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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

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On-the-spot appraisal

**Wind farms at the Smøla Archipelago
(Norway)**

(15-17 June 2009)

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I. GENERAL INTRODUCTION

The pressure to build wind farms all over Europe is growing considerably at a fast rate. The goal is to produce 'green' energy in order to counteract climate change. In this positive development, however, the actual and potential conflicts with nature values (habitat deterioration, bird collisions, decreased landscape functions) in planned locations of wind farms is a growing concern.

Especially more evidence became available about alarming numbers of bird fatalities. Knowledge based development is recommended, stressing the avoidance of potentially hazardous conditions and the unknown level of cumulative effects caused by series of several wind farms. (De Lucas et al. 2007). The need for more intensive monitoring and scientific research before and after wind farm development is to be stressed.

Environmental impacts of wind farms have often only been recognised or taken seriously after public complaints by NGOs. Even the comments or recommendations from official nature agencies are not always given the attention and follow-up they merit, especially in countries where the final decisions do not depend on full agreement with the Environment Ministries. The unbalanced impact of ecology and economy could be restored by making the environmental advice compulsory when taking decisions on biodiversity related issues.

Especially the availability of ecological data before first proposals for wind power plants arise or at least before final decisions on wind farm locations are prepared is sometimes poor, although - notably- long term ornithological inventories (breeding and migration) are maintained and even published in most countries (see also increased website information). Even if existing or collected in function of an Environmental Impact Assessment (EIA), these data are often not covering a complete annual cycle and are not fully taken into account, neglected or underestimated in the EIA reports.

Despite existing literature and early warnings in several countries the selection of wind farm locations remains a matter of controversy within the 'green' sector. Especially standard requirements on completeness and independent review of EIAs still represent a matter of concern. There is also a growing need for modelling the cumulative effects of series of wind farms along migration corridors (mainly coastal or trough mountain passes). Areas that are suitable for wind farm development (wind volume dependent) can be both public grounds without actual function or deserted and cheap sites after traditional land use stop (mostly grazing) and easy to make accessible. However, in many cases such land has high importance for biodiversity, notably for resident flora and fauna and their specific habitats. Here the obvious key species to assess compatibility with wind farm development are mostly birds and bats, of which many species figure on

Red lists or have protected status.

Even when some species or habitats concerned are rare, threatened or have an unfavourable conservation status, projects of alternative energy sometimes seem difficult to be altered, unless risks of deterioration of precious natural and even human habitats. Fortunately, for most countries qualified basic information on priorities for conservation exists, such as Red Lists, Vegetation maps, Important Bird Areas, Wetlands, etc. Especially the ecological networks of protected areas under several international agreements or conventions (Ramsar, Natura 2000, PEEN, Emerald etc.) deliver detailed and often up to date information on biodiversity, its threats and management needs.

At the request of the Bern Convention Standing Committee, an on-the-spot appraisal visit was carried out in Smøla, Norway, on 15-17 June 2009, in order to analyse the situation concerning the conflict between the operative wind farms and nature values.

Terms of reference

The purpose of the expertise was to:

- Examine the two wind farm complexes in the Archipelago of Smøla, Norway, in an area of importance for the nesting of White-tailed Eagles and other species;
- Assess the detrimental impacts on the fauna and flora species and their natural habitats, including the potential cumulative effect of the proliferation of wind farms within the Norwegian range of the White-tailed Eagle;

- Assess the existing mortality surveys and the ongoing research project conducted by the Norwegian Institute for Nature Research (NINA) addressing the following long-term effects of the windmills on the White-tailed eagle: reduced breeding population; increased adult mortality; reduced breeding success; and increased juvenile mortality;
- Discuss with all relevant authorities as well as representatives of associations and NGOs;
- Make appropriate recommendations to the government.
- Submit a short written report to the next meeting of the Standing Committee on the Bern Convention to be held in November 2009.

During the site visits and meetings I was accompanied by Mrs Carolina Lasén-Díaz from the Bern Convention Secretariat who also prepared the contacts and collected most relevant information and reports before and after this expertise.

The detailed programme and a summary of the presentations is to be found in Annex 1 and Annex 2.

II. THE SMØLA ARCHIPELAGO WIND POWER PLANT CASE: BACKGROUND INFORMATION

Review of documents available from CoE prior to the on-the-spot appraisal

In this report I do not envisage to make a complete summary of all the Standing Committee or Bureau meeting documents available, but shortly mention the chronology of relevant actions. Some documents with details on the procedures followed are added as annexes.

In the paragraph after this review I add new elements and data presented during the on-the-spot appraisal.

Chronology

In 1998 the Norwegian Government reported to the Parliament that a policy to develop renewable energy aims at an annual wind power production capacity of 3 TWh by 2010.

This case concerns the establishment of a wind farm complex (phase I and II) in the Archipelago of Smøla, in an area of exceptional importance for the nesting of White-tailed Eagles and other bird species (some of them on the red-list). The government recognised the international value of the area (1998) but found that the impact of the development, notably on the White-tailed Eagle would be relatively moderate. The EIA report that was asked by Statkraft to be prepared by NINA in 1999 only envisaged 4 red-list species and was based on (part of) existing knowledge.

The correspondence between the Ministry of Environment and the Ministry of Oil and Energy is only available as a short English translation: “*An unofficial translation of the most important elements of the letter of 10 July 2001 from the Ministry of Environment to the Ministry of Oil and Energy*”.

(see text in ANNEX 3). In this letter the MoE -among other remarks- sets conditions for the license to be imposed through pre- and post studies regarding Phase I of the Smøla wind farm, before Phase II is to be realised. Also a process of establishing mitigating measures is mentioned as obligatory.

This controversy between energy production and nature values along the Nordic coast, notably the Smøla Archipelago, has been subject of discussions in the framework of the Bern Convention Standing Committee since 2001. Indeed, at its 21st meeting in November 2001, complaints dated 24.08.2001 were discussed as well as a Note by the Ministry of Environment.

The letter of complaint dated 24.08. was sent by the Norwegian Ornithological Society to the Bern Convention Secretariat and to BirdLife International, with copies to: Ministry of Petroleum and Energy – Oslo, Ministry of Environment – Oslo, Directorate of Nature Management – Trondheim and the Royal Society for the Protection of Birds (RSPB) – UK. This letter included a Note by Alv Ottar Folkestad dd 30.06.2001 : “*Smøla vindpark, Statkraft SF - Complaint from the Norwegian Ornithological Society*”, with an appendix: *Supplement to “Prosjekt ‘Verneplan for Smøla kommune’. Fagrapport. Fylkesmannen i Møre og Romsdal 1999”. The Island of Smøla Northwest.*

With this exhaustive scientific document the Norsk Ornitologisk Forening NOF formulated concerns about the lack of a conservation plan to take care of the island's unique and valuable nature and diminish the negative effects of the planned wind farm of 18 km². The Note and Appendix contains a valuable overview of relevant information on biodiversity values and threats. The wind farm effects go further than red list species and must be investigated also in relation to landscape, coastal heath with rare bog and mire habitats, several other bird species etc. The lack of a nature conservation plan was emphasised. This draft plan of the regional environmental authorities (the County Governor) was already discussed in 1999, as the proposals and background information was far too weak; even more, the process for creation of protected areas was halted from October 2000 until June 2001.

A Note dated 26.11.2001 from the Environment Department (MD, Avdeling for Naturforvaltning) entitled "*Brief on the conflict between wind power energy and White-tailed Eagle breeding at Smøla Island, Norway*" gives an important overview of the process and considerations related to this case. It is stated that the Smøla wind farm planning has been dealt with in a correct way. Norway therefore submits that there is no contradiction with the Bern Convention related to the case of the White-tailed Eagle and that the obligations under this and other international conventions are fulfilled.

BirdLife International, acknowledging that wind farms are potentially very positive environmentally, urged that it was important that a full Environmental Impact Assessment be carried out. BirdLife has opposed this wind farm in Smøla, which was recognised by the Government to be the most controversial indeed because Smøla is the most important White-tailed Eagle breeding concentration along the Norwegian Atlantic coast and probably the most dense 'colony' at world level. The BirdLife representative thought that the scheme was in contradiction with Articles 4 and 6 of the Convention. Supported by the WWF, he asked that a file be opened.

The Standing Committee took note of these different statements and viewpoints. It thought that wind power was an interesting alternative; the important point was whether such installations had an impact on bird populations but it was acknowledged that there were little data on the subject at that time.

So the Standing Committee in 2001 decided not to open a file on this question but asked Norway not to authorise the second phase before assessing the results of the first. This was also a condition and a condition for concession of the Environment Department (letter of 10.07.01), that asked for pre- and post-monitoring and especially one year of observations after realisation of Phase I and before the start of Phase II. However, the Norwegian Water Resources and Energy Directorate (NVE) granted the concession to Statkraft both for Phase I and II dated 20 December 2000. After the Phase I (20 turbines) of the wind farm was licensed, this Phase I was completed in 2002. Phase II (reduced from 52 to 48 turbines) was constructed in 2005 following a rather limited study of Phase I, even though it had been recommended to have at least one year of field records before Phase II building could start; assessment of collision mortality appears to have been undertaken much too late (2006) *.

At the 26th Standing Committee meeting in November 2006 the case was raised again by NGOs during discussions on wind energy and nature conservation. The delegate of Norway then pointed out that this issue was not in the meeting's agenda and noted that the usual procedure needed to be followed regarding complaints.

At the 27th Standing Committee meeting in November 2007, the Norwegian government reported on actions undertaken after the licence to build the windmills in the Smøla Archipelago had been issued in 2000, including a review by the Norwegian Institute for Nature Research (NINA) addressing the following long-term effects of the windmills on the White-tailed eagle: reduced breeding population; increased adult mortality; reduced breeding success; and increased juvenile mortality. The Norwegian delegation also informed the Standing Committee that a new research project would be conducted until 2010-2011 in order to improve information on wind turbines and their impacts on birds and coastal birds population dynamics concerning both pre- and post-construction phases.

At this 27th meeting the Standing Committee decided to keep this issue as a possible case file and asked the government of Norway to submit annual reports to the Committee, with the possibility of undertaking an on-the-spot appraisal in 2009, which had the agreement of the Norwegian delegation. This would enable results to begin to become available from the new Norwegian Government-funded

international research project on the impacts of wind turbines on birds and coastal birds population dynamics concerning both pre- and post-construction phases. This is due to be completed by 2010-2011.

In April 2008, the Norwegian authorities reported on developments related to the research project carried out by NINA, including the start of a series of sub-projects. The Norwegian authorities await significant results from this research programme before taking any other action to protect bird populations in Smøla.

At the 28th meeting of the Standing Committee in November 2008, the Norwegian delegation informed about the project being carried out by NINA until 2010-2011, as well as about several mortality surveys. They indicated that there are over 2400 pairs of breeding White-tailed Eagles, that trends are positive (species removed from red-list) and that they await for the final NINA project results to address mitigation issues. The authorities hoped that information from the research project could be used to consider future shutdown of windmills for a shorter period during the spring and autumn migrations.

The representative of Birdlife International then stressed the urgency of the on-the-spot appraisal to be conducted in 2009 as the annual mortality of White-tailed Eagle caused by windmills is considered now twice the natural rate and also due to the fact that the full impact on the local population would only become apparent in future years. The NGO also expressed concern about the potential cumulative effect of the continuing proliferation of wind farms within the Norwegian range of the White-tailed Eagles. The NGOs recalled that at its 21st meeting in 2001, the Standing Committee had decided not to open a case file on this case, but had asked Norway not to authorise the second phase of the wind farm project before assessing the results of the first one. At the following meetings in 2006 and 2007 BirdLife International drew the attention of the Standing Committee to the fact that, as they had warned in 2001, the wind farm is having a significant impact on the White-tailed Eagle population, including killing of numerous individuals. Furthermore the Norwegian government had failed to heed the advice of the Standing Committee and following a very limited study of Phase I (20 turbines completed in 2002) had gone on to permit Phase II which was constructed in 2005; assessment of collision mortality did not begin until February 2006. It was a decision in 2001 to licence Phase I and II at the same time indeed, but the conditions for the start of building Phase II apparently were not compulsory.

During the 2008 Standing Committee Meeting an updated report of the NGOs with scientific evidence on several aspects was presented (see reference list); one of the questions was whether the legality of the continuation of the Smøla wind farm and the potential for its removal from this exceptionally sensitive site could be recommended.

Further documents: see reference list; also via internet many documents could be consulted.

* After Phase I only two incomplete searches for dead birds were conducted (February and March 2003). After Phase II was finished (autumn 2005) some incomplete searches after dead birds were conducted. Systematic searches were conducted only from February 2006.

III ON-THE-SPOT APPRAISAL VISIT 16 AND 17 JUNE 2009

List of participants see Annex 1.

A. Presentations at the Meeting of 16.06.09

Berit Lein (Directorate for Nature Management) opened the meeting as chairperson.

This consultation meeting brings together a number of stakeholders related to the wind farm development in this part of Norway: investors, authorities from different levels, scientists and conservation NGOs and can discuss openly with the Bern Convention delegation.

After this introduction, Carolina Lasen Diaz (Bern Convention secretariat) summarised the reasons for this expertise. The role of the Bern Convention and the case-file system was explained and the aim of on-the spot appraisals. The relation of wind farm development and the network of protected areas, landscape and cultural values was mentioned. The Bern Convention can give guidance and help to find

the balances which need to be worked out at national level, responding international standards. If this fails a case file can be opened and recommendations are passed to the Norwegian Government.

Following these introductions, 7 well documented presentations were brought by the representatives of BirdLife, (Norsk Ornitologisk Forening, NOF), the Norwegian Water Resources and Energy Directorate (NVE), the owner/exploitant of the wind farms (Statkraft), the Directorate for Nature Management (DN) and finally 3 scientists from the Norwegian Institute of Nature Research (NINA).

We have summarised those presentations (see **Annex 2**) as they content important issues and conclusions that are discussed below. These presentations also can contribute as a basis for further actions in the framework of the Bern Convention.

B. Field visit and comments on-the-spot

In the afternoon there was a field trip to the wind farm where the local situation, the technical aspects and the methods used for research were discussed. Afterwards the Smøla County Governor of More og Romsdal and the Municipality of Smøla representative kindly organised a small guided tour along the recently established nature reserves, neighbouring the Smøla wind farm.

(1) The first part concerned the wind farm where staff from Statkraft and NINA illustrated the technical and research aspects (avian radar, high-tech photo camera installations, digital data handling and connections etc.). The sophisticated research equipment and the way this is intensively used is really impressive (and expensive). In this regard the function of the wind farm as a field laboratory is clear and I can confirm and insist that applied and fundamental research is especially aiming at collecting data for modelling questions such as long-term impacts on nature.

I could experience the location of the wind farm in relation to the landscape (dominating the scenery for a great part of the island of Smøla: often called 'visual pollution'). I did not recognise any other land-use in the wind farm (e.g. no grazing or harvesting). The contrast between such an industrial settlement and the ecologically highly valuable and specific natural habitats of coastal lowland heath, mires and bogs is quite shocking. The dimension of the rows of turbines, but also of the related infrastructure (27 km connecting road network, housing for staff and scientists at the very core area of the spot, 150 Kv power lines etc.) is impressive and fully alters the formal openness of this land indeed. Therefore I also consider the free entrance for (recreational) walking and biking as a serious supplementary pressure on the remaining natural ecosystem (almost not accessible without these roads).

Thus, I cannot neglect the serious primary and secondary habitat fragmentation impact of this road and turbine network. I also suppose from this first view that the very construction works must have had considerable (at least temporary) impacts on water table and water quality of the vulnerable oligotrophic mire system and on other abiotic qualities of the site (geomorphology, undisturbed soil and bedrock diggen for intensive cabling etc.).

I could observe one White-tailed Eagle sitting at its nest in the wind farm. As I was informed that this island is harbouring the highest breeding concentration of this species in Norway (and Europe), it is surprising that the *precautionary principle* was not applied here. From the presentations we learned that a number of territories nearby the turbines became deserted or nests were unsuccessful. More surprising even is that historical data have been interpreted in a way that the Phase I of the wind farm had to be installed outside the most dense breeding concentrations of White-tailed Eagles. This proves that the authorities were aware indeed about the high mortality risks and asked a for judgement after phase I.

So I cannot understand that this assessment has not been fulfilled seriously (as far as I have written details) and especially that phase II has also been established in the more western part of the breeding area with high concentrations of White-tailed Eagle that were to be 'avoided' in phase I.

(see map in Fig. 1).

I was informed by NOF that after Phase I only 2 incomplete searches for dead birds were conducted (February and March 2003). After Phase II was finished (autumn 2005) some incomplete

searches after dead birds were conducted. Systematic searches were conducted only from February 2006.

Notwithstanding the scientific doubts upon statistical significance etc. of impacts, I cannot escape from the impression that the decision making process has violated generally known natural phenomena of international importance: the presence of White-tailed Eagle and of pristine coastal lowland.

(2) A second roundtrip over a larger part of the island was kindly guided by Magne Gjernes (Municipality of Smøla) and Ulf Lucasen (County Governor of Møre og Romsdal). In particular, we visited the recently designated nature reserves that are situated at the NE and SE of the wind farm. With small brooks and mires situated in peat and heathland, mixed with rocky outcrops these reserves Hopavassdraget and Midt-Smøla represent an impressive and very open landscape (except for the view on the turbines). In the South smaller reserve areas of Fløtjønna and Sjøvågen are holding some larger water surface with interesting shore vegetation and avifauna.

As was explained during the meeting, the designation process of these reserve areas took a very long period (and was even stopped during 2000-2001) thus giving the opportunity for the very fast process of licensing the wind farm in this very similar area. The in January 2009 designated protected areas are shown on the map in Fig. 2.

In my view this almost symbolic precedent of underestimating nature values in favour of economic motives ought to be counteracted by an overall protection of remaining uncultivated or semi-natural habitats. However, at several stretches along the existing roads the detailed boundary of the newly established reserves have been fixed in a way still enabling developments of urban, recreational or other local developments.

Although this matter is not explicitly mentioned in my 'terms of reference' for this mission, I want to comment on this designation procedure indeed. In view of a possibly '*compensatory decision*' for the loss of pristine land on Smøla due to the wind farm, I am convinced that a wider and more correct delineation of the reserves is to be investigated based on the integrity of the abiotic and biotic features of the land and its landscape-ecological processes, goods and services.

During this guided tour, we were able to observe the part of the (existing) power line that has been removed and placed underground (mainly for preventing collision of Swans). This positive step is presented as a mitigation measure, but it is too much a limited effort, counteracted by the creation of new power lines at other places.

During this site visit we observed valuable habitats of Otter (with tracks), Atlantic Salmon, specific birds and plant species. Finally we passed the 'landscape preserve' in the South, where exceptionally the building of new summerhouses or huts remains possible.

3) Thanks

I would like to thank the organizers of the on-the-spot appraisal, especially the chair Mrs Berit Lein, and the Directorate for Nature Management, who brought together the most important authorities involved: investors, scientists, municipal and NGO representatives. My sincere thanks also go to the speakers and the guides during the field visit. I enjoyed these two days meetings in the most constructive spirit.

After concluding the mission with a short *press encounter*, the participants were asked to provide the Bern Secretariat and the expert with additional documents. We are very grateful to those that did the effort to send (translated) documents or relevant summaries of reports within a short period.

Finally I especially thank Carolina Lasén Diaz for the support during this mission and for her valuable comments to the first draft of this report.

IV. EXPERT'S COMMENTS AND CONCLUSIONS

In this section I do not envisage to make a complete summary of all documents, website information and reports available. The first reflections on-the-spot are summarised in the paragraph above.

Reviewing the step by step procedure that argued and allowed the wind farm development at Smøla. I have tried to evaluate the decision making process (stakeholders involved, time needed etc.) in view of the great needs for nature conservation in the area and the (often unbalanced) processes of designating protected areas.

Especially the contribution of DN (see **Annex 3** with translation of different letters and decisions) gives a clear overview of the Smøla wind farm licencing process since 1997. NOF reacted with a chronological list of their formal interventions and adds supplementary comments to the Expertise Meeting at Smøla (1.07.09). NOF also did provide a letter with suggested recommendations for future wind farm development in Norway (**Annex 7**). NINA formulated some thoughts about the improvement of the EIA processes and mitigation measures, see below. After the on-the-spot appraisal a letter dated 29.06.09 with suggested recommendations was send as well (**Annex 8**). New regulations (after 2008) are referred to in a letter of the Ministry of Petroleum and Energy dd 1.07.2009 (**Annex 9**).

We prefer to include in a textbox the NINA-conclusions of 1999:

The 1999 EIA conclusions by NINA regarding WTSE:

(1) A wind power plant on Smøla will affect a breeding population of 50-60 WTSE pairs, i.e. an area with the most abundant WTSE population in Norway. Available data indicate that the WTSE breeding on Smøla to a minor extent locate their nests closer to areas with human activities or infrastructure (i.e. roads, houses, holyday houses etc.) than 1000m. Depending on the selected alternatives for the wind turbine siting and number, the following direct effects are supposed to occur:

- Alternative 1-4 (40 MW, A, B, C, Phase 1): A minimum of 4-5 pair are supposed to be affected so heavily that they will abandon the area as a breeding ground. The A, B and C alternatives will partly affect different pairs, however, the number of pairs affected seems to be the same.

- Alternative 150 MW: 9-10 pair are supposed to be affected so heavily that they will abandon the power plant area as a breeding ground.

(2) It is difficult to assess the long term consequences for the WTSE population of this, as we among other things do not know what will happen if the pairs abandon their traditional breeding grounds and try to settle outside the power plant area, as most of the optimal habitats already are "saturated" with WTSE. However, depending on age, social structure etc. it may result in a long term noise in the population before new territories and new migrating corridors between these and the hunting areas in the marine habitats are re-established. This might in the short term also lead to lowered nesting success for a major part of the population and in the long term to a permanent reduction of the WTSE population on Smøla (and the NW-parts of the western coastal region).

It is clear that the considerable amount of bird collisions, especially White-tailed Eagle as duly monitored only since 2006 proves that this risk was initially underestimated (26 casualties in 3 years). Arguing that only the local population is affected is in contradiction to the results of movement analysis of individually marked birds. Especially immature White-tailed Eagle can explore larger sections of the Nordic coast, where also a series of power plants is build or under study. Data were presented by NINA that the reproduction rate with the actual artificial mortality could cause a decrease at population level.

In view of future wind farm development along the Norwegian coasts I hope that the conflicting experience of Smøla will lead to an integrated approach based on scientific evidence, international conservation responsibilities and full respect for the precautionary principles.

Norway has subscribed a number of international conservation targets. As a Contracting Party of the Convention on Biological Diversity (CBD, 1992) a National Biodiversity Strategy was established. Norway is also engaged in the 'Countdown 2010' to halt the loss on Biodiversity against 2010 (Kiev, 2003). As a Contracting Party to the Bern Convention, Norway has to respect criteria related to conservation of habitats, fauna and flora. Some internationally important wetlands have been designated under the Ramsar Convention (1971) but still a number of sites could be added.

Although the EU Bird and Habitat Directives (1979, 1992) can be taken into account also by non-member states, Norway does not respond to these requirements. At the same time, however, the country did accept to follow other EU Environmental Directives and guidelines (a.o. the EIA-Directives); so in principle the designation of a Natura 2000 network of 'special protected areas' (SPAs, SACs) could become a target for Norway as well. In any case, Norway is making progress in the development of the 'Emerald Network' under the Bern Convention.

With regard to further wind farm developments, "Norway's National Report on Implementation of the Convention on Biological Diversity" (April 2009), states on p. 87:

"It is important to ensure that the expansion of wind and water power happens without negative effects on natural diversity, outdoor recreation, or significant landscapes. Sea-based production of renewable energy is interesting in the long-term, but it will require a considerable effort in, among other things, research, development and demonstration of new technologies."

('The Norwegian Biodiversity Policy and Action Plan - Cross-Sectoral Responsibilities and Coordination' was made as a report to the Norwegian Parliament (Storting) Report No. 42 (2000-2001) in 2001. Simultaneously with the submission of the 3rd Norwegian National Report to CBD, the status of the sector responsibility to the Action Plan was reported in the Government's Environmental Policy and the State of the Environment in Norway (Report No. 21 (2004-2005) to the Storting). The sector ministries were asked to similarly update their issues of the Action Plan to the 4th National Report).

From this publication I can conclude that the Norwegian Government has learned to avoid conflicts between nature conservation and green energy. In fact the aims of producing 3TWh in 2010 is to be balanced with conservation strategies such. Procedures must guarantee the transparency of the EIAs and time for site-specific research in addition to common knowledge.

As the Energy Ministry and related agencies seem to have the highest ranking (and political weight) in the process of licensing wind farms (and imposing items to be handled in EIAs?), the warnings in EIA reports, the complaints of NGOs and even the statements from MoE and DN often seem to be minimised or denied (see the example of Smøla phase I and II).

The presentation of NVE during our visit repeated the following statement:

- *The licensing process of Smøla wind farm has been correct, according to the normal procedures for management as required by Norwegian law.*
- *NVE granted license knowing that collisions may occur, nesting sites could be displaced and access to foraging areas could be reduced*
- *Smøla wind farm was regarded as a major contributor in enhancing production of renewable energy and would contribute to the Norwegian goal of producing 3 TWh renewable energy within 2010*

Good and transparent regulations must prevent unbalanced decisions in the disadvantage of common values such as archaeology, nature and cultural landscapes. Good EIA processes are the responsibility of the Directorate for Water and Energy (NVE) and the Directorate for Nature Management (DN), and their respective ministries. EIA processes may be improved by stressing the need for both desktop and field work as part of the assessment. Also, several alternative sites or a wider search area should be included in EIA studies. Adequate follow up programmes must be explicitly demanded in the process of providing license to a wind farm.

After a license is given, pre- and post-construction studies should allow for capturing the natural variation (daily, seasonal, annual), necessitating studies which encompass more than one year of data-collection. Finally, EIAs would benefit much by being able to be based on all available data. Regarding this need of long term records and monitoring in the field, protocols between official scientific institutions and NGOs on biological data collection, availability and validation are to be encouraged.

There is increasing public awareness on the negative image of wind farms. The National Energy Plan sets 3TWh as a goal for 'green energy' and mentions an increase of hydropower in order to reduce

conflicts of wind farms and nature. (*However, hydropower also can have negative impact on species, landscapes, natural and cultural habitats. We have been informed that the EIAs for hydropower follow a stronger process where complaints from nature administrations are more seriously taken into account*).

Most regrettably there is no National Plan for Wind Power, nor a Strategic Environmental Impact Assessment for the realisation of this 3TWh goal. Separate wind farm plans are still judged without considering the cumulative effects mentioned before. Reference to the outcome of NINA results, only expected by 2011, increases the need for considering a moratorium principle. As to ongoing and not yet licensed wind farm projects, such a moratorium could be imposed. Less drastic would be the revision of existing plans in case of evident or potential conflicts. This needs to be based on long-term observations including the most recent data and must be prepared as a contribution to the EIA (incl. pre and post monitoring).

There is a great need for understanding and modelling cumulative effects of different wind farms put along the same migration corridor or in the same habitat type where vulnerable species survive. Although the cumulative impact can be difficult to prove statistically, there are often existing ecological data (bird counts, individually marked bird movements, habitat mapping etc.) for a pre-assessment of possible effects. In many cases this will support the *precautionary principle*, based on common sense. However, thorough field work on relevant topics must be undertaken during at least one whole year (or most preferably several years) before final request for licenses can be put forward.

Data collection and availability for assessing cumulative effects must receive priority when the scope of wind farm EIAs are specified, with research priority for applied aspects. The growing knowledge on movements of individually marked birds is an example of monitoring that can highly contribute in the cumulative impact modelling or at least to put forward or search for alternative locations and mitigating measures.

This all means that extra time and money must be made available for both specific site related research (pre and post) and monitoring of integrated phenomena at larger scale (e.g. N. Atlantic bird migration patterns, biotope loss by habitat fragmentation and deterioration, global warming effects on coastal habitats, secondary impacts such as pressure of increasing disturbance, etc.).

Selection criteria on potential suitability of land and landscapes (or offshore areas) for wind farms are to be compared/confronted with ecological knowledge of these very land types to enable the selection of the least disturbing matches. Identification of values in classes from locally to internationally important is to be updated or completed before further wind farm locations are fixed.

More efforts are needed to put the two conflicting strategies (green energy vs. conservation) in one common approach with clear guidelines, instead of handling two different timetables and sets of criteria. Sites of specific scientific interests and actual or potential nature values, vulnerable or pristine habitats etc. need many years, even more than a decade to get a conservation status as nature reserve or national park, compared to the short period of a few years to finalise a wind farm license! The experience of former monitoring and studies (e.g. NINA at Smøla) must become openly available and 'translated' in more general guidelines for future wind farm establishment.

Annex 4 gives a summary of the guidelines developed jointly by The Ministry of Petroleum and Energy (MPE) and The Ministry of the Environment (MoE) that were approved in 2007. The objectives are to contribute to increased development of environmentally friendly wind power and to ensure that conflicts with other interests are kept at an acceptable level. The guidelines recommend the development of regional plans to ensure a comprehensive assessment of suitable areas for wind farms. This will provide a better starting point for planning of individual projects. Regional plans should have a 10-15 years' perspective, not focus on individual projects and should contain an assessment of environmental topics, based on available information. Furthermore the plans should provide an assessment of potential conflict for each topic identified, discuss the cumulative effects of more wind farms and class areas according to suitability to wind farming. Regional plans are given final approval by the MoE in cooperation with Ministries concerned and provide vital information when individual projects are being assessed by the energy authorities.

(Experts' comments: in this approach, the establishment of national or regional plans for sites with landscape and natural values -if not yet existing in updated format- should be finalised at the very same time as the inventory of suitable wind farm locations, in order to guarantee balanced assessments by both sectors).

As a compulsory approach, the authorities concerned should establish a preceding screening of all new wind farm proposals with the National Biodiversity Strategy (including international agreements) and with existing conservation plans of lower hierarchy, before official next steps are worked out.

Refusal of wind farm in *no-go zones* such as national parks and other protected sites and landscapes, important areas for wildlife and pristine wilderness areas including a surrounding additional buffer zone (500-700 m) is to be accepted as an overall strategy of precaution. For this principle also the use of the "Catalogue for Nature Protection at County level" with the categories "local", "national" or "international importance" and mapping of the 1980s is to be made obligatory. These inventories of conservation networks, however, need to be actualised and 'translated' into proper and reviewed boundaries. Localisation criteria must take into account both Norway's obligations to international conventions and national environmental goals.

The view that the Smøla wind farm delivers several functions to the society of Smøla is correct (especially during the building period many manpower was needed), but this may not underestimate the presence of pristine coastal lowland and its long-term ecological goods and services to human society as well (e.g. eco-tourism, qualified settlement, quality of fish stocks, freshwater reservoir etc.). The presence of settlements, especially small harbours, fishing activities and some local agriculture, cannot argue to categorise the whole island as 'urban area' (*sic*) not harbouring 'unspoiled nature' and thus minimise the need for serious EIA related to *all* aspects of conservation interest.

The quality and independency of EIA assessments must be subject to compulsory *peer review* by qualified scientists (thus preferably not depending on project financing from related companies or departments). Besides the quality of EIAs, the completeness and the transparency of procedures, e.g. responses to complaints, the way in which conclusions and recommendations are taken into account etc., is a matter of concern that again merit a peer reviewing process. It is to be accepted that in some cases a second opinion can be ordered.

The EIAs must include an integrated evaluation, taking into account the functional aspects, goods and services of the ecosystems as a whole. This can be partly based on key species but may not be restricted to only studies on some of these (cfr Smøla). The process of identifying possible sites for wind farms must improve. National or regional plans for wind farms must be established, and alternatives with little negative impact to the environment must be selected e.g. in areas that are already disturbed by human activities. This procedure must be the joint responsibility of the Environment and Energy departments.

The licence for exploiting wind farms is given for 25 years. We strongly advise to restore the natural landscape and habitats at Smøla after this period and not renew the licence. Meanwhile the use of the site causing secondary disturbance, e.g. pollution, recreation, is to be reduced in order to lower the impact of the wind farm as a whole.

When relocation to alternative areas outside (potential) conservation areas and/or if restoration of (parts of) wind farm is not realistic, the requirement for compensations and/or mitigating measures still holds. Compensation can be the designation of (comparable) wilderness areas elsewhere that have not yet any protection status.

Finally, basic scientific knowledge and technology is available to set up regulations for early warning systems and the shut down of turbines during e.g. intensive migration periods, unfavourable weather conditions, or courtship/nestling/fledgling periods of rare bird species. Also the presence of Bats as frequent turbine victims may not be underestimated, but this requires specific research and monitoring.

Conclusions

In 2001 and so far the Bern Convention Standing Committee decided not to open a new case file on the wind farm developments in Smøla, in spite of its qualification as a IBA and (potential) protected areas sites and the considerable fatalities with White-tailed Eagles and other birds.

Article 4 of the Bern Convention establishes that “Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the conservation of the habitats of the wild flora and fauna species, especially those specified in Appendices I and II, and the conservation of endangered natural habitats”; and further “That the Contracting Parties undertake to give special attention to the protection of areas that are of importance for the migratory species specified in Appendices II and III and which are appropriately situated in relation to migration routes, as wintering, staging, feeding, breeding or moulting areas”

I note with concern that far-reaching decisions on wind farm establishment seem to have been based upon incomplete or partial information brought together in EIAs that rather minimise the effects of wind farms at the very core of White-tailed Eagles and other rare species breeding/feeding areas or along coastal migration corridors.

We have been informed during our mission about the planned wind farm Havsul I. This is planned inside the foraging area of seabirds from Runde (largest seabird colony in S Norway) and an area of very concentrated waterbird- and seabird migration on the west coast. NOF had made complaints about to the OED (Oil Ministry) but these were recently dismissed. Thus the government seem to follow the same strategy of disregarding important areas for birds in wind farm planning. This endorses the need for further actions as a test-case after the establishment of the Smøla wind farm.

Based upon the above reported on-the-spot appraisal, the presentations, information and comments received, I am convinced that Norway through unilateral decisions of the Ministry of Petroleum and Energy did underestimate or even neglect the requirements of the Bern Convention.

Therefore I strongly advise the Bern Convention Standing Committee to open a file on the Smøla Wind farm case.

After the on-the-spot appraisal and talks with many stakeholders, I propose draft **recommendations** to be addressed to the Norwegian Government as a Contracting Party to the Bern Convention.

V. PROPOSED RECOMMENDATIONS

1. Urgently establish a long term Strategic Environmental Assessment (SEA) for future wind farm development in Norway, including integrated economic, social and environmental aspects and introducing strict methodologies and criteria for balanced site selection.
2. Before licensing a wind farm ensure the quality, independency and completeness of the EIAs including the interpretation and the follow-up of recommendations and complaints through a peer review process and a transparent procedure; the results of the current NINA-project at the Smøla wind power plant must enhance the fundamental knowledge needed for improved EIA processes.
3. Reduce the detrimental impact of the existing Smøla wind farm on birds (especially White-tailed Eagles) by imposing mitigation measures to Stadkraft, such as shutting down (some of) the turbines in crucial periods of the annual bird cycle (pair formation, reproduction, fledging, migration) or in periods of adverse weather conditions, and ensure a proper scientific follow-up of such closed periods; also envisage further reduction of mortality caused by power-lines.
4. Reconsider the planned wind farm projects along the Norwegian coast within important migration corridors or affecting specific habitat types, and suspend their construction pending the results of the NINA research program at Smøla until 2011 and envisage the revision of the EIAs concerned.
5. EIAs must take into account the duly formulated NINA recommendations, follow qualitative guidelines, investigate alternative sites including a wider search area, predict cumulative effects of wind farms and propose relocation of potentially conflicting wind farms towards areas that are already disturbed by human activities.

6. The Directorate of Nature Management must guarantee the necessary investigations and mitigation measures in the process of wind farm licensing, as is agreed in hydropower projects; the advice and comments from the environmental authorities or the complaints from NGOs are to be publicly addressed in the final decisions by the NVE, in case they are not followed by the licensing authority, specifying the justification why the arguments were not taken into account.
7. Introduce a moratorium for further wind farms in sites of scientific interest and high nature values (even if they have not yet been granted with a conservation status) pending the assessment of site specific and regionally cumulative impacts on ecological processes and nature values (e.g. bats, long distance feeding areas of birds and migration corridors).
8. The priority of designating internationally important sites may not be influenced or delayed by the potential suitability for wind farm development in those areas.
9. Investigate the possibilities and consequences of a non-renewal of the licence for exploiting the Smøla wind farm concession by the year 2026 or consider a reduced period, and create the possibilities for due ecological restoration of the site.
10. Compensate the loss of natural area with ecological functions and the disturbance of the scenery as a result of growing numbers of wind farms by speeding up the designation of new conservation areas at appropriate sites or regions in order to safeguard landscape and biological diversity as two of Norway's most important assets.

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VII. FIGURES, MAPS: SEE ANNEX 10

VIII. ANNEXES

Annex 1. Programme of the on-the-spot appraisal at Smøla (15-17 June 2009)

The task was carried out as follows:

15 June (Monday)

19:10 Arrival at Smøla – minibus to the hotel

16 June (Tuesday)

Meeting: Nature Department, NINA, representatives of Ministries, other authorities, owners, NGOs

08:00 – 08:30 Introduction and information regarding the process of establishing the Wind Power Plant by DN

08:30 – 08:50 Information from NVE (Norwegian Water Resources and Energy Directorate) (Wind Authority)

08:50 – 09:10 Information regarding the Wind Power Plant and operation – by Statkraft (Owner)

09:30 – 10:00 The formal complaint and background for the complain by BirdLife International/NOF

10:00 – 12:00 Knowledge and knowledge exchange/discussions - presentations from the ongoing research program - results, possibilities, impossibilities, discussion by NINA. (With comments from Statkraft, NVE, DN and BirdLife /NOF).

13:00 – 16:00 Field trip – with possibilities for the expert to question any parties

1800 Dinner with possibilities for bilateral meetings with any of the parties.

17 June (Wednesday)

08:00 – 10:30 Possibility of bilateral meetings

Meeting to discuss monitoring and possible measures to be applied.

10:45 Departure by minibus to the “Kystekspresen” (boat) – 15:05 Arrival in Trondheim

Participants at the on-the-spot appraisal, Smøla

Elisabeth Bruusgaard (Ministry of Petroleum and Energy – OED)

Lars Håkon Bjugan (Norwegian Water Resources and Energy Directorate – NVE)

Nils Hendrik Johnson (Norwegian Water Resources and Energy Directorate – NVE)

Solveig Paulsen (Ministry of Environment – MD)

Berit Lein (Directorate for Nature Management – DN) (*chair*)

Øysten Størkersen (Directorate for Nature Management – DN)

Jo Anders Auran (Directorate for Nature Management – DN)

Snorre Stener (Directorate for Nature Management – DN)

Sveic Nic. Norberg (Directorate for Nature Management – DN)

Tormod Schei (Statkraft)

Bjørn Iuell (Statkraft)

Arils Solem (Statkraft)

Kjetil Solbakken (Norwegian Ornithological Society – NOF)

Alv Ottar Folkestad (Norwegian Ornithological Society – NOF)

Morten Ree (Norwegian Ornithological Society – NOF)

Kjetil Bevanger (Norwegian Institute for Nature Research – NINA)

Roel May (Norwegian Institute for Nature Research – NINA)

Espen Lie Dahl (Norwegian Institute for Nature Research – NINA)

Ulf Lucasen (County Governor of Møre og Romsdal)

Magne Gjernes (Smøla municipality)

Kai Holmen (Smøla municipality)

Eckhart Kuijken (expert for the Council of Europe) and Christine Verscheure

Carolina Lasén Diaz (Bern Convention Secretariat, Strasbourg)

Annex 2. Summary of presentations at the Meeting of 16.06.09

(some of the experts' personal reflections are added in italics)

1) Alv Ottar Folkestad (BirdLife, Norsk Ornitologisk Forening - NOF)

Summarised elements of the procedure and the NOF complaint.

- Smøla is listed in IBA (nr 39) because of highest breeding density of White-tailed Eagle (65-70 pairs)
- National classification system category 'natural areas', at Norwegian level unique flora and fauna: coastal lowland area with peatland heath, mires and bogs.
- NOF has results from field work since 1972 (*knowledge not 'translated' into protection decisions?*) and cooperated in all wind farm procedures being convinced that it would be refused.
- After positive decisions, NOF contacted Bern Convention in 2001 asking to open a case file, based upon Art. 3.1, 4 and 6 of the Convention. (*quid National Wildlife Act? Wind farm acceptable?*)
- The EIA was to be based upon existing knowledge but was restricted to only 4 bird red-list species. -
- The risks of bird collisions were underestimated and the overall ecological value of nature almost neglected.
- NOF questioned the limits of acceptance of industrialisation of the almost pristine landscape.
- NOF asks that negative experiences lead to measures and more positive follow up in other wind farm projects in Norway.

2) Lars Håkon Bjugan (Norwegian Water Resources and Energy Directorate – NVE)

Presented an overview of wind power in Norway, a brief introduction of NVE and the status of wind power in Norway

- The actual production of wind energy is to be increased up to 3 TWh by 2010.
- The license to Statkraft for Smøla is granted for 25 years and the process took 2-3 years.

Steps of the licensing process (from ppt presentation by L H Bjugan):

- Notification
 - Notification (October 1997)
 - Notification sent on public hearing (December 1997)
 - Background paper for EIA-program (July 1998)
 - Final EIA-Program (July 1998)
- Application
 - EIA and application (January 2000) (*NINA EIA 1999 only studied location alternatives ON Smøla !*)
 - Application and EIA sent on public hearing (January 2000)
 - Additional demands to EIA investigations (June 2000)
 - Final on-site inspection (September 2000)
 - License decision by NVE (December 2000)
- Complaints
 - Complaints on NVE license (January/February 2001)
 - NVE comment complaints and send case to OED (March 2001)
 - Final decision made by OED (September 2001) (*underestimated bird strikes, only knowledge 1999*)
- Change of license for wind farm
 - Statkraft applies for changes (July 2002)
 - Application sent on public hearing (July 2002)
 - NVE grants license changes (November 2002)
 - Complaints on NVEs license (December 2002)
 - NVE comment complaints and send case to OED (April 2003)
 - Final decision made by OED (July 2003)
- Change of license for 132 kV grid connection (cable)
 - Statkraft applies for changes (April 2003)
 - Application sent on public hearing (April 2003)
 - NVE grants license changes (August 2003)
- Pre- and post studies
 - NVE determines program for pre-studies (March 2001)

- NVE determines program for post-studies (December 2002)
- NOF complaint NVEs decision (January 2003)
- NVE comment complaint and send case to OED (May 2003)
- Final decision made by OED (August 2003)
 - Result from post-studies
- Statkraft sends report from NINA to NVE (August 2003)
- NVE does not initiate further mitigation measures (August 2003)
- NOF and SRN complaint NVEs decision (September 2003)
- NVE comments complaints and send case to OED (September 2003)
- Final decision made by OED (October 2003)
 - Further comments by L H Bjugan
 - The licensing process of Smøla wind farm has been correct, according to the normal procedures for management as required by Norwegian law.
 - NVE granted license knowing that collisions may occur, nesting sites could be displaced and access to foraging areas could be reduced
 - Smøla wind farm was regarded as a major contributor in enhancing production of renewable energy and would contribute to the Norwegian goal of producing 3 TWh renewable energy within 2010

3) Tormod A. Schei (Statkraft)

Presentation, information and comments on Smøla wind farm and operation of research.

Area: 18 km²; production/ year: 450 GWh ; installed effect: 150 MW

Number of turbines: 68 in total : 20 á 2 MW (Sept. 2002) and 48 á 2,3 MW (Sept. 2005)

Statkraft supposed the increasing turbine dimension from phase I to phase II has decreasing impact on birds (*this is not confirmed in scientific papers*).

Many details were presented on the ongoing research, partly paid by Statkraft (see further: NINA). (*Quid impact of ground activities, roads, cables, settlement for technical and scientific staff, traffic, recreational opening of pristine area.*)

After phase I there was short time for follow-up studies (NINA: only bimonthly monitoring of bird strikes, no figures on removal of corpses by scavengers). In 2006 monitoring increased (weekly, trained dogs) as well as high-tech experiments for following birds; NVE finances larger program from January 2007. Thus Smøla wind farm became a full scale laboratory.

(What about lessons learned after phase I before building phase II could start (condition !?) Are the number of strikes and the effects on breeding White-tailed Eagle acceptable? Criteria? (cfr. complaint by NOF). Statkraft did not agree with the classification of the area as almost pristine land but regarded this as 'urban landscape' (sic).

The results of research mentioned here are followed by more detailed presentations by NINA.

4) Snorre Stener (Directorate for Nature Management – DN)

- Presentation on the role of DN
- comments on the notification including the proposed planning programme.
- works out a preliminary thematic conflict assessment.
- comments on the application and the EIA
- revises the thematic conflict assessment.
- gives recommendation to the Ministry of the Environment regarding environmental issues.
- The purpose of the thematic conflict assessment : helps to see relationships between different projects, and give a combined assessment of proposed wind farms (ranked according to conflict).
- Environmental topics assessed:
 - Natural environment (bird life, nature types, ecological function, outdoor recreation, areas without major infrastructure developments)
 - Landscape
 - Cultural heritage
- Finally a map of other wind power plants in the region is presented.
- DN is aware that especially the cumulative negative impacts of those wind farm is to be studied. DN requires for all wind farm projects follow-up studies (after phase I at Smøla this was a condition to investigate effects during 3 years)

(but apparently there was no moratorium or hold on for the phase II before the results were known).

5) Kjetil Bevanger (NINA)

History and scope of NINA research (elements from the ppt presentation)

- 1999: NINA asked by Statkraft to carry out an EIA for the planned Smøla wind-power plant, focusing red-listed species (based on existing knowledge)
- 1999: EIA report finalised: *"Wind mill park at Smøla: Potential impacts on bird species on the Norwegian red list"*
- 2002: NINA asked by Statkraft to *"Prepare a program for post construction studies"*, *"Spring censuses of Smøla Willow Ptarmigan"* and *"Assessment of ornithological consequences given a lay-out change of Smøla Wind Power Plant Phase II"*.
- 2003: NINA asked by Statkraft to carry out *"Population monitoring of WTSE on Smøla in 2003 related to the wind power plant"* and make a *"Proposal for additional data collection: Recording of WTSE killed due to collisions with wind turbines"*.
- 2004: NINA applied for money to the Norwegian Water Resources and Energy Directorate (NVE) and the research activities related to WTSE were continued within a funding consortium by NVE, Statkraft, the Norwegian Electricity Industry Association (EBL) and Norsk Hydro . The activities were named *"Wind Power and Birds; Research and Development Project 2004"*
- 2005: The research activities related to the WTSE were funded by NVE, the Directorate for Nature Management (DN), EBL and Statkraft, and named *"Support for research on wind power and birds"*.
- 2006: The research activities related to WTSE were discussed on a meeting at NVE in March and economic support was agreed on, following the 2004 and 2005 model.

April 2006: several dead WTSE were recorded within the wind power plant area, and Statkraft invited NINA to a meeting in May asking us to prepare for a larger research project, including experiments on mitigating measures.

June 2006: Application to the Norwegian Research Council 2006: NOK 11.5 mill. (2007-2010):

"Pre- and post-construction studies of conflicts between birds and wind turbines in coastal Norway"

Active partners coordinated by Kjetil Bevanger (NINA), Arne Follestad, et al.

Project objectives:

- Documentation of species specific mortality - identify vulnerable species to improve future EIA
- Collision risk modelling
- Bird behaviour/behavioural responses (selected model species)
- Population responses
- Developing technical tools and mitigating measures
- Terrain modelling – identify high risk areas to improve future EIA processes

The Statkraft economic contribution (NOK ca. 12.5 mill) earmarked for:

- Weekly search for dead birds
- Radar purchase/development as a tool to learn more about the effects of wind turbines on birds
- Assess auditory and visual mitigating measures
- Genetic analyses of sea eagles
- Purchase of additional radio transmitters for sea eagle studies
- Behavioural response studies of sea eagles (including video camera construction)
- Scope 2007-2008
 - Mortality studies (weekly search for dead birds)
 - Willow ptarmigan population studies (including telemetry)
 - Waders and smaller passerines
 - Red throated diver (for AMEC – finalised)
 - White-tailed sea eagle: see following presentations by NINA researchers
- Scope 2009-2010
 - Mortality studies (weekly search for dead)
 - Willow ptarmigan population studies (including telemetry)
 - Waders and smaller passerines response studies
 - White-tailed sea eagle : see following presentation by NINA researchers
 - Avian radar lab; assessing large scale radar systems for bird migration monitoring

- Camera system (improve software, data processing), turbulence studies
- Mitigating measures (light, rotor-blade paintings)
- GIS and terrain modelling

This detailed and highly sophisticated NINA research will certainly lead to better understanding of actual risks (effects of both abiotic and biotic aspects) and must enable predictions and proposals for mitigating measures.

(Specific set-up of research for studying cumulative effects along the Norwegian coast is not (yet) clear.)

From the following 2 NINA presentations we learn that some of the 1999 conclusions are to be changed, based upon evidence of field work and statistical analysis (e.g. impact on breeding success of White-tailed Eagle).

The 1999 EIA conclusions by NINA regarding White-tailed Eagles are copied under § IV p. 9.

6) Roel May (NINA)

"Spatial assessment of collision risk in white-tailed sea eagle at the Smøla wind farm".

- Aims
 - Spatial assessment of avian collision risks with wind turbines
 - Development of tools and methods for assessing spatial impacts of wind turbines
 - Case study species: white-tailed sea eagle
 - Effects at different spatial scales
- Techniques utilized
 - Radio marked (sub-)adult sea eagles
 - Avian Radar Laboratory
 - Camera-based video system (horizontal and vertical coverage)
- Applicability
 - Close-encounter behavioural response analyses
 - Recording actual collisions
 - Early-warning system in slowing/shutting down a turbine
- Merlin Avian Radar System
 - Continuous recording of activity over a large area
 - Behavioural phenomena: migration, circling, interactions
 - Visualisation of collision tracks
 - Applicability:
continuous monitoring of bird activity, recognition of risky and avoidance behaviour, collision-risk rates, early-warning system: bird migration, periods with increased risk
 - GPS tracking of individual sea eagles (30 White-tailed Eagle, tendency to return frequently to natal site)
 - Estimation of risk rates using Brownian Bridges
(modelling, effects of avoidance behaviour?, displacement effects, turbine avoidance, where are the risk rates highest?)
- Conclusions
 - Technical and methodological aspects on utilizing avian radar and camera-based video system
 - Modelling 3D flight behaviour and movement patterns
 - Extending Brownian bridge risk rate models
 - Avoidance behaviour near turbines using radar data
 - Displacement using resource utilisation functions
 - Bird activity patterns in space and time using radar
 - Collision risk models based on avian radar data

7) Espen Lie Dahl (NINA) Monitoring & Population modelling

- Aims of study
 - Monitor important population parameters in White-tailed Eagle:
 - Effects from Smøla wind farm
 - Population modelling
- Results

- Differences in the proportion of successful and unsuccessful breedings, inside and outside one kilometer distance from the wind farm, before and after development of the wind farm.
- Possible causes: 26 White-tailed Eagle found dead, several territories left abandoned, increased disturbance, effect strongest close to turbines, BACI (before-after-control-impact) important
- Mapping of White-tailed Eagle nest status Smøla wind farm 2009
- Future work:
 - Dialog with Birdlife Norway/Norwegian Sea Eagle Project concerning use of some of their data
 - Analyse in detail what determines population density
 - Reference areas with known densities
 - Prediction model based on GIS analyses: shore length, area of shallow waters, habitat type, terrain, other parameters?
 - Predictive population model – Smøla wind farm
 - Describing the dynamics of the White-tailed Eagle
 - Modelling the effects from Smøla wind farm
 - Valuable for wind energy planning – predicting scenarios
 - Estimating cumulative effects
 - What data do we need? number and status of territories, reproduction, age-specific survival
- Some conclusion: Effect of increased mortality on population: when the adult mortality rate of 0,05 (normal) increases to 0,10 the population growth rate decreases from 1,024 to 0,99.

Annex 3. An unofficial translation of the most important elements of the letter of 10 July 2001 from the Ministry of Environment to the Ministry of Oil and Energy

The main conclusion is stated on page 1 (the two first paragraphs in bold letters) and reads as follows: “The Ministry of Environment recommends that the Ministry of Oil and Energy maintains the license granted by NVE as regards phase I as well as phase II. However, in the opinion of the Ministry of Environment, phase II should only be developed when the factual consequences of phase I are clear.

MD [The Ministry of Environment] considers it very important that mitigating measures to limit the negative consequences of the enterprise to the largest extent possible, are carried out. The demand for such measures should therefore be emphasized in the conditions for license. The conditions for license should also impose thorough pre - and post studies as regards phase I, with a view to obtaining the best possible basis for deciding the content and extent of the mitigating measures. The Ministry moreover assumes that the authorities of environment will be invited into the process of establishing mitigating measures.”

The assessment as regards the project by Statkraft, is mainly to be found in part 4 of the letter. This part contains mainly the following elements:

- The Parliament has decided that 3 TWh windpower should be achieved before 2010. It is very important to the Ministry of Environment that this goal is reached.
- At the same time, it is important that one seeks to establish wind farms in areas where the consequences for the environment are as small as possible, and that it is signaled that wind farms cannot be established without consideration for such consequences
- The planned wind farm, and in particular phase II, could have substantial negative consequences as regards important environmental values
- The Ministry of Environment would therefore recommend a step-by-step development at Smøla where phase II should only be developed when the consequences of phase I are clear and assessed. Such step-by-step process is used i.a. in Denmark.
- The Ministry of Environment is particularly concerned with the consequences relating to biological diversity, and primarily as regards the bird populations at Smøla. The consequences as regards the White-tailed sea eagle are central, but it is the opinion of the Ministry that we need more information about the factual consequences as regards eagle and other types of biological diversity before we can say something with certainty about their significance as regards further development at Smøla.
- A step-by-step development at Smøla could give a very good opportunity to gain first hand knowledge about consequences of wind farm development in Norwegian nature. Such knowledge does not exist today. By turning Smøla into a national reference area for wind power, with pre - and post studies as regards phase I, one could gain valuable knowledge that could be used both when considering further development at Smøla, and when considering other projects. The conditions for license should therefore impose pre - and post studies. Both the authorities and Statkraft should contribute financially to such studies.
- The Ministry of Environment also considers it very important the mitigating measures are carried out. The demand for such measures should therefore be part of the conditions for license.

Annex 4. Planning guidelines for wind farming: unofficial translation of elements of the guidelines; 25.06.09; HaN/MoE.

The guidelines were developed jointly by The Ministry of Petroleum and Energy (MPE) and The Ministry of the Environment (MoE) and approved in 2007. The target groups are developers, municipalities and authorities concerned. The objectives of the guidelines are to contribute to increased development of environmentally friendly wind power and to ensure that conflicts with other interests are kept at an acceptable level.

The contents of the guidelines are:

- Purpose and substantive scope
- National energy objectives and conditions
- Topics to be considered in planning and localization
- Regional plans
- Municipal master plans
- Coordination of planning and licencing procedures
- Single turbines and small scale wind farms

The topics to be considered when planning wind farms are:

- protected areas
- Landscape values
- Cultural heritage
- Biological diversity
- Recreation areas
- Large areas without technical installations
- Noise
- Reindeer husbandry and sami activity areas
- Civil aviation and defence
- Tourism
- Agriculture

The guidelines recommend the development of regional plans to ensure a comprehensive assessment of suitable areas for wind farms. This will provide a better starting point for planning of individual projects. Regional plans should have a 10-15 years' perspective, not focus on individual projects and should contain an assessment of environmental topics, based on available information. Furthermore the plans should provide an assessment of potential conflict for each topic identified, discuss the cumulative effects of more wind farms and class areas according to suitability to wind farming. Regional plans are given final approval by the MoE in cooperation with ministries concerned and provide vital information when individual projects are being assessed by the energy authorities.

Annex 5. BirdLife IBA Factsheet NO039 Smøla archipelago (partim; dated 1999 ?)

Country/Territory	Norway
Administrative region(s)	Møre og Romsdal
Central coordinates	8° 0' East 63° 19' North Map
Area	27400 ha
Altitude	0 - 70m
Criteria	A1, A4i, B1i, B1ii, B2



Site description An archipelago of 5,847 islands, islets and skerries, with large expanses of intervening shallow sea. The main island, Smøla, is a mosaic of open mire and coastal heathland, with many small lakes, streams, ponds and pools, and is cultivated in places. Its coast is dissected by many inlets and bays. This is one of the largest marine wetlands in Norway, and some of the largest continuous mires in the country are also found here.

Birds Smøla has one of the highest breeding densities (pairs per hectare of land) of *Haliaeetus albicilla* in the world. The sea areas are important for wintering divers *Gavia*, grebes *Podiceps* and various seaduck. *Cygnus cygnus* winter in notable numbers (up to 300 birds or more). The area has been an important moulting site for flocks of *Anser anser*, causing conflicts with the local farmers. The largest colony of *Ardea cinerea* ever found in Norway was located in the area during the 1970s (200-300 pairs). Some species normally found in the mountains of Norway, or along the coast further north, breed here, e.g. *Pluvialis apricaria*, *Lagopus lagopus* and *Calcarius lapponicus*. Breeding divers (*Gavia stellata* and, to a lesser extent, *G. arctica*) are also relatively common.

Species	Season	Year	Min	Max	Quality	Criteria
<u>Greylag Goose (<i>Anser anser</i>)</u>	non-breeding	1989	2000	2000	-	B1i
<u>Common Eider (<i>Somateria mollissima</i>)</u>	winter	1989	5400	5400	-	B1i
<u>White-winged Scoter (<i>Melanitta fusca</i>)</u>	winter	1989	2050	2050	-	B2
<u>Red-breasted Merganser (<i>Mergus serrator</i>)</u>	winter	1989	2800	2800	-	A4i, B1i
<u>Common Loon (<i>Gavia immer</i>)</u>	winter	1989	150	150	-	A4i, B1i
<u>Red-necked Grebe (<i>Podiceps grisegena</i>)</u>	winter	1989	600	600	-	A4i, B1i
<u>White-tailed Eagle (<i>Haliaeetus albicilla</i>)</u>	resident	1998	30	30	-	A1
<u>Black Guillemot (<i>Cephus grylle</i>)</u>	breeding	1989	250	250	-	B1ii, B2

Protection status: National None International None

Conservation issues Current problems include drainage and further cultivation on the largest islands; coastal and marine bird species are very vulnerable to oil pollution. There are plans to build wind-farms in an area where several pairs of *Haliaeetus albicilla* nest ('Other' threat). Management of *Anser anser* (by shooting), in order to reduce crop damage, is being evaluated by the Norwegian Institute for Nature Research. Protection plans for the area have been prepared by the County Governorate of Møre and Romsdal.

Threats and importance

agricultural intensification/expansion	high
drainage	high

Citation BirdLife International 2007 *BirdLife's online World Bird Database: the site for bird conservation*. Version 2.1. Cambridge, UK: BirdLife International. Available: <http://www.birdlife.org>

Annex 6. Unofficial translation/summary of parts of document 2000/8003 – 3 (DN)

With reference to the white papers no 58 (1996 – 97) and no 29 (1998 – 99) from the Norwegian Government and The World Commission on Environment and Development report on environment and development, DN states that we welcome wind energy as a alternative energy source. Anyhow a cost-benefit analysis should be based on both a realistic view of the potential wind energy along the coast and the influence on nature and landscape that such constructions might have.

Using wind as an energy source is positive, but there are also some negative influences (effects) on the environment. Of negative effects we will mention noise from each Wind Power Unit, that infrastructure like roads; subterranean supply cable and power transmission lines will change the character of the landscape. Power lines are recognized as a main hazard against a lot of red list species of birds. High attention should be made to minimize the negative effects on the environment due to constructions and encroachment.

The World Commission on Environment and Development define loss of biodiversity as a global threat in line with the threat of climate change. The main threat against biodiversity in Norway is the sum of all encroachments that influence, reduces and split areas and habitats and in that way destroy habitats for a lot of different types of living creatures. Wind power stations can there for give negative consequences on environment. Conflicts regarding use of areas can arise if wind power stations are established in valuable nature and recreation areas. DN will therefore give a signal about that one need to be restrictive to establishing wind power plants in areas of especially valuable biological diversity and areas of especially high ecological function. Resting areas for water birds and areas for migrating birds are examples of such areas.

Due to the dimension and need for enough wind, wind power stations are often placed in areas where they are easily seen. The consequences for the landscape might there for be extensive. In this view the consequences depends on what localization is chosen. Landscape and the adventure of nature are values that need to be taken care about when alternative localizations are evaluated and considered in environmental impact assessments processes and processes according to The Planning and Building Act.

It is important that wind power plants are localized to areas with less conflict regarding conservation and user interests. This is important both for the wind power plant itself and for power transform lines and other infrastructure.

In connection with building of wind power plants in Norway it is essential that environmental impact assessment is accomplished, before license is given. If needed assessments should be supplemented with surveys to highlight possible conflicts and approach problems. When the wind power plant is running, surveillance and monitoring program should be implemented to test the conclusion of the environmental risk assessment and also contribute with documentation and competence for further extension.

Especially now when building of wind power plants are starting up in Norway there is a need for major wind power projects to be built step by step. License for further phases might eventually be given when effects on environment from the previous phase have been monitored and evaluated.

At least 60 breeding pairs of White-tailed sea-eagle are localized on Smøla. In the environmental assessment it is made clear that phase 1 will come in direct conflict with at least 4 – 5 breeding pairs. The assessment conclude that it is difficult to consider the effect on the rest of the population of White-tailed sea-eagle. In a short run it might result in less breeding. In the long run this can result in a permanent reduction of the population of White-tailed sea-eagle in this region.

Norway have a special management responsibility for White-tailed sea-eagle since half of the European population live in Norwegian territory.

We want to point out that according to the environmental assessment, phase I will have medium to great impact on birds, while phase 2 will have very high impact on birds.

We do not find that established knowledge for the actual region and also partly from Smøla are used to make clear the significant effect of power lines for the death of Whooper swan and White-tailed sea eagle.

DN point out that the environmental assessment do not describe known flyways for birds within the area. DN does also point out that there are essential lack of documentation regarding which flyways are used by different species of birds in the actual locality on Smøla. These kind of information are considered crucial for the possibility of consideration of consequences of the enterprise. It is our consideration that power lines from the wind power plant towards Edøy contains areas with especially high risk of collision between birds and the power line.

Power lines should not be established between the wind power plant and the Hinnå - watercourse (Hinnåvassdraget). The road should go from south to north so that the high-voltage cable can be laid in this road. The needed precaution of laying the cable in the road is due to the risk off collision between different species of birds, like Whooper swan and Red-throated diver, and the power lines.

It is DN's view that in a energy political perspective is right to emphasis new energy. In the same time we will pinpoint that it is great uncertainty regarding the extent of the effects for environmental values of national importance in this project. A substantial condition for recommending development of step 1 is therefore that terms of precautions for follow-up surveillance and monitoring are given in the conditions for a license.

DN will emphasize that one in follow-up surveillance and monitoring give answers whether the influence of the different factors are as expected, detect unexpected effects and to learn and establish knowledge for further expansions and development on other sites. This kind of surveillance and monitoring is crucial for both the owner and the authorities to be able to appraise the effects of measures and eventually adjust or alter the measures done to intercept unforeseen effects.

The need of knowledge is connected to the state of the environment before and after development. It is also important to be aware of other factors that influence the environmental status parallel with the actual development. How the development contribute to change and what the result is of the influence of these other factors. For example the need of reference areas should be considered.

Surveillance is important to establish needed basic knowledge for a certain area before development of wind power plants. The same importance do monitoring and surveillance in the area and in reference areas when the wind power plant are established have. Appreciation of results from such surveillances and monitoring should be used when judgment are made whether it is acceptable to allow new development steps.

Statkraft have not presented a proposal for a follow-up survey program including a plan for implementation of the program. If license is given, then terms of which surveillances that are needed with a defined time limit should to be laid down. We assume that the proposed program for follow-up surveillance will be sent on public inquiry.

Translation received 1.07.2009 from Snorre Stener (Directorate for Nature Management – DN)

Annex 7 Letter of Norsk Ornitologisk Forening dd 1.07.2009

Council of Europe

The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention)

Your ref.	Your contact	Our ref.	Our contact	Date
	Eckhart Kuijken		Kjetil Aa. Solbakken (kjetil@birdlife.no)	1.7.2009

Recommendations for future wind farm development in Norway

As part of the “on the spot appraisal” on Smøla wind farm, Norway June 15th-17th 2009, by the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern convention), BirdLife Norway would like to add some recommendations for future wind farm development in Norway.

Our government has a short term goal to achieve 3 TWH electrical power from wind farms by 2010, and the long term goal is many times more. The goal is to produce clean energy in order to counteract climate change. Thus the pressure to build wind farms is enormous. In fact it seems to be so big, that it matters little what other environmental impacts the wind farms might have. BirdLife Norway can't accept wind farm development that counteracts national goals and international obligations on nature conservation and sustainable development, especially regarding important areas for birds and biodiversity in general.

We are also of the opinion that wind power plants with adverse consequences on areas of big biological importance (like Smøla) do not produce green energy.

In our experience Norwegian nature conservation authorities have much too little real influence in wind farm issues. The identification of possible wind farm localities, content of EIAs and final decisions are all made by the energy authorities: Norwegian Water Resources and Energy Directorate (NVE) and Ministry of Petroleum and Energy (OED). Furthermore comments from the nature conservation authorities in these respects are often ignored. Consequently Norway's obligations to international environmental conventions, like the Bern convention, and national environmental goals are often gravely neglected. As a result much of the Norwegian wind energy production appears more “green washed” than green.

We recommend some changes to be made to improve this situation:

- The process of identifying possible sites for wind farms must improve dramatically. National or regional plans for wind farms must be made, and alternatives with little negative impact to the environment must be chosen. In our country it should be possible to localize wind power plants in areas that are already disturbed by human activities.
- Better site selection criteria must be implemented to ensure that obvious conflict cases are identified and put to rest at the earliest possible stage before much money or prestige is spent. At least important areas for wildlife and pristine wilderness areas should be added to the list of places to be avoided. Until now most wind farms have been developed in more or less pristine wilderness areas, because wind farms in more developed and inhabited areas are associated with more obvious and expensive conflicts. Localisation criteria must take into account both Norway's obligations to international conventions and national environmental goals.
- The experiences from the Smøla wind farm must be used, so that it is required to make much better EIAs in future projects. It should never be adequate to base EIAs on existing knowledge. Thorough field work on relevant topics must be undertaken. For obvious reasons it is necessary to demand that at least one whole year (or most preferably several years) is available

for field work for an EIA regarding biological diversity. This is currently not the case, and some EIAs are actually carried out in autumn/winter when little of interest can be found in the field. Thus many EIAs are inadequate for making knowledgeable decisions. It is currently a much longer process to designate a site as a nature protection area, than to decide to build a wind farm. This is remarkable as long as wind farms in most cases have irreversible effects on the environment. Today the NVE is responsible for making the EIA programs. The EIAs are then commented upon by many authorities and other parties in a hearing process. The County Governor often makes the most comprehensive remarks to the EIA programmes. On environmental issues NVE listens most to the statements from the Ministry of Environment (MD). We urge the MD to demand far better EIAs in the future.

- It is required that assessments of cumulative effects and systematic effects on relevant single species are made, as well as levels for acceptable cumulative loads in this respect (e.g. white-tailed sea eagles killed in different wind farms in a region or the entire county).
- Adequate follow up programmes must be explicitly demanded in the process of providing license to a wind farm. Furthermore the Directorate of nature management must get the opportunity to demand (not request) further investigations and mitigation measures in regard to wind farm licensing, as the case is in hydropower projects.
- Necessary knowledge must be actively collected by field work. A holistic view of nature qualities must be implemented. All parties must realize that the Norwegian natural heritage must primarily be preserved through other mechanisms than nature conservation legislations.

For BirdLife Norway (Norwegian Ornithological Society)

Kjetil Aa. Solbakken
Executive Secretary

Alv Ottar Folkestad
Chairman

Annex 8. Letter of NINA dd 29.06.2009

Carolina Lasen Diaz
Secretary of the Bern Convention
Council of Europe
F-67075 Strassbourg Cedex, France

Your ref:
Our ref: 667/2009-476.23
Place: Trondheim
Date: 29.06.2009

On-the-spot appraisal at the Smøla wind power plant

Dear Secretary,

After the discussions we had during the on-the-spot appraisal for the Bern Convention at Smøla, the expert Dr. Kuijken indicated to be interested to receive any further input/suggestions to possible recommendations. At the end of the on-the-spot appraisal, the expert gave his first impression for recommendations. He mentioned a full moratorium on wind power plant development in entire Norway, and a two-year stop in the operation of the Smøla wind power plant in order to allow for research activities during that period. We feel these recommendations are not satisfactory. First, other wind power plant plans may also provide us with “good practice” examples, why stop those? Secondly, stopping the operation of the Smøla wind power plant over a two-year period would be useless for doing research and possibly result in increased casualties after this period. Both the study of a “pre-construction” situation or a post-construction situation is impossible when the wind power plant operation is stopped but still there, in our view. Still, NINA feels we may learn something from the on-the-spot appraisal at the Smøla wind power plant. Hereunder you will find the recommendations from NINA.

1. Improved EIA processes

NINA feels that the main problem why the concession for the Smøla wind power plant resulted in a complaint by Birdlife Norway (NOF) is the lack of optimal requirements for Ecological Impact Assessments (EIA). Requirements for Ecological Impact Assessments in Norway are described in the Plan- and Building Act (plan- og byggeloven). Improvements would therefore have to be set down in amendments or regulations. There have been discussions between the authorities and constructors on who is responsible for establishing a solid base of fundamental knowledge on environmental impacts of wind power plant development. The current NINA-project at the Smøla wind power plant is partially established to enhance the fundamental knowledge needed for improved EIA processes. The most important lesson learned from the current complaint is that this should not happen again at other places. Good EIA processes are the responsibility of the Directorate for Water and Energy (NVE) and the Directorate for Nature Management (DN), and their respective ministries. In our view EIA processes may be improved by stressing the need for both desktop and field work as part of the assessment. Also, several alternative sites or a wider search area should be included in EIA studies. After concession has been given, pre- and post-construction studies should allow for capturing the natural variation (daily, seasonal, annual), necessitating studies which encompass more than 1 year of data-collection. Finally, EIA's would benefit much by being able to be based on all available data. Open and direct access to all presence information, as collected by authorities (e.g. Naturbase, Rovbase) and NGO's (e.g. NOF, Zoologisk forening) alike should in all cases be ensured.

2. Smøla wind power plant as laboratory

Still, the construction of the Smøla wind power plant has resulted in white-tailed sea eagle casualties. To be able to mitigate such problems both at the Smøla wind power plant and at other places, the responsible authorities (NVE, DN), industry (Statkraft) and other actors (NOF, NINA) should continue to utilize the Smøla wind power plant to study effects of wind turbines on avian wildlife, test the

effectiveness of specific mitigation measures and carry out in-depth studies on sea eagle population dynamics. For the latter, NOF should place their data at direct disposal.

3. Mitigation at Smøla wind power plant

Based on the outcome of the tests as mentioned in point 2, NVE and Statkraft should be obliged to minimize detrimental effects of the Smøla wind power plant on white-tailed sea eagles. This may be done by applying effective mitigation measures within the wind power plant, but also by minimizing additional mortality caused by electrocution at power-lines (cabling or safer constructions) on the island of Smøla.

We hope these recommendations may give both the expert and the secretary of the Bern Convention food-for-thought in their considerations.

Best regards,

—
Roel May /s
Kjetil Bevanger /s
Espen Lie Dahl /s

Annex 9. Letter of the Royal Ministry of Petroleum and Energy dd 1.07.2009 to the secretariat for the Bern Convention (3 p.)

Title: National provisions for impact assessment and licensing of wind farm projects in Norway

(original not copied)

An overview is presented of national regulations. An important statement is that the regulation related to the EIA (Royal Decree 2005) implements the relevant EC-Directives.

It is announced that from 1st July 2009 the legal basis regarding to EIA is the Planning and Building Act (27.06.08) and the new Regulation (Royal Decree of 26.06.09).

NVE is the competent authority according to the Energy Act.

Then follows an overview of the procedural steps in the licensing procedure with EIA for windmills.

Annex 10. Maps

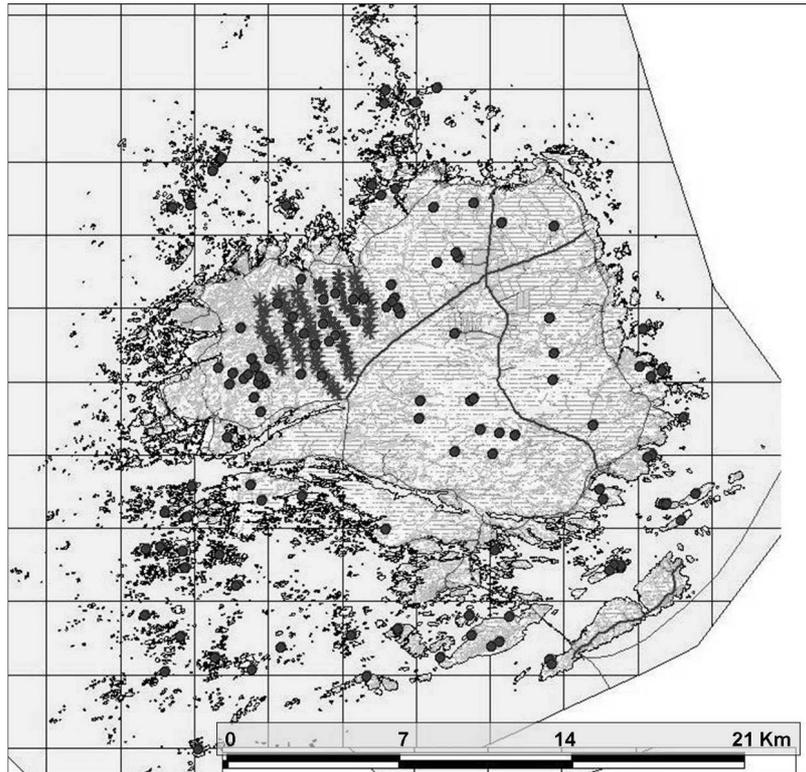


Fig 1 The Smøla archipelago: location of wind farm phase I and II - 68 turbines represented as asterisk; phase I = row 4 & 5 from left location of all White-tailed Eagles' nests (dots) (source: NINA presentation 16.09.09)

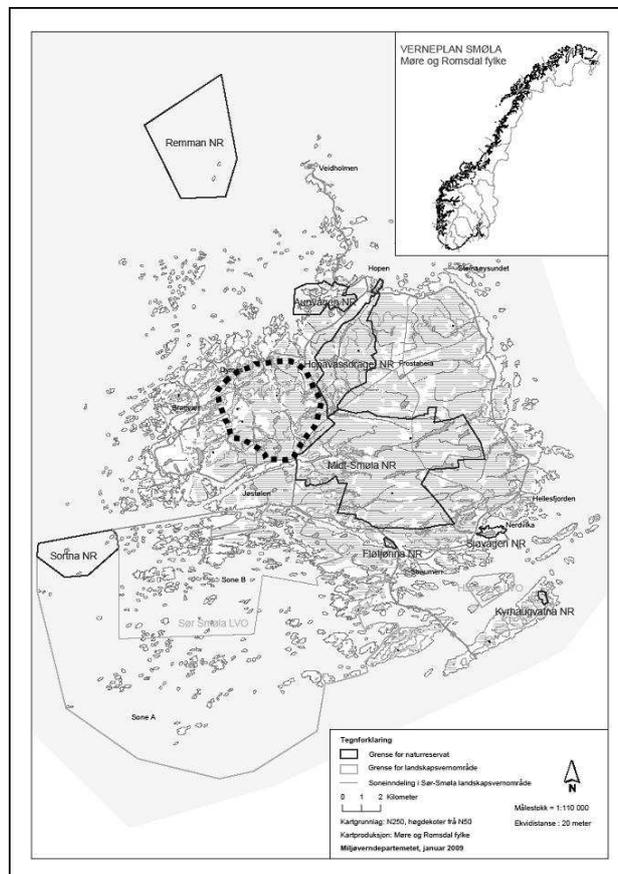


Fig 2 The Smøla archipelago: designated protected nature reserves (NR) and landscape (LVO) with the approximate location of the wind farm (dotted line) Source: Miljøverndepartement, January 2009