK BAP priority habitat, for its biodiversity interest. Peat is a carbon store, and "active" (biologically healthy) blanket bog sequesters carbon from the atmosphere, while blanket bog that has been damaged, for example by forestry ploughing or drainage, tends to release carbon into the atmosphere (see paragraph 50).

40 Blanket bog that has been damaged by forestry or drainage can usually be restored so that it is once again "active", or peat-forming. RSPB Scotland has extensive practical experience of peatland restoration through our activities in the Flow Country. Since acquiring the Forsinard Estate in 1995, and the subsequent acquisition of a number of other forestry blocks, we have removed 2,200 hectares of forestry planted on blanket bog, and restored the hydrology of a further 15,600 hectares of unplanted blanket bog by drain blocking. This is one of the largest peatland restoration projects in the UK. We also work with a range of research partners to understand the impacts of our management interventions on peatland ecology, hydrology and carbon. UK and Scottish Governments, as well as the European Commission, are committed not only to protecting blanket bog but also to restoring blanket bog that has been damaged by past land use change, including forestry (see Section 15 of Appendix 1 of our 2013 response). This will have long term benefits for both biodiversity and climate.

41 Until 1981, the Strathy South forest was in state ownership, run as a farm by the Scottish Office Agriculture Department. In 1981 it was sold to Fountain Forestry and then to a number of private investors, for whom Fountain Forestry continued to manage the land as a new commercial forest, with planting being carried out from 1983 to 1994. The forest is surrounded by nationally and internationally protected blanket bog: the Strathy Bogs, West Halladale Skelpick Burn and Lochan Buidhe Mires SSSIs, all four of which help underpin the Caithness & Sutherland Peatlands SPA and SAC.

42 Strathy Bogs is the earliest site designated in the Flow Country for its blanket bog interest (as a National Nature Reserve in 1960, and as an SSSI in 1974, with subsequent extensions in 1984 and 1994). The European sites were classified in 1999 (SPA) and 2005 (SAC), and the Caithness & Sutherland Peatlands is also on the UK's tentative list of candidate World Heritage Sites. The designation of Strathy Bogs took place at a time when protecting blanket bog in this way was rare, and so the original SSSI must therefore have been considered one of the very best examples of blanket bog in the Flow Country. As the surrounding blanket bog units (mesotopes) have suitable topography and in their original state were under similar management, they are likely too to have been of very good quality. This is backed up by NCC's assessment in *Birds Bogs & Forestry*[15] and is consistent with the overall topography of the application site.

[15] Stroud, DA, Reed, TM, Pienkowski, MW &Lindsay, RA (1987) *Birds, bogs and forestry,* Nature Conservancy Council

43 It is clear that the creation of Strathy South forest will have caused significant damage to the original blanket bog interest of the site. In addition, a preliminary examination of the topography of the site suggests that in its original state, the peatland landscape may have offered some connectivity for surface water flow from land to the north of Loch Strathy (in what is now part of the Skelpick Peatlands SSSI), to the Yellow Bog (part of Strathy Bogs SSSI). Past surface flow in this area would have been bounded by the Strathy River to the east and the Yellowbog Burn to the west. Much of this area is now planted with trees, but lacks forest roads. The development proposal would result in the construction in this relatively less damaged area of wind turbines, foundations, hard standings and roads, including the sole road access to all of the turbines in the western half of the scheme. It seems inevitable that this would result in significant additional hydrological impacts on the bog and it seems unlikely that this would be compatible with restoring any pre-forestry surface-water flow to the Yellow Bog from higher ground to the south.

44 At a wider scale, as a large "island" of forestry surrounded by SAC and SPA blanket bog, Strathy South forest is a prime candidate for restoration to blanket bog habitat. It is essentially similar in character to the extensive areas of forestry successfully being restored or earmarked for restoration on RSPB's Forsinard reserve, which abuts the wind farm site on two sides. With a sensitive and strategic approach, primarily focussed on restoring habitats, our extensive experience in blanket bog restoration suggests that there is no reason why the site could not be restored to a high standard.

45 However, this aim is not compatible with construction of a large wind farm, which would cause significant damage to the site additional to that already done by forestry planting. This damage would also be additional to any limited damage likely to be caused by sensitive removal of the trees currently present. The additional impact would come from turbine bases and hard standings, and both new and reconstructed roads, all of which would impair water movement and consequently recovery of the surface vegetation layer, which is required for the restored bog to be "active". In particular, a 39-turbine wind farm would require much more substantial roads than the current forest road, in order to take the very much greater weight and dimensions of combinations of vehicle and load, and the very much larger number of vehicle movements than those required solely for timber extraction and restoration.

46 So far, SSE's proposals for restoration are poorly developed and appear to offer only very limited restoration. The ES contains no attempt to map out, or prioritise for restoration, any of the main peatland units. There is no detailed restoration plan. No attempt appears to have been made to assess the extent and condition of Sphagnum within any of the forest blocks, which would indicate which blocks might have the greatest potential for restoration. The only map of habitat management shows large areas where it is proposed to manage the surface vegetation in order to deter nesting by some species of bird. It must be assumed that management to deter bird nesting will, in effect, significantly constrain restoration of the peatland to its full potential. Because active blanket bog needs a naturally functioning surface layer, this particular proposed management is not compatible with restoring blanket bog habitat, nor with the proper functioning of those areas of bog to sequester and store carbon. This deemed requirement to actively hinder proper restoration also raises serious doubts about the fundamental suitability of this site for a development of this type.

47 Therefore, at best, SSE's proposals will offer only minimal and very small-scale benefit to blanket bog habitat. If the wind farm is constructed, the permanence of the roads and turbine bases means that larger scale, more complete, restoration of functional blanket bog units will be permanently impaired. Given the scale and location of Strathy South forest, entirely surrounded by, and on similar habitat to the SAC/SPA, any small scale habitat benefits from the development, which are in any case at present purely hypothetical and undeveloped, are entirely lacking in appropriate long-term ambition for this site.

48 In its present state, Strathy South forest is a large and isolated legacy of poor land-use policy dating from the 1980s. Under current forestry policy it would ultimately be restored to blanket bog, with a long-term view to inclusion within the SPA/SAC, and future inscription as part of a Flow Country World Heritage Site. This biotope/habitat restoration would be entirely in keeping with the overarching objectives of the Birds and Habitats Directives, and would greatly enhance the integrity of peatland habitat within this part of the SPA and SAC and would positively contribute towards future inscription as part of the Flow Country World Heritage Site. Consenting the wind farm would, by contrast, both exacerbate and perpetuate the damage already caused by forestry plantation, potentially jeopardising not only habitat restoration across the development site, but possibly also the agreement of UNESCO to inscribe the Caithness & Sutherland Peatlands as a World Heritage Site.

49 In determining the Strathy South wind farm application, Scottish Ministers are obliged by regulation 3 of the Conservation (Natural Habitats &c.) Regulations 1994 to exercise their functions which are relevant to nature conservation so as to secure compliance with the requirements of the Birds and Habitats Directives. Given the importance to the long-term integrity of the Flow Country peatlands of restoring the Strathy South site as far as possible to active blanket bog, the objectives of the Directives would be undermined by the development of a wind farm on this site. Consequently, we consider that the "conservation opportunity cost" of consent to the long-term objectives of the Birds and Habitats Directives should carry great weight in the determination process, in addition to that afforded to the assessments required under regulation 48 of the effects of the project on the integrity of the SPA and SAC as currently designated.

Carbon impacts

50 The assessment of potential carbon losses and savings is a material consideration in determining a wind farm application. Wind farm development in sensitive peatlands can, if poorly planned, harm biodiversity and undermine the climate benefits of renewable energy, given the importance of Scotland's peatland ecosystems for both carbon storage and habitat provision. The importance of peatlands for carbon storage, and the potential for development to cause significant carbon emissions is recognised in Scottish Planning Policy which states (paragraph 205) "*where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO_2) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO_2 to the atmosphere. Developments should aim to minimise this release*."

51 To enable this assessment, the Scottish Government provides a carbon calculator which calculates a project's 'carbon payback period', i.e. the amount of time it will take for the wind farm to begin generating carbon emissions reductions, taking into account loss of carbon from peatland disturbance and other factors. There is no strict "bar" for what is an acceptable or unacceptable payback period, although developers are expected to "follow best practice for minimising carbon emissions and disturbance of peat"[16]. The Applicant's calculations suggest a carbon payback period of 1.1 years (minimum -0.5 to maximum 4.6 years[17]), and also suggest the project would be expected to generate electricity at a carbon intensity of 32g tCO_2/kWh (minimum 32 and maximum 63). This would meet the non-statutory Scottish Government target ratio of CO_2 equivalent emissions to power generation of 50g tCO_2/kWh by 2030.

[16] See http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17852-1/CSavings

[17] The calculator inputs include expected, minimum and maximum figures to provide an expected, best and worst case scenario.

52 RSPB Scotland commissioned an independent review (attached) of whether the carbon calculator has been used appropriately in the assessment of this proposal. We include a copy of the review report alongside this response. This review concluded that the carbon payback period may have been significantly underestimated. The review suggests a number of changes are required to make a more accurate prediction of carbon payback. These changes would increase the estimated payback period from 1.1 (min -0.5 and max 4.6) to 7.3 years (min 4 and max 16.1).

53 The review also highlighted limitations in the calculator's approach to assessing the carbon dynamics of restoration in afforested sites, as it has no capacity to include gradual changes to emissions, instead considering restoration as a step-change from an unrestored to a restored site. Neither the Applicant's nor the RSPB Scotland figure can be considered definitive given the use of default values in place of site specific data. However, the review did identify a number of areas where values used are not realistic, or are not based on best available evidence, resulting in an underestimation of the carbon payback period.

54 A number of areas where the carbon impacts are considered to have been underestimated (and their relative impact on the results) are summarised as follows:

Exclusion of forest carbon loss

55 Although it is likely should the wind farm proposal not progress, there is no current confirmed plan to fell the forestry in the absence of the wind farm so, according to the calculator guidance, loss of forest carbon should be included in the calculations. The Applicant's calculations exclude forest carbon losses but claim the carbon benefits of post-felling restoration. If the calculation deems felling to be part of existing plans then, logically, restoration would be part of that plan too and should not therefore be considered a result of the wind farm. Therefore the loss of forest carbon should be included in the calculations.

Under-estimation of extent of drainage impact

56 The carbon payback period is sensitive to the extent of drainage caused by wind turbine infrastructure. The Applicant used values based on (unreferenced) professional judgement by RPS staff of 10 m expected drainage (range 5 – 25m). There have however been reports in peer-reviewed literature of drainage extending to >10 m and on occasion >25 m on previously gripped upland peatland[18,19,20.21] Our review concluded that a more conservative range should be used, with an expected drainage extent of 20m (range 5 to 50m).

Under-estimation of time required for regeneration of bog plants after restoration

[18] Wilson L et al (2010). Recovery of water tables in Welsh blanket bog after drain-blocking: Discharge rates, time scales and the influence of local conditions. *Journal of Hydrology*, 391: 377-386

[19]Holden J, Wallage ZE, Lane SN, McDonald AT (2011) Water table dynamics in undisturbed, drained and restored blanket peat. *Journal of Hydrology* 402, 103-114.

[20] Wallage ZE and Holden J (2011) Near-surface macropore flow and saturated hydraulic conductivity in drained and restored blanket peatlands*. Soil Use and Management* 27, 247-254.

[21] Armstrong, A. et al., (2010) The impact of peatland drain-blocking on dissolved organic carbon loss and discolouration of water; results from a national survey*. Journal of Hydrology*, 381(1-2): 112-120.

57 Although there will be other short-term benefits it is highly unlikely that restoration will result in a functional bog habitat, or complete restoration of site hydrology, within 6 years (range 4 to 8) as stated in the Applicant's calculations. Current evidence suggests hydrological conditions require more than 6 years to equilibrate[22,23,24] Research from Canada suggests that 10 years is not enough[25]. No restoration projects to date have reported a return to near-natural bog habitat within their current life span, of generally up to 10 years[26,27] Even the oldest restoration site (18 years since restoration began, very low timber yield prior to felling) does not function like a near-natural peatland. Our review concluded that a more conservative range should be used, with an expected 25 years for hydrology and habitat to return to its previous state (range 10 to 80) years.

Table 1: Summary of changes proposed to the Applicant's carbon calculations and their impact on the expected, minimum and maximum carbon payback period and carbon intensity of power generation.

Additional changes suggested (cumulatively)	Expected payback time (fossil-fuel equivalent) in years	Range of payback time (fossil-fuel equivalent) in years	Expected ratio of CO_2 equivalent emissions to power generation (Scottish Government target for 2030: 50g/kWh)
SSE version	1.1	-0.5 to 4.6	32 (maximum 63)
Corrected discrepancies with Environmental Information following SEPA advice (see details in report)	0.9	-0.9 to 6.2	37 (max 83)

[22] Wallage ZE and Holden J (2011) *Ibid 20*

[23] Wilson L et al (2010). Recovery of water tables in Welsh blanket bog after drain-blocking: Discharge rates, time scales and the influence of local conditions. *Journal of Hydrology*, 391: 377-386

[24] Holden J, Wallage ZE, Lane SN, McDonald AT (2011) *Ibid 19*

[25] McCarter, C.P.R., and Price, J.S. (2013) The hydrology of the Bois-des-Bel bog peatland restoration: 10 years post-restoration. *Ecological Engineering* 55, 73-81

[26] Ramchunder SJ, Brown LE, Holden J (2009) Environmental effects of drainage, drain-blocking and prescribed vegetation burning in UK upland peatlands. *Progress in Physical Geography*, 33, 49–79.

[27] Bellamy, P.E., Stephen, L., Maclean, I.S. and Grant, M.C. (2012) Response of blanket bog vegetation to drain-blocking. *Applied Vegetation Science* 15: 129–135

Addition of removal of forestry (simple method) + above changes	1.1	-0.8 to 6.4	42 (max 88)
Average rate of carbon sequestration in timber (tC ha^{-1} yr^{-1}) increased to 2.4 as per Cannell et al. 1999 for Sitka spruce + above changes	2.0	0 to 7.6	68 (max 116)
The average extent of drainage values altered to expected 20 m (range 5-50 m) + above changes	2.3	0 to 10.9	64 (max 176)
Full reversal to near-natural site conditions increased to expected 25 years (range 10-80 years) + above changes	3.1	0.5 to 10.3	86 (max 193)
Using the detailed method to calculate losses from felling forestry instead of the simple method + above changes	**7.3**	**4.0 to 16.1**	**205 (max 321)**

58 In conclusion, if the carbon payback period was to be adjusted as recommended in the independent review, taking account of forest carbon removal, conservative estimations of drainage around tracks and turbines, and the time expected for habitat and hydrology to recover, the carbon payback would be estimated at 7.3 years, rather than the 1.1 years estimated by the Applicant. In a worst case scenario, it could take 16.1 years for the wind farm to begin to deliver carbon emissions reductions. This means that the proposal still has some carbon benefits compared to fossil fuels, but they are likely to be significantly less than suggested by the applicant. Under the revised figures, the project would also fail to meet the Scottish Government's non-statutory target carbon intensity of power generation by 2030 (see Table 1 above). Given the large number of alternative projects currently in the development process, the vast majority of which would be less environmentally damaging. RSPB Scotland considers that our important national renewables targets could be met more effectively through alternative projects to Strathy South.

Planning background

59 Comments made on the **Highland-wide Local Development Plan** in RSPB Scotland's response of 25 October 2013 remain relevant. However, Scottish Planning Policy (SPP) has been revised since the 47-turbine layout was submitted. It "*introduces a presumption in favour of development that contributes to sustainable development"* and goes on to state "*The aim is to achieve the right development in the right place; it is not to allow development at any cost."* This development is manifestly not in accordance with this policy.

60 SPP on wind farms introduces a requirement for planning authorities to "*set out in their development plan a spatial framework identifying those areas that are likely to be most appropriate for onshore wind farms as a guide for developers and communities*" following a standard approach. This approach would place Strathy South in an "Area of Significant Protection" as much, if not all, of the area

lies on "*carbon rich soils, deep peat and priority peatland habitat*" as is clear from mapping in a recent SNH Report[28] and confirmed by the Applicant's peat probing[29].

61 The peat depth map shows that 36 out of 39 turbines are proposed to be sited on deep peat, defined by Forestry Commission as soils with a peat layer exceeding 50cm in depth,[30] with 22 on peat over 1m deep, 11 on peat over 2m deep, and 2 on peat over 3m deep. Scottish Planning Policy sets out the need for '*significant protection'* of "*carbon rich soils, deep peat and priority peatland habitat*", where "*further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation*". It also sets out that "*Where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO_2) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO_2 to the atmosphere. Developments should aim to minimise this release*."

62 This policy clearly applies to this site given the extent of deep peat present and potential for restoration. The proposed development would have significant peatland adverse impacts and therefore does not comply with Scottish Government policy.

63 The SPP now also states that "*Areas identified for wind farms should be suitable for use in perpetuity".* It seems therefore that wind farm development should not be considered as a temporary or transitional land use and, as set out above, the permanent legacy of a wind farm at Strathy South could be at the permanent cost of proper full restoration of its outstanding peatland interest. This policy seems clearly aimed at discouraging development on sites such as this, where only temporary operation is ever likely to be suitable and a legacy of some permanent damage to the sensitive site seems inevitable.

64 Highland Council's **Interim Supplementary Guidance: Onshore Wind Energy** does not conform to the revised SPP and so should be given limited weight in the decision-making process

Contribution towards renewable energy targets

(See "Progress to 100% renewables target" (attached)

65 The declared generation capacity of the 39 turbine wind farm is 132.6 MW. The contribution that would be made to meeting the Scottish Government's target of 100% of the equivalent of Scotland's electricity demand from renewable sources by 2020 will be a material consideration in the determination of this application. However, there are many alternative renewable energy development proposals across Scotland that could provide significant energy contributions for less environmental harm (and greater carbon emissions reductions, given the siting of Strathy South on deep peat).

[28]Bruneau, P.M.C & Johnson, S.M. 2014. Scotland's peatland - definitions & information resources. *Scottish Natural Heritage Commissioned Report No 701.* http://www.snh.org.uk/pdfs/publications/commissioned_reports/701.pdf

[29] Strathy South Wind Farm ES Addendum July 2013 Vol. A3, Figure A14.4

[30] Forestry Commission Scotland (2000) Supplementary guidance to support the FC Forests and Peatland Habitats Guideline Note http://scotland.forestry.gov.uk/images/corporate/pdf/peatland-habitats-supplementary-guidance.pdf

66 In September 2014 Scotland had 7.1 GW of installed renewable electricity generation capacity, with an additional 8.7 GW of capacity either under construction or consented[31]. Adding projects in planning, this figure totals 19.8 GW. Scotland's Electricity Generation Policy Statement estimated that meeting the 100% target will require **around 14-16 GW** of capacity to be deployed. The Scottish Government considers (as of 18th Dec 2014) that we are "on track for our targets of 50 per cent of demand by 2015 and 100 per cent by 2020" [32]

67 Whilst national targets should not be treated as a cap, these figures clearly demonstrate that our important national renewables targets can be met without any need for damaging and inappropriately sited wind energy proposals, such as Strathy South.

Forestry

68 Extensive comments on forestry aspects of this wind farm proposal made by RSPB Scotland in Section 15 of Appendix 1 of our response to the Energy Consents and Deployment Unit, dated 25 October 2013 still stand.

End

[31] December 2014 Scottish Government Renewable Planning Statistics - Summary Tables. http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/Energy/planningdata

[32] http://news.scotland.gov.uk/News/Another-record-year-for-renewables-13c1.aspx

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