Bodø University College
Bodø Graduate School of Business

Master Thesis
Master of Science in Energy Management

Norwegian wind energy development and bird interactions in the context of Environmental Impact Assessment

May 2010

EN310E 003
Sofoklis Gkillas

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"It is socially unacceptable to be against wind turbines in your area - like not wearing your seatbelt or driving past a zebra crossing."

-Ed Miliband, UK climate change secretary, The Guardian, 7 April, 2009

Abstract

This is the prelude of the present Master Thesis focused on the Environmental Impact Assessments in the Norwegian wind energy sector. Norway, which has established a target to increase its renewable energy production and energy efficiency to 30 TWh per year in 2016 (compared to 2001), has made a significant turn to wind power development as an efficient alternative energy resource. Nevertheless, green political goals in the past and nature conservation issues, like excessive fatal bird collisions with wind turbines, create cautiousness concerning this wind power venture. Thus, the purpose of this academic research is to discover how Norwegian government is managing to wear thin the negative impacts of wind farms on bird populations; based on a case study on Smøla wind farm, having the largest installed wind power capacity in Norway. These environmental challenges are emphasized and discussed, especially in the context of the Environmental Impact Assessments being carried out. Procedures, guidelines and directives for wind farm licensing and environmental impact assessments are used, discussed, being compared to EU's ones and analyzed at length, in order to examine how sustainability in the Norwegian wind power industry can be achieved in an efficient way. In researcher's efforts, he attempts to clarify to what extent improvements for mitigating negative bird and wind farm interactions are feasible practically.

Sammendrag

Dette er opptakten til en masteroppgave med fokus på miljømessige konsekvensutredninger innen den norske vindkratsektoren. Norge, som har en etablert målsetting om å øke sin fornybare energiproduksjon til 30 TWh per år i 2016 (sammenlignet med 2001), har påvirket vindkraftutbyggingen mye, og fremhevet dette som en effektiv alternativ energiressurs. Til tross for grønne politiske mål – vindkraftindustrien opplever motbør i form av naturkonservering, som for eksempel at fugl dør etter kollisjon med vindmøller. Dette er bakteppet for at denne oppgaven ser på hvordan norske myndigheter håndterer negative aspekter med vindmøllefarmer og fugl, basert på en casestudie av Norges største vindpark (målt etter installert kapasitet) – Smøla vindpark. Disse miljøutfordringene er i fokus, og blir diskutert – spesielt opp mot konsekvensutredningene som blir utført. Prosedyrer, retningsliner og direktiver for vindfarmer, samt miljømessige konsekvenser, blir diskutert og sammenlignet med tilsvarende fra den europeiske union, for å undersøke hvordan bærekraft i norsk vindkraftindustri kan oppnås på en effektiv måte. Forskeren tilstreber gjennom dette arbeidet å belyse i hvilken grad det er praktisk mulig å implementere forbedringer som reduserer antallet drepte fugler.

Acknowledgments

This Thesis is the final assignment for the MSc in Energy Management at Bodø Graduate School of Business and MGIMO University in Moscow. This Master Thesis weights 30 ECTS credits and it is a result of free choice of the topic.

Firstly, I would like to express my gratitude to Bjørn Iuell and Tormod Schei, Senior Environmental Advisors in Statkraft AS, who gave me valuable information and support related to Smøla wind farm; helping me efficiently finishing my Master Thesis. Secondly, I would like to thank Ben Bjørke, Social Economist from the Norwegian Wind Energy Association, for his assistance on crucial updates and data on wind energy issues in Norway, as well as for arranging a trip to Smøla wind farm for me.

In addition, I also thank my supervisor Kristin Haugland Smith; as well as the Associate professor Anatoli Burmistrov in Bodø Graduate School of Business, who provided me with constructive critics and helpful advises on my topic. Special thanks to Petter Danielsen, who translated the Abstract to Norwegian. I am also grateful to all the interviewees who contributed at most, based on their personal insights, to this academic research. I also wish to express my gratitude to Christos Zachos, a close relative of mine, who has been supporting me mentally to all moves and steps I have taken until today.

Lastly, I want to thank all backers of renewable energy; people who I owe my motivation and willing to continue keeping high hopes for a better world.

Sofoklis Gkillas

Table of Content

Survey of Figures and Appendices

Survey of Figures

Survey of Appendices

Abbreviations

DN	Directorate of Natural Management
EIA	Environmental Impact Assessment
Environment	The term *"environment"* is used as encompassing human beings, fauna, flora, natural resources, landscape, climate, cultural heritage and interactions among those.
EU	European Union
IBAS	Important Bird Areas
ICZM	Integrated Coastal Zone Management
IUCN	International Union for Conservation of Nature and Natural Resources
NINA	Norwegian Institute for Nature Research
MoE	Ministry of Environment
NGO	Non Governmental Organization
NOF	Norwegian Ornithological Society
NORWEA	Norwegian Wind Energy Association
NVE	Norwegian Water Resources and Energy Directorate
OED	Norwegian Ministry of Petroleum and Energy
SACs	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SPAs	Special Protected Areas
UN	United Nations

Watt (W) = Unit for effect or output; energy per second.

Kilowatt (KW) = 1000 W

Megawatt (MW) = 1000 kW

Gigawatt (GW) = 1000 MW=1 million kW,

Terrawatt (TW) = 1000 GW=1 million MW=1 billion KW.

Kilowatt hour (kWh) = Unit for energy; One kilowatt produced or used in one hour.

Megawatt hour (MWh) = 1000 kWh

Gigawatt hour (GWh) = 1000 MWh=1 million kWh.

Terrawatt hour (TWh) = 1000 GWh=1 million MWh =1 milliard kWh

1. Introduction

1.1. Theme and background

On behalf of various environmental organizations and other groups of people worrying about climate change and the greenhouse effect, it has been suggested that wind power can be an efficient energy solution; in order for many European countries to be energy independent from fossil fuel consumption, and simultaneously face effectively today's environmental challenges. During the last 20 years wind power generated output in Europe has increased to more than 100 TWh from 0.7 TWh, mostly in Denmark, Germany and Spain (See appendix A) (Bjørke, 2009).

When it comes to Norway, the country enjoys the best onshore potential in Europe and the second offshore wind power potential after Portugal (Inpow.no, 2010). Norway has excellent wind resources with high wind velocity (up to 9m/s) for much of the Norwegian coast from Lindesnes and north, and for many inland areas, where Finnmark is the county with the greatest onshore wind power potential (see appendix C). Norway, having the longest coastline in Europe which is able to produce and export up to 40 TWh by 2020-2025 (half of it coming from offshore wind power) could become the *''energy battery of Europe''* based on its wind capacity (Inpow.no, 2010).

Given all the climate change reasons, European energy security and Norway's huge wind resources, the country published the White Paper no 58 (1996-1997), where it is pointed out that increased investments in renewable energy sources like bio, wind and sun energy are necessary to achieve a more sustainable development (NVE, 2009). In connection with the consideration of the Storting White Paper No. 29 (1998-1999), it was determined to build wind power plants which annually would produce 3 TWh by the year 2010 (regjeringen.no, 1998). In 1998, the maximum installed wind power capacity in Norway was only 0.75 MW (NVE, 2009). Towards these directions, today in Norway there is an installation of wind energy capacity which consists of 431 MW (see appendix E) (EWEA, 2010).

Nonetheless, the oxymoron is that Norway's wind power accounts only for 0.7 percent (in 2008) of the country's total power generation (NVE, 2009), while only 2 MW of them were installed in 2009 (see appendix B). As regards the outcome of the wind energy political goal that officially the Norwegian Parliament decided in March 2000, Norway is not reaching the proposed annual production of 3 TWh in 2010 (see appendix D). Moreover, according to Ben Bjørke, Social Economist in Norwegian Wind Energy Association (NORWEA), any additional installed wind energy capacity in Norway is ruled out during 2010.

As a matter of fact, Norway continued its efforts for additional renewable energy with the inclusion of wind power, based on the White Paper no 11 (2006-2007), establishing a new government target of increasing renewable energy production and energy efficiency of 30 TWh per year in 2016 compared to 2001 (regjeringen.no, 2006). For that reason, according to NVE (Nils Henrik Johnson, Senior Adviser, Norwegian Water Resources and Energy Directorate) there are more than hundred wind farm projects under consideration at present, where 30 of them have already been granted a license (see appendix F).

Nevertheless, this energy turnabout of Norwegian government to wind power, in order to counteract climate change, has produced significant reaction from many environmental organizations and other interest groups. These groups are concerned with possible wind power side effects, in regard to nature conservation and more especially the protection of birds' population and variety in Norway. On the other hand, Norwegian government supports the position that wind power leads to a high degree of renewable energy production and sustainable development, while at the same time coping effectively with today's environmental challenges (regjeringen.no, 2005). Despite the fact that it is most important for Norway to secure its wind industry development in the market and reach the 2016 targets established, environmental challenges arise concerning the protection of red-listed birds and other species as well from negative impacts of wind farms; even if there is a trade off between wind turbines' impact on nature values and reduction of carbon emissions.

As a matter of fact, wind farm locations in many cases have significant importance for biodiversity, notably for resident flora and fauna and their specific habitats (birdlife.no, 2009). The need for measuring indirect, long-term and

cumulative effects on birds caused by wind farms is vastly interconnected with migration corridors (mainly coastal or through mountain passes) and breeding areas (birdlife.no, 2009). Compatibility with wind farm projects located nearby biodiversity hotspots, especially when some bird species are rare, threatened or have an unfavourable conservation status, sometimes seems challenging and potentially not promising (birdlife.no, 2009).

On the above grounds, Smøla wind farm is an interesting case: based on the fact that Norwegian Government reported to the Parliament in 1998 the energy goal of an annual wind power production capacity of 3 TWh by 2010, the establishment of a wind farm complex (phase I and II) in the Archipelago of Smøla was the first step for the accomplishment of that goal (birdlife.no, 2009). Nonetheless, Smøla wind farm, being the biggest installed wind farm in Norway and one of the biggest onshore wind farms of Europe (accounting almost for 1/3 of the Norwegian wind energy capacity); has complications with bird and eagle collisions with its wind towers. Smøla Island is an important area for the nesting of White-tailed Eagles and other bird species (some of them on the Norwegian red-list), where significant bird mortality numbers have been occurred caused by wind turbines (birdlife.no, 2009).

More specifically, White-tailed Eagle and Willow Ptarmigan (along with other two bird species) were birds included in the International Union for Conservation of Nature and Natural Resources (IUCN) red list of threaten species having the *''near threaten status,''* at the time that the wind farm got a licence [both of them now have the status of least concern (iucnredlist.org, 2010); however, Norway has a global responsibility status for white-tailed eagle]. Statkraft, the developer of this wind farm, has spent respectful financial resources on research and development, especially on post studies to minimise these negative impacts. That led for Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats) to assess the negative impacts and fatalities on birds in this wind farm in June 2009 (Statkraft.com, 2009).

The sensitive issue here is the question of which institution shall be the one that approves the EIA, sets the conditions and gives the license to build a wind power plant. As it is now, it is not DN (Directorate for Nature Management, which belongs to the Ministry of Environment), but NVE which belongs to the Ministry of Petroleum

and energy. Even if NVE has improved the EIAs guidelines from 2007, offshore wind projects still remain problematic in terms of bird populations and wind farm installations. The Havsul projects in Møre and Romsdal (county municipality) are a typical example of that issue: the projects are called Havsul I, II, III and IV. In July 2009 NVE decided that the only project that got a concession was Havsul I, (the first offshore wind power project in Norway which is approved) (regjeringen.no, 2008). The other projects were denied concession on grounds of negative environmental impacts, especially on birdlife (NVE, 2009).

1.2. Problem Statement

Considering that it is most important for Norway to secure its wind industry development in the market and reach the established government targets of increasing renewable energy production and energy efficiency of 30 TWh per year in 2016 compared to 2001; as well as based on the complications with bird collisions in Smøla wind farm, this master thesis is undertaken in order to shed light on the present environmental challenges that Norwegian wind power facing, and more especially looking at the bird protection perspective. A systematic utilization of wind power should secure the differentiation of energy production of Norway, creating simultaneously a stable natural environment for birds and other habitats. Overall, the central problem statement is related to the already mentioned challenges and problems, being formulated as follows:

How effective Norwegian legislation, guidelines and licensing procedure for wind farms in the context of EIAs are in mitigating negative impacts on birds, as caused by wind power development?

In order to approach this problem in a fruitful way, the statement is specified by introducing two sub-research questions, which are structured and highlighted in researcher's effort to define all possible aspects of master thesis's main goals and purposes. This is beneficial for structuring this master thesis and giving the opportunity of having a better insight. The sub-questions are as followed:

1. How Smøla wind farm should be used in order to improve the quality of the Norwegian system related to EIAs for wind farms, for future wind power developments concerning birdlife?

2. Which are the differences between Norwegian and EU Directives, legislation and guidelines related to EIAs in promoting protection and conservation of birds?

1.3. Contribution

This master thesis is fairly focused, on an academic and scientific base, towards the clarification of future governments' decision making; concerning potential developments in the Norwegian wind energy field. By comparing procedures, guidelines and directives related to EIAs and SEAs about the protection of birds in EU and Norway, stimulating conclusions come to the fore. This fact is focused on the need to indicate problems of a potential inadequacy of effectual guidance and directives from the Norwegian ministry of Petroleum and Energy. In other words, to what extent the quality of EIAs assists decision makers, with the best of knowledge of the potential impacts of a wind farm, it is crucial to be known in order to be decided if a wind farm project should be accepted or not.

As a result, institutes, environmental and scientific organizations, as well as Norwegian government, may consult this master thesis in order to observe how these real challenges can be met in the very offset of offshore wind power deployment, as well as in the promising onshore wind power development. Moreover, this master thesis can be an important source of information for various groups contributing to a further environmental cost-benefit analysis of wind power. Moreover, future Norwegian environmental Directorates will be able to face effectively forthcoming challenges and obstacles related to potential wind energy plans and bird interactions; bearing in mind successful or miscalculated energy strategies and policies on EIAs of the past within this specific renewable energy field, as they were implemented by previous governments.

2. Methodology

In this chapter, the methodological procedure followed in this master thesis is described, through focusing on the research approach, philosophical position, chosen method, data collection and sampling, data analysis, research quality, ethical aspects and strengths and weaknesses; which were taken and studied.

2.1. Research approach

It is of outmost importance to have approached this research study in the most efficacious way, granted that it affected the procedure of collection of all information and data. In this case, it is difficult for the researcher to have a clear picture of the situation beforehand, due to the fact that there is no detailed background related to wind power development in Norway and bird interactions.

Considering that the goal of this master thesis is to make a research under scrutiny in order to identify and bring to the surface various aspects of problem posed, explorative research is used. The main goal is to find out insights into the general nature of this problem as well as potential decision alternatives, which are significant characteristics of an explorative research (David A. Aaker; V. Kumar; George Day, 2001, p.77). The fact that there is little previous knowledge needed, without preconceptions on the subject, makes research procedure most flexible and qualitative. Thus, explorative research is used in order for the researcher to find out and understand what the nature of the general question posed is; as well as identify possible alternative strategies that will be decided upon especially related to most sensitive issues, like new wind power projects, political goals and policies regarding nature conservation. This is more than obvious, especially when trying to focus on the implications related to bird collision/wind farm challenges in the wind energy sector

in a country like Norway; where never before it did face challenges of a similar nature.

2.2 Philosophical position

In this paper a lot of focus is put on interviews and people's beliefs and not exclusively on number and figures; especially when issues like wind power projects are addressed in a manner that cast some doubt on whether sustainable development could be approached related to natural values. This research study is focused on the ways people understand world and nature by sharing their experiences with each other, using basically the means of everyday language (Easterby-Smith, 2008: p.58). As a result, researcher's philosophical position is that of Social Constructionism, where he is able to corporate people's perspectives by asking different groups and organizations about their opinion concerning wind power development in Norway and bird collisions on wind turbines; as well as concerning the improvement of EIAs within the context of conservation of birds, where researcher's study is not independent and irrelevant of human interests and beliefs.

Thus, gathering facts and measuring statistical probabilities is not what this master thesis is aiming for, in order to identify and analyze the challenges of Norwegian wind power development; and to what extent it approaches to achieving sustainability. The researcher is a part of the discussion by collecting various constructions of people, based on their experience on the subject (Easterby-Smith, 2008: p.59). Attention is paid to the ways people are thinking and communicating with each other, verbally or otherwise. Thus, the focus should be on understanding and interpreting the reasons that make people have different experiences, instead of identifying external inputs which explain human behavior (Easterby-Smith, 2008: p.59).

Finally, the position of Constructivism is the one that is applied in order to express the subjective nature of reality. Furthermore, qualitative research methods are selected, which are to be described in the next chapter; and are the tools of the Constructionism paradigm, being the chosen philosophy of this research study.

2.3. Chosen method

The research method chosen is the qualitative method, derived from Constructionist research design. It is based on the collection of data in the form of words, and it is a tool used to understand and describe human experiences and opinions (wilderdom.com, 2006). In this master thesis, concepts and theories related to EIAs and the interactions between Norwegian wind energy sector and birds are referred, in order for the researcher to end up to conclusions and confirmations or not of the specific hypotheses made and tested; based on the collection of observations to address these hypotheses. Given the above, a deductive case study approach is chosen for this purpose (socialresearchmethods.net, 2010). Yin (2002, p.37) defines that a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. A case study aims to draw particular conclusions with the assumption that the researcher is very much interested in that specific case (Gummesson, 2000, p.84). An in-depth assessment of single events is based on gathering of different data by using various collection methods, including interviews as well as documentary and observation analysis. According to Saunders et al. (2000, p.94), a well-constructed case study helps the researcher challenge an investigated theory and to provide a source of new hypothesis.

In this case, the researcher ends up with concrete conclusions by comparing data from the same events and facts; for example, asking different sides about their opinions on environmental issues related to wind power policies in Norway in the context of EIAs, about sustainability and how it can be achieved, as well as about possible influences on natural values. These interviews are judgmental up to a point, since the most relevant data needed had to be chosen in order to make the appropriate comparisons. Thus, being focused on groups like Norwegian energy and environment ministries and their directorates, environmental organizations like the Norwegian Ornithological Society, companies and energy associations, no specific decision was made on the number of interviewees in the beginning of this research study; given the fact that the researcher did not know where exactly this research would lead. As a result, searching for implications related to Norwegian government's solutions in

facing these environmental challenges in wind power industry, the research is based on key points marked and grouped into similar concepts.

2.4. Data collection and sampling

Asking questions and making comparisons is an indivisible part of data collection and analysis chosen in this master thesis. In addition, questions were relevant to the interviewees in order to end up with a result. As regards the collection of primary data in particular, this was gathered through face to face guided interviews, telephone and email interviews. Those interviewed are people from the Norwegian wind energy sector [NORWEA, NINA (Norwegian Institute for Nature Research), Kjeller Vindteknikk AS (Wind Measurements and Analysis Company)], Ministry of Environment (MoE) and two Directorates of Norwegian government (NVE, DN), Birdlife Norway (NOF) as NGO; as well as a representative from Smøla municipality. There were also meetings with senior managers of the company Statkraft, which is the developer of Smøla wind farm.

Literature review is based on Norwegian laws and regulations for wind farms in the context of EIAs (Energy Act, Building and Planning Act, Biodiversity Act, guidelines for wind farm development in Norway etc), as well as on EU Directives for EIAs, Strategic Environmental assessment, Sustainable development, Stakeholder theory; guidelines for screening and scoping and other directives related to birds and habitats in the context of the EIAs. Regarding secondary data, information is collected and gathered from published reports, articles and books related to the problem statement posed. More specifically, reports and guidelines were studied, deriving from research institutions (Smøla case/Berne Convention), ornithological organisations related to the interaction of birds in regard to wind turbines collisions; and in particular, related to complications with wind farms concerning various functions of birds.

This research study was focused on the non-probability sampling technique, concerning the way data was chosen. The fact that specific groups and companies have already been mentioned and interviewed indicates that information was derived from people and groups, which have not been chosen by equal probability. The nature

of the problem statement is fairly qualitative, meaning that it is not feasible and practical to do random sampling, approaching the sampling problem with a specific plan in mind beforehand related to possible interviewees (Socialresearchmethods.net, 2006). In this case study, data was gathered from interviews taken from Norwegian ministries and their directorates, environmental groups and energy companies, until it become repetitive and no new information could emerge at that time. However, important factors permitting for picking the appropriate sample size were knowledge and experience, which the researcher had. Literature review, which is already mentioned, and previous personal experience on this procedure, helped a lot the researcher make the right sampling (Thomson, 2004).

2.5. Data analysis

Given the fact that deductive case study is the methodology chosen, it is necessary that comparative analysis is used in this research study. The analytical process has been divided in three steps: description and systematization of data, categorization of data and combination between information in the different categories (Jacobsen, 2000). More especially, 3 conceptual categories of secondary data (relevant reports) and 8 conceptual categories of primary data (face to face, phone and email interviews), comprising the conceptual framework of this research, are compared to the theoretical framework in order for the researcher to understand the insights and implications of the stated problem. This categorization of related data and analytic approach, after the line by line comparative analysis method, leads to more analytical ideas and conceptions. In this master thesis, data is organized in a way that all participants in interviews are chosen according to their close relation to the problem statement.

Nevertheless, some primary data are not very much related to the above data categories. This is the reason why this primary data can be found also in introduction (NORWEA and NVE statements on page 2) as well as in the analysis part [***First part of Analysis:*** NOF commenting on baselines studies; Kjeller Vindteknikk AS and Geir Wang (Specialist Inspector on Smøla wind Farm) on mitigation measures; NINA on

offshore wind power. ***Second part of analysis:*** NOF commenting on INON maps; NVE on Important Bird Areas (IBAS); and MoE on Offshore wind energy development]. Assessing the efficiency of Norwegian EIA and licensing procedure for wind farms within the context of bird conservation; and the EU and Norwegian comparison of legislation and EIA processes regarding birdlife, comprise the two components of the analysis-discussion chapter. These two sections of analysis are fairly interconnected with the two supporting sub-questions, as presented in introduction; in researcher's effort to answer explicitly the problem statement posed in the present master thesis.

2.6. Research quality: Validity and Reliability

One of the most important issues for a researcher is the quality of research study, which is the key for the successful formation of a master thesis. In general, reliability and validity in qualitative research are ensured by examining the level of trustworthiness of a research report (Creswell; Miller, 2000). As regards validity, researcher's perception of this term has a lot of influence in his selection of the final implications and assumptions.

Reliability and validity are fairly conceptualized as trustworthiness, which affected the research perspectives to eliminate bias and increase truthfulness (Denzin, 1978). Interviews from competent people of the wind power sector in Norway, as well as from other environmental organizations and relevant Norwegian ministries were a challenge for the researcher; in order to engage quality more practically, realizing that deductive case study itself will be used in order to provide quality in this paper. Data collection, comparative analysis and theoretical sampling were crucial components for an efficient quality assessment, given the fact that case study played a critical role in this research. Moreover, even though all interviewees were asked for their confirmation by stating their names and approving all information collected from them (all conversations were recorded and transcripts were made); it is not a requirement for deductive case study analysis to ask interviewees to accept the interpretation of data by the researcher.

2.7. Ethical aspects

In this paper, the researcher was respectful towards the participants' rationality and dignity. Interviewees from wind energy industry and other people involved in the issue were viewed as partners, and not as objects like in quantitative methods; demonstrating respect for their competencies (Sime, 2007). Researcher's central goal was not to provoke any psychological damage (through his research and its results) to participants, emphasizing confidentiality to sensitive information; which is a major characteristic of deductive case study and qualitative research.

More specifically, the methodology of qualitative research has to be fairly understood in order to guarantee ethical issues; thus in this research study the relativist stance was chosen. According to this ethical approach, it was up to the researcher to choose what specific issues are about to be discussed with the interviewees, which derived from his own experiences and personal biography (sahealthinfo.org, 2009). Ethical standards were defined by the researcher based on his conscience, given the fact that comparative analysis was used by applying combined exploratory case study and deductive case study approach in this master's thesis. As a consequence, confidentiality and reciprocity were ensured by the personal onus of the researcher, in his effort not to reveal and report private and sensitive data; as related to the participants from whom the interviews have been taken (he was asked by several interviewees not to). This position is critical, especially when one considers the mere fact that wind power projects affect directly the quality of life of the Norwegian counties and municipalities involved; as well as of birds (sahealthinfo.org, 2009).

2.8. Strengths and weaknesses

Exploratory research helped the researcher get a deeper insight into EIAs in Norwegian wind energy field and its framework; while addressing queries of significant relevance to the core of this matter, which is related to sustainable

development. Smøla wind farm is the biggest wind farm in Norway, already constructed and in actual function, meaning that one is able to count the real impacts of this wind power plant on birds. Additionally, Smøla wind farm started full function in 2005, and it is not very distanced from today; as well as from present wind farm development in Norway.

Furthermore, given the fact that qualitative approaches are fairly suitable for discussions and issues like wind power development in Norway in relation to EIAs, they provided emerging concepts and ideas; based on comparison of a big range of management issues, and by exploring sensitive situations, like behavioral and communicative approaches of human relationships (Matsumoto, 2009). In addition, the big variety of wind farm stakeholders participated in the interviews (they were nine in number) secured that none of the opposing sides was thrust aside.

Nonetheless, in this research study the researcher might not have been able to soundly avert potential negative aspects of his exploratory research, which might have included the lopsided lack of some viable information from the email interviews, only taken from the Norwegian energy and environmental ministries and their directorates (they sidestepped a face to face interview); as well as based on the difficulty to approach politicians talk about the matter. In addition, let it be known that the ongoing research on Smøla on birds is not finished yet, as it will come to a close in 2011. This reality might not provide the researcher with absolute implications on birds and their protection from the activity of wind farm in Smøla, in order to draw general conclusions. Furthermore, there is a fairly limited literature and theory related to EIA processes and guidelines for wind farms in Norway (legislation was in Norwegian and translation to English might not be precise); as well as most limited number of researchers making academic studies in the country on this particular topic.

Nonetheless, by implementing deductive case study analysis, it is credible to rely on the tenacious validity and reliability of the researcher himself; by being a social and business scientist and by having the appropriate ample academic background needed for the compilation of this master thesis.

3. Conceptual and Theoretical Framework

This selected literature consists of a conceptual and theoretical background related to the underlying issues of: Sustainable development; EIAs and sustainability in the context of EIA; wind energy stakeholders and birdlife; SEA; birdlife and its interaction to wind energy; as well as to EU and Norwegian legislation, guidelines and directives related to EIAs and conservation of birds.

3.1. Sustainable Development

Sustainable development is a concept which has turned into misused most of the times from the international community; as referred to various topics, from climate change to business development. Therefore, despite a plethora of international conferences, meetings and literature written on the concept of sustainable development, the interpretation of this term is still inconsistent (Bosshard, 2000). At this point, it has to be highlighted that due to the complexity of environmental, economic and social aspects, the attempt to define precisely what sustainable development represents would be a difficult challenge for research (O'Riordan, 1993).

Definitions on sustainability are compound and differ significantly, as one is addressed at various institutes and organisations. The definition on sustainable development that has been mostly quoted is related to a concept which "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

According to the United Nations World Summit outcome document (2005), sustainable development is the integration of the three components of: economic development, social development and environmental protection as interdependent and mutually reinforcing pillars. The concept of sustainable development based on the

ecological, economic and social aspects and their correlation, can affect society's attitude towards natural environment implementing tools (like EIA).

As it is pointed out in following Figure (Figure 1), sustainable development encompasses all three elements of social, economic and bio-physical (environmental) impacts that need to be considered to a similar framework; while traditionally the focus has been only on the environment (Kirkpatrick and Lee, 1997). However, sustainable development cannot be considered as an everlasting and self-contained concept due to its dynamic nature, depending only on cultural, social and moral values of individuals (Bosshard, 1997).

Figure 1: Sustainable Development (University of Abertay Dundee, 2010)

Since researchers have developed and redeveloped various definitions for the concept *''sustainable development,''* a growing awareness of the need to measure sustainability had already been in the frontline (Moffatt et al., 2001). Given the fact that measurement instruments of sustainable development were long used in fields such as economics, social accountability and environmental science, these indicators were seen as logical devices of assessing sustainable development (Bell and Morse,

2003). Hence, it is necessary to put the theoretical concept of sustainable development into a concrete form (Becker and Jahn, 1999).

One of the above measurement instruments is the Environmental Impact assessment (EIA); as supported from the concept *''Strategic Environmental Assessment (SEA).''* In chapter 3.1.2., sustainability in the context of EIA will be defined, in order to support researcher's conceptual framework on this term in the present master thesis; as it has already been stated, that the term *''sustainable development''* is challenging to be defined.

3.1.1. Environmental Impact Assessment

Environmental impact assessment (EIA) is a tool for decision-making at all levels, used to identify and evaluate potential environmental impacts of a current or a proposed development (Glasson et al., 1999). EIA is defined as a tool that governments use to protect the environment and to be able to know more about the impacts human activity is going to create in advance (Barker and Wood, 1999). EIA is a project management tool for gathering and analyzing information on the environmental impacts of a project by identifying potential environmental effects, assessing the importance of environmental implications, examining if impacts can be mitigated, suggesting preventive and corrective mitigating measures, informing decision makers and concerned stakeholders about the environmental interactions with the project; and by advising whether the project should proceed or not (ESCAP, 2003). The three fundamental goals of the EIAs are to lead to decision-making, to end up to the formulation of the actions to be taken for development and to be used as an instrument for sustainable development (Glasson et al. 1999). EIA was initially implemented in USA by the National Environmental Policy Act (NEPA) in 1969 (Wood, 2003), being applied in more than 100 countries at the present. As regards Europe, it was firstly required in the European Union (EU) through the Directive 85/337/EC, while amended in 1997 and 2003 (CEC, 1985, 1997, 2003).

EIA processes usually consist of the following steps:

screening, scoping, baseline data collection and studies, identification of environmental impacts, impact prediction as well as comparison of alternatives and determination of significance, mitigation measures, public consultation and participation, environmental monitoring and the environmental impact statement (EIS) (ESCAP, 2003).

Screening is the first key decision of the EIA procedure, and its purpose is to determine whether a proposal requires an EIA or not (eia.unu.edu, 2010). Screening categorizes the project proposals into three categories: projects which require an EIA, projects which do not require and EIA, and projects which their need for application is not clear (ESCAP, 2003). Major projects, like wind farms, warrant a full EIA on grounds that they are considered to have potentially significant negative impacts on human health and safety, on rare or endangered species, on biological diversity or on lifestyle and livelihood of local counties (eia.unu.edu, 2010).

When it comes to the Norwegian wind energy sector, screening is obligatory by the present regulations related to impact assessments; with an EIA being undertaken under specific requirements for 5MW wind power plants, or more (NVE, 2009).

Scoping is related to the determination of the coverage of the EIA study for a proposed project that might have significant environmental impacts. During scoping, alternatives are developed to the proposed action and issues are identified in order to be considered in the EIA (unescap.org, 2003). Scoping ensures that EIA studies are focused on the significant impacts, and that time and money are not wasted on unnecessary investigations (eia.unu.edu, 2010). Scoping is not an isolated phase of an EIA, but it may continue well into the project planning and design process, based on upcoming issues that may arise for consideration. Scoping also determines the assessment methods to be used, identifies all affected interests as well as provides an opportunity for public involvement in determining the issues to be assessed (unescap.org, 2003). Scoping is important due to the fact that it ensures that detailed prediction is only carried out for critical issues related to the project. EIA are not responsible for carrying out exhaustive studies on all environmental impacts for all projects. When a full scale EIA is considered necessary, scoping should include terms of reference for these further studies (FAO, 2010).

Methods of Scoping and their steps are described as follows: **(a)** Drawing up a plan for public involvement at an early stage; **(b)** gathering relevant existing information and including a preparation of a preliminary list of potential environmental impacts and alternatives to these; **(c)** distributing of information to affected stakeholders; **(d)** identifying major issues of public concern; **(e)** assessing the significance of issues on the basis of available information; **(f)** establishing priorities for environmental assessment; and **(g)** deploying a strategy for addressing priority issues for those which need further data collection in order to be resolved (unescap.org, 2003).

Baseline studies refer to the collection of background information on the biophysical, social and economic aspects related to the area that the project is to be carried out (unescap.org, 2003). Usually, information is gathered from secondary data from a database, or from the acquisition of new information through field samplings in the project premises. The task of collecting baseline information starts from the period of project inception; nevertheless, the big majority of this procedure is usually carried out during scoping (unescap.org, 2003). Baseline studies are based on obtained data in order to provide a description of the status and trends of environmental factors (e.g., mortality or breeding trends of species), against which predicted changes can evaluated in terms of importance; as well as to provide a means of detecting actual change by monitoring from the moment a project has been implemented (unescap.org, 2003). Baseline studies and scoping are interrelated in terms of using available data and local knowledge. Once key impacts have been identified, there is a need for further in-depth studies for additional data (FAO, 2010). A full year of baseline data is necessary to record seasonal effects of many environmental phenomena. Nonetheless, in order to avoid delays in decision making, short-term data monitoring shall be carried out in parallel with the long-term collection to make conservative estimates of environmental impacts (FAO, 2010).

Impact identification starts at the early stage of scoping, and as EIA study progresses more information becomes available on the environment and socioeconomic conditions of the proposed project (unescap.org, 2003). The preliminary identification of impacts based on scoping, can be confirmed as well as new impacts can be identified during the investigation and EIA process (unescap.org,

2003). As regards the present master thesis, the biological impacts and their consideration are the ones in this category which are studied and are interconnected with the effects on biological resources such as vegetation, wildlife, flora, fauna, aquatic life and with ecosystems overall (unescap.org, 2003). An impact can be described as the change in an environmental parameter, which results from a particular activity. In Figure 2, one can observe that the above change is the difference between the environmental parameter with the project, compared to the situation of the same environmental parameter without the project (eia.unu.edu, 2010).

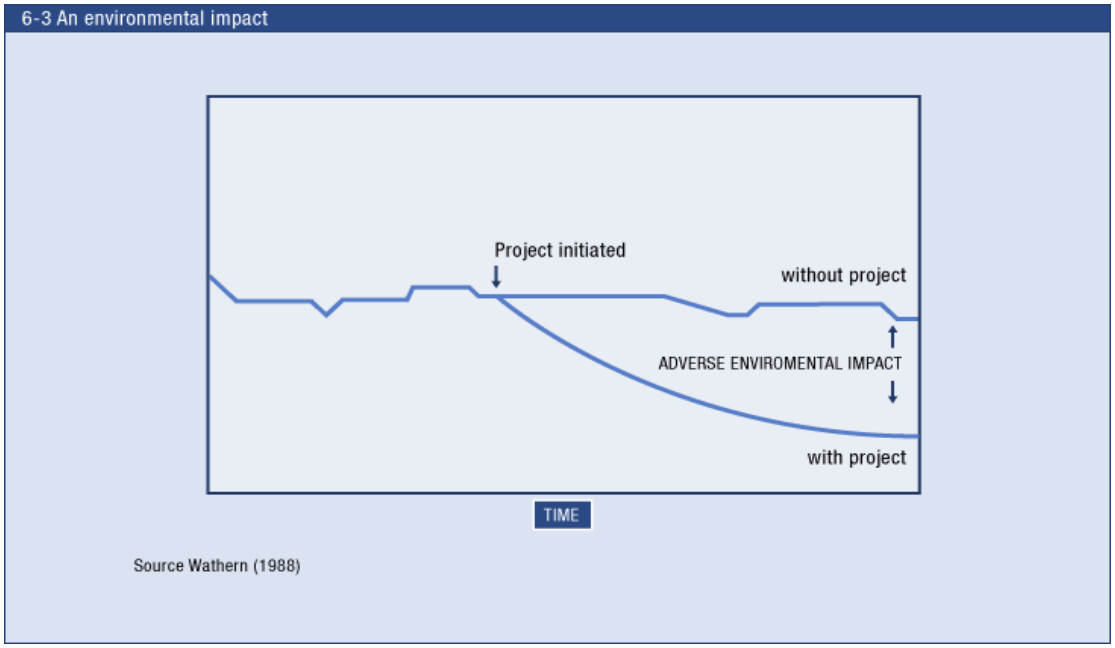

Figure 2: An environmental impact (eia.unu.edu, 2010)

Impact prediction and comparison of alternatives is the next step of the EIA process. As long as all important impacts have been identified, their possible size and characteristics can be predicted (eia.unu.edu, 2010). Prediction should be based on the available environmental baseline studies, which they should have already been done before this stage (unescap.org, 2003). Impact prediction is based on the magnitude of impacts, as well as on the extent and duration of impacts. Based on the fact that a systematic decision-making in the choice of alternatives must be achieved, trade-off analyses which typically involve the comparison of a set of alternatives relative to a series of decision factors are a common tool stage (unescap.org, 2003). As regards the key elements for assessing impact significance, these consist of the elements of the

triple bottom line in the context of EIAs, which are the ecological, social and economical standards (unescap.org, 2003).

Mitigation measures are a critical component of the EIA process and their goal is to prevent, reduce or offset adverse impacts of development activities, and to keep those that do occur within an acceptable level (eia.unu.edu, 2010). Usually in an EIA, mitigation measures are often located after the evaluation section, coming after the analysis and comparison of alternatives. The rule is that first a preferred alternative has been selected, and then second mitigating measures have been added to the project (eia.unu.edu, 2010). In general, as the EIA becomes more detailed, impact avoidance is minimised as well as the concern to compensate for unavoidable impacts. Nonetheless, these distinctions are not rigid and creative mitigation should be sought at all steps of EIAs (eia.unu.edu, 2010).

Mitigation measures can be divided into three elements: preventative, corrective and compensatory, as described in Figure 3. More specifically, as regards the preventative (*''avoidance''* in Figure 1) mitigation measures they are effective when applied at an early stage of project planning, like avoiding regions that are environmentally sensitive (eia.unu.edu, 2010). At any time, during project planning and implementation, new types of impacts can emerge and different mitigation measures should be proposed depending on each case (unescap.org, 2003).

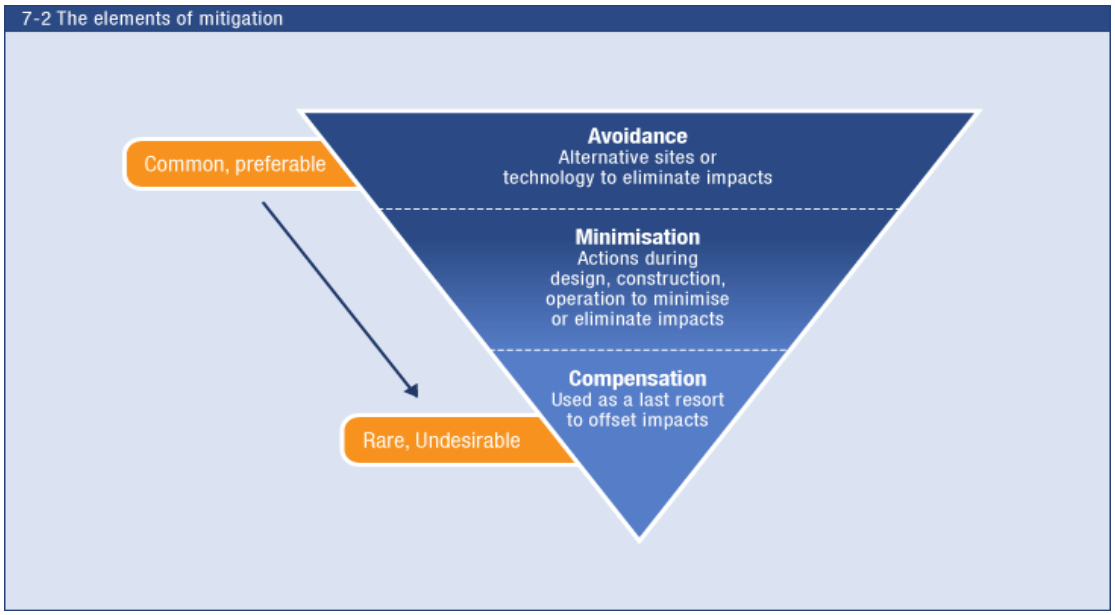

Figure 3: The elements of mitigation (eia.unu.edu, 2010)

The involvement of stakeholders in EIAs is based on the public consultation and participation process. These stakeholders usually consist of local people, NGOs, voluntary organizations, private sector, national/local governments, scientist and experts (unescap.org, 2003). Some of the benefits of the stakeholder involvement are based on an improvisation of understanding between the different parts, on the identification of alternative choices and mitigation measures, as well as on the sense of local ownership. However the inadequacy of local knowledge on the projects, especially when wind power is implemented on an area, can be a drawback of the participatory process including stakeholders (unescap.org, 2003).

A serious drawback of most environmental impact assessments is the ***absence of baseline data*** during the operation of development projects. Impact predictions and mitigation measures are impossible to succeed and be effectual without this baseline data.

Environmental monitoring provides specific information on the characteristics and functions of all variables concerned in space and time (unescap.org, 2003). The most basic aim of EIA monitoring is to ensure that the implementation of the project has the least negative environmental impacts. The main types of monitoring activity of an EIA are: **(a)** the baseline monitoring which consists of a survey on basic environmental parameters in the area of the potential project before construction, **(b)** the impact monitoring which consists of the biophysical and socio-economical parameters within the project area that have to be measured during the project construction, and **(c)** the compliance monitoring which consists of periodic sampling methods and systematic recording of specific environmental quality indicators after completion of the project, in order to ensure that the project shows compliance with the recommended environmental protection standards (unescap.org, 2003).

Finally, all steps of the EIA process end up to the ***Environmental Impact Statement (EIS),*** which purpose is to provide a coherent statement of the potential impacts of a proposed project and the measures that shall be taken; in order to ease

and remedy them (eia.unu.edu, 2010). Furthermore, EIS addresses the full scope of impacts including short, medium and long-term impacts; as well as their permanent or temporary nature (Historic Scotland, 2007).

3.1.2. Sustainability in the context of EIA

Sustainable development, especially on the basis of nature environmental aspects, affects society's behaviour towards natural values by implementing management and planning tools, like Environmental impact assessment. A lot of research has been made on how effective EIAs are, but not on how EIAs and sustainable development can be interrelated (Nieslony, 2004). The main aim of the EIA is to tackle the conflict between human development and environmental protection, which corresponds to the purpose of sustainable development (Sadler and Jacobs, 1990).

EIA as a management tool and instrument to achieve and promote sustainable development depends on an individual definition and interpretation of the concept *''sustainability''* by different stakeholders (Cashmore, 2004). Thus, society's conception of what sustainable development represents, affects the perceived contribution of EIA to this framework (Cashmore, 2004). Although current Environmental impact assessment practices are based on nearly twenty years of experience in Europe, and the general implementation of Norwegian EIA system in accordance with the EU Directives is relatively recent, there has not been a lot of research on the outcome of the development of wind power projects on bird population areas. As a consequence, the extent to which EIAs actually achieve and promote sustainable development, as well as protection of threatened and migratory birds in the Norwegian wind energy field is not exactly specified.

Based on the above assumptions, it is useful to develop a conceptual framework of sustainable development in the context of EIA process with the following issues being considered (Nieslony, 2004): **(a)** achievement of decisions through public participation, democratic involvement of stakeholders with access to

decision-making process (Sadler and Jacobs, 1990) **(b)** education of stakeholders on sustainability issues based on training (UNCED, 1992) **(c)** consideration of indirect, cumulative and long-term impacts of a proposed project (Chadwick, 2002; Cooper, 2002) **(d)** consideration and effectiveness of alternatives and mitigation measures (Potschin and Haines-Young, 2003) and **(e)** integration of ecological, economic and social considerations in decision-making procedure (Novek, 1995) [Nieslony, 2004].

Norway aims to achieve sustainability through its strategy for sustainable development, where essential components for that policy must be based on the following principles (regjeringen.no, 2008):

1) EQUITABLE DISTRIBUTION

Equitable distribution is a fundamental value for Norway, for both people living today and future generations. A policy encouraging continued economic growth is to be followed taking place within the framework of sustainable development, and at the same time without compromising the ability of future generations to meet their own needs (regjeringen.no, 2008).

2) INTERNATIONAL SOLIDARITY

According to Norwegian government, world poverty is a violation of human dignity and it is vital to be faced effectively by promoting of economic and social development, democracy and human rights. The Government will encourage people to follow the principle "think globally, act locally" (regjeringen.no, 2008).

3) THE PRECAUTIONARY PRINCIPLE

Environmental policy followed by Norway is to be based on the precautionary principle, in the sense that environmental considerations must be given priority as long as uncertainties exist about the outcome of human activity. The long-term perspective which respects the tolerance limits of the environment comes to terms with this principle. Crucial and irreversible environmental changes are to be avoided,

being of crucial importance related to sustainable development for Norway (regjeringen.no, 2008).

4) THE POLLUTER-PAYS PRINCIPLE

The ones who pollute shall pay the real costs of potential harm they cause to the environment. As long as polluters are required to pay for the damage they produce on the environment, society can get motivated in order to use more efficient resources. Consistent implementation of the polluter-pays principle ensures that environmental goals can be achieved at the lowest possible cost for all stakeholders involved (regjeringen.no, 2008).

5) JOINT EFFORTS PRINCIPLE

Sustainable development relies on a productive dialogue and joint efforts by all stakeholders involved; thus, the joint efforts (or democratic/participatory) principle arises here for that reason. The environment and its protection through sustainability must become a necessary part of the everyday discussion in day care centres and schools, so that children can adapt this mentality and knowledge on the topic at an early stage and age. Furthermore, knowledge base should be provided to public administration, consumers and business field. Norwegian authorities are responsible for promoting efficacious policy instruments and for giving information, which enable people take environmentally sound steps and initiatives (regjeringen.no, 2008).

Thus, according to the international and Norwegian theoretical and literature review, the conceptual framework on sustainability in the context of EIAs encompasses:

(a) The precautionary principle connected to cumulative, indirect and long-term impacts,

(b) The joint efforts principle based on stakeholder involvement,

(c) The polluter-pays principle based on the consideration and effectiveness of alternatives and mitigation measures and

(d) The integration principle focused on the ecological, economic and social impacts (Nieslony, 2004).

3.1.3. Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) according to Partidario (1999, p.62) is *"…a systematic, on-going process for evaluating, at the earliest appropriate stage of publicly accountable decision-making, the environmental quality and consequences, of alternative visions and development intentions incorporated in policy, planning or programming initiatives; ensuring full integration of relevant biophysical, economic, social and political considerations"*. Strategic Environmental Assessment and EIA emerged almost together and the implementation of different SEA systems occurred no later than EIA processes (Dalal-Clayton and Sadler, 2005). Nonetheless, only in the beginning of this century SEA became a legal instrument in EU (Therivel, 2004); and that occurred as a result of the consideration that it can overcome EIA's drawbacks, by taking into account the environment earlier in the decision-making procedure (Dalal-Clayton and Sadler, 2005; Partidario, 1999). SEA contributes to sustainable development by attempting to integrate the natural environment, society and economy into the decision-making process at policies, plans and programmes (Theophilou, 2007). The SEA Protocol of the United Nations Economic Commission for Europe [as a supplement of the Espoo Convention (1991)], and the EU SEA Directive have been widely adopted by many countries (Therivel, 2004).

According to Therivel (2004) SEA has some basic principles which are as follows: SEA is a tool for ameliorating the strategic action, for promoting participation of all stakeholders in the decision making process; for focusing on key sustainability constraints and limits at the right plan making level; for assisting to identify the best option for strategic action; for aiming to minimize negative impacts and optimize the positive ones and at the same time for compensating for the loss of valuable benefits and features; and for ensuring that the strategic actions and plans do not create irreversible damage from impacts that may occur. SEA usually consists of the following stages: **(1)** screening of plans and programs **(2)** scoping **(3)** identification, prediction, evaluation and mitigation of potential impacts **(4)** consultation, revision and post-adoption activities (Epa.ie, 2003).

The importance of SEA and its interrelation to EIA is based on the scope and kinds of impacts described by the latter, which usually are limited to the project's direct impacts in an EIA (Thérivel and Partidário, 1996). The consideration of cumulative impacts caused by small several projects over time or in space in EIAs is usually not adequate (Benson, 2003). Similarly, SEA deals with larger-scale impacts such as those on biodiversity and global warming with more efficacy than an individual EIA (Therivel, 2004). Furthermore, SEA takes under consideration also the alternatives or mitigation measures that go beyond the ones usually taken on individual projects (Thérivel and Partidário, 1996). On the same wave length, a good-quality SEA facilitates the identification of development options and alternative proposals, which are more suitable in order to achieve sustainable development (IAIA, 2002). Moreover, SEA is able to be more pro-active in nature, whereas EIA is constrained by the scope of the proposed project which is under scrutiny (epa.ie, 2003).

When it comes to sustainability, SEA contributes to the promotion of sustainable development based on the fact that it has the potential to lead to a more integrated framework of planning, by encompassing all the sustainability considerations (natural environment, society, economy) throughout the planning process; for instance, during the identification process of suitable locations for the development and assessment of policy alternatives (Partidário, 1999). Nonetheless, the limitations of SEA related to the need for time and resources (money is a deterrent factor of SEA implementation in many cases) can make it difficult to be applied by several counties (Thérivel, 2004). The large scope of areas that have to be covered, the big number of different decision making levels; as well as the large number of alternatives proposed make collecting information and analysing data for SEAs, fairly complicated and time-consuming (Thérivel and Partidário, 1996).

3.2. Wind Energy Stakeholders and Birdlife

In this chapter, all stakeholders involved in the present case study are highlighted, in order to indicate their power interrelations.

In the need of a definition on the term *''stakeholder,''* a stakeholder can be *"anyone significantly affecting or affected by a decision making activity"* (Chevalier, 2001). In addition, stakeholders are defined as those who consider themselves to have an interest or stake on an issue, and not the ones which the agency considers to have a stake or would like to include (Jackson, 2001).

As regards the wind energy stakeholders in this master thesis, they are representatives from local communities, Norwegian wind energy industry, environmental organizations and NGOs representing birds, as well as Norwegian government and its respective ministries; *"who have a moral or financial stake in, or influence on, a wind farm project"* (Teoh, 2000:1).

In fact, the above stakeholders can be subdivided into **primary, secondary and key stakeholders**, based on their significance and influence in wind farm projects (ODA, 1995). According to Weller (1998), three major stakeholder groups can be identified:

A) ***Reactive*** **or** ***inactive*** stakeholders, representing the lowest level of interaction with others, e.g. wind turbine manufacturers;

B) ***Impulsive or independent*** stakeholders, who can be barely influenced but can exercise themselves strong influence, e.g. governments, nature environmentalists;

C) ***Dynamic*** **or** ***interactive*** stakeholders who even if they influence other stakeholders, they also get influenced, e.g. counties and municipalities.

In the present case, Norwegian government and its respective ministries and directorates, as well as NOF and BirdLife International (speaking of birds), can be considered as primary stakeholders; due to the fact that the relevant legislation on wind farms, as imposed by Norwegian government, directly affects bird populations. NINA, and wind energy companies (e.g. Statkraft) can be also considered as primary (as well as secondary) stakeholders; as related to the problem statement of the present master thesis. Key stakeholders can be NORWEA, Kjeller Vindteknikk AS (wind energy consulting company) as well as Smøla community and all concerned

communities with wind energy plans; which are taking a consulting position on the issue discussed here.

In the meanwhile, based on the problem statement, NOF and BirdLife International as being independent NGOs, can be considered as impulsive stakeholders. Inactive stakeholders can be NORWEA, Kjeller Vindteknikk AS and all relevant communities. Concluding, Norwegian government and its respective ministries and directorates (being dependent on Norwegian voters) can be considered as dynamic stakeholders; as well as Statkraft and all Norwegian wind energy companies (competitive business environment).

3.3. Birdlife and Environmental Impact Assessment

Biodiversity is a very crucial topic to be given great importance, relevant to all steps of EIA. The Convention on Biological Diversity defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (IAIA, 2005). The first World Summit on Environment and Development in Rio de Janeiro (1992) put an emphasis on the importance of biodiversity as the basis of world's existence, in order to have a sustainable future for the forthcoming generations. The Convention on Biological Diversity (CBD), the Ramsar Convention, and the Convention on Migratory Species (CMS) recognize EIA as a crucial decision-making tool, to help plans and development to include biodiversity issues, like threatened, migrating or endemic species (IAIA 2005). Approaching the ecosystem requires a long-term perspective and strategy which shall be based on management and environmental tools like EIAs; which are able to measure the unpredictability of ecosystem functions, behaviour and responses against human interference, like wind farm development (IAIA, 2005).

Therefore, Norway has signed many international conventions in order to promote sustainability in the context of EIAs in the field of biodiversity and

protection of birds in particular. Norway's international agreements and conventions related to birds and EIAs include the:

Biological Diversity Convention, the World Summit on Environment and Development in Rio de Janeiro (1992), the Bern Convention, the Bonn Convention, the Convention on Migratory Species, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Ramsar Convention (Convention on Wetlands), the agreement on the Conservation of Populations of European Bats and the convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991) (environment.no, 2010).

More specifically, Bonn Convention, the Convention on Biological Diversity and Berne and Ramsar Convention are related to the protection of bird species, and are interconnected with the EIA procedures for wind farm development in Norway.

The Convention on Migratory Species (CMS-Bonn Convention) is a global agreement on the protection of migratory species of wild animals in order to avoid any migratory species becoming endangered (CMS, 2004). The Convention entered into force in 23/6/1979 and 56 countries have joined the agreement, including Norway. The convention is a framework agreement on migratory species and populations who regularly cross national boundaries (birdlife.no, 2010). This convention operates with various lists that indicate different degrees of action, like the list I of migratory species including species at stake of extinction; and where the member states are obliged to ensure protection of both species and their habitat through strict conservation measures. List I includes three bird species found in Norway (including the white tailed eagle). List II includes migratory species that have an unfavourable conservation status and need or would significantly benefit from this international cooperation to ensure an adequate protection; including twenty bird species found in Norway (CMS, 2010).

For these species, member states should strive to enter into regional agreements that could strengthen further this purpose. There are so far regional agreements involving Europe connecting with birds and mammals, like the Agreement on the Conservation of Bats in Europe; with Norway having joined the bats Agreement (birdlife.no, 2010). When it comes to EIAs and SEAs, the convention

in 2002 urged all participatory countries to include in EIAs and SEAs, wherever relevant, impacts related to impediments to migration, transboundary impacts on migratory species, and impacts on migratory patterns and ranges (CMS, 2002).

The Convention on Biological Diversity (CBD) is the first global agreement on conservation and sustainable use of biological diversity and its components (cbd.int, 2009). The Convention entered into force on 29/12/1993 and has 175 countries having endorsed the agreement. One of the most important topics of the convention is that members should as far as possible ensure the integration of responsibility for achieving convention's objectives in the various sectors of biodiversity, including birds protection (birdlife.no, 2010). In the context of the convention, guidelines have been published for incorporating biodiversity into EIA and SEA procedures including: screening, scoping, making impact assessment to predict and identify the potential environmental impacts of a proposed project or development (this includes the identification of indirect and cumulative impacts related to loss or sustainable use of a population of a species), identifying mitigation measures, deciding on whether there should be an approval on a project or not and monitoring and evaluating the development activities, predicted impacts and proposed mitigation measures (Cbd.int 2004).

The Convention of European Wildlife and Natural Habitats (Berne Convention) has a primary goal of protecting the European plants and animals and their living environment (Council of Europe, 2010). The convention places particular emphasis on the protection of endangered and vulnerable species and endangered habitats. The agreement was entered into force on 19/4/1979 with 38 countries having joined it. The species included in the convention are listed in three separate lists: List I includes approx. 700 plant species (vascular plants, mosses and algae) which member countries shall have them under strict protection; 19 of which are in Norway (birdlife.no, 2010). List II includes approx 700 animal species (mammals, birds etc) which are protected against hunting and gathering (including eggs). Many species, 145 of them are birds which are found in Norway. Member states are obliged to have these species strictly protected and to ensure their habitats. List III covers most of European species, including birds which are not covered by List II. The utilization of

these species is regulated in such a way that stocks are not threatened. Finally, List IV includes gear and hunting methods that should be prohibited.

The Convention for the Protection of wetlands (CW/Ramsar Convention) is a global agreement which was drawn up in the city of Ramsar in Iran 2/2/1971, and involves 114 countries having endorsed the agreement. Convention's objective is the protection of wetlands with a special focus on wetlands of international importance for wetland birds. In addition, the Convention gives considerable emphasis on the protection of other flora and fauna associated with wetlands and wetland resources, which should be managed in a sustainable manner (ramsar.org, 2010). Every individual country having signed the Convention is obliged to establish so-called Ramsar Sites. Separate criteria are established for the identification of such areas, including the occurrence of endangered species (birdlife.no, 2010). For those areas that are included in the list of Ramsar Sites, it is required from each country to ensure that the areas' ecological function is not impaired by human activity; coming to terms with the best possible knowledge about their values and tolerance limits, based on a sustainable manner. Norway has so far designated 23 such areas (hence 5 in Svalbard) with a total area of 700 km2 (birdlife.no, 2010).

3.4. Impact of wind farms on Birdlife

Wind turbines can interfere with birds by affecting their natural habitats and by creating problems with collisions on them, depending on how bad or well sited a wind farm is (canwea.ca, 2006). In fact, a study undertaken reviewing the negative impact of wind turbines on birds in USA, came out with the conclusion that only 2 birds per turbine annually ever die due to collisions with wind turbines (NWCC, 2001). This fact shows the tremendous difference in numbers of deaths per year associated with birds crashing into buildings, vehicles and windows which are counted in millions. As regards migratory birds, it is estimated that more than 10,000 migratory birds are killed in Toronto, Canada each year especially between the hours of 11:00 p.m. and 5:00 a.m. in collisions with office towers (canwea.ca, 2006).

According to Royal Society for the Protection of Birds (RSPB) (2007), increased use of wind power is supported, *''as long as wind farms are sited, designed and managed so they do not harm birds or their habitats.''*

Soaring birds are able to detect the presence of wind turbines on grounds that they change their flight direction when they fly near the turbines and their population number can be sustained (Lucas, Janss, Ferrer, 2004).

Radar studies of onshore and near-shore wind farms in eastern U.S.A. have indicated that migrating songbirds fly well within the reach of large turbine blades (worldofwindenergy.com, 2010). This is one of the reasons why the majority of collisions with wind turbines have involved single birds (Kingsley & Whittam 2005); and even in poor weather conditions very few multiple bird kills have been reported (Powlesland, 2009).

Nonetheless, the fact that wind turbines have rapidly whirling blades conjures an image of a bird being bludgeoned and then reduced to a cloud of drifting feathers. Hence, wind farms which are built in bird migration routes, on ridges and upwind slopes, in areas when visibility is poor like in rainy, foggy, and in dark locations; as well as in established bird breeding or feeding habitat run a high risk of bird collisions (bird-habitats, 2009).

Except for causing collisions, wind turbines also cause displacement of migratory birds and are assumed to be detrimental in locations where there is a known high density of migratory birds; especially at major stop-over areas and feeding sites (WMBD, 2009). Wind potential areas are mostly located along coastlines, mountaintops and ridges as well as wetlands, which often lie along flight paths and routes of many migratory birds (WMBD, 2009). As a consequence, many wind farms due to high wind power capacity in these areas are being built, and this especially is a cause for concern; bearing in mind that these regions are frequently used by rare, endangered and red list threatened bird species (WMBD, 2009).

A lot of research and studies still have to be carried out, not only focusing on only wind farms and bird collisions. It is characteristic that wind farm development also result in habitat loss for birds (Percival 2000). Unfortunately, very few

conclusive studies are available, due to the fact that procedures incorporating pre and post construction observations are insufficient (Ketzenberg et al., 2002).

Very few studies have taken under consideration differences between diurnal and nocturnal behavior, assessing daytime activity most of the times (Anon, 2006). The majority of birds killed by collisions to wind turbines in USA are nocturnal migrating songbirds (Policansky, 2007). Moreover, differences in behavior between resident and migrant birds towards wind farms have been detected in some studies (Kingsley and Whittam 2005; Drewitt and Langston 2006).

Deaths of birds have also often been reported due to electrocution caused by power lines connected to wind farms (abcbirds.org, 2007).

Furthermore, disturbance and displacement may arise caused by increased human activity at a wind farm during construction and maintenance periods; as well as from the construction of road accesses, specifically in areas where there was little human development before the wind farm installation (cumulative impacts) (Powlesland, 2009).

Other studies suggest that disturbance may lead to reduced breeding productivity (Madsen 1995), as well as to reduced survival or a reduction in available habitat (Woodfield & Langston, 2004); so disturbance can be significant for some species under certain conditions (indirect impacts) (Powlesland, 2009).

Overall, when it comes to birds dying due to collisions with wind turbines and electrical wires, it is fairly unlikely to specify a number each year as a result of the growing wind power development globally. Therefore, the number of birds killed compared with the amount of energy produced should be taken into account; as well as the mere fact that wind farms may vary considerably in the risk they pose to bird populations from area to area (bird-habitats, 2009). Moreover, migratory bird routes are not precisely studied as well as how topography, weather, and turbine type affect bird mortality (Gao, 2005).

Research conducted at one location can hardly be used to identify potential impacts and promote mitigation measures at other locations, due to differences in topography, in types and densities of species; as well as the type of wind turbines (Gao, 2005).

3.5. EU legislation related to EIA, SEA and Birdlife

For public wind energy plans, the requirements for EIAs are reflected in EU regulations and guidelines, which the Member States (as well as Norway) have implemented. EIAs were introduced in Europe with the EU EIA Directive 85/337/EEC (lastly amended in 2009) (Ec.europa.eu, 2010). Moreover, Special Protection Areas (SPAs) and Sites of Community Importance (SCIs) form the Natura 2000 network, as designated under the Birds and Habitats Directives respectively; in the context of EU SEA Directive (European Parliament, 2009).

- ***EU EIA DIRECTIVE***

The EIA process makes sure that environmental consequences and impacts of projects are identified and evaluated before authorisation is given (Ec.europa.eu, 2010). All stakeholders involved are able to give their opinion, and all results (which are published for the information of all parts involved) are taken under consideration in the procedure of authorizing the project. EU EIA Directive outlines: which project categories shall be made subject to an EIA, which procedure has to be followed; as well as the content of the impact assessment (Ec.europa.eu, 2010).

More specifically, according to Article 3 the direct and indirect effects of a project should be taken into account based on human beings, fauna and flora; and according to Article 5, the information to be provided by the developer shall include at least the data required to identify and assess the main impacts, which the project is likely to have on the environment. However, Member States shall, if necessary, ensure that any authorities having relevant information, with particular reference to Article 3, shall make this information available to the developer (Eur-lex.europa.eu., 2009).

Speaking of wind power development, this category is subject to article 4 (3) of annex II included in energy industry projects (Eur-lex.europa.eu., 2009). It is also required that an EIA should consider the cumulative impacts that could arise from a combination of the project's impacts with those of other existing or planned developments in the surrounding area, according to the published EU guidelines on scoping (Ec.europa.eu, 2001).

It has to be defined here that the inclusion of the indirect and cumulative impacts as well as their interactions in an EIA, contributes to a better decision making process. This is the reason why EU EIA Directive includes the consideration of cumulative impacts. The description of the likely significant effects of a project in Annex IV [information referred in article 5 (1)] in the Consolidated EIA Directive (2009), should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project. Thus, the assessment of indirect and cumulative impacts, and all impact interactions should be taken into account as an integrated part of EIA process (ec.europa.eu, 1999). Given this fact, according to the next figure there is an effort to define these terms based on the 1999 EU guidelines for the assessment of indirect and cumulative impacts as well as their interactions:

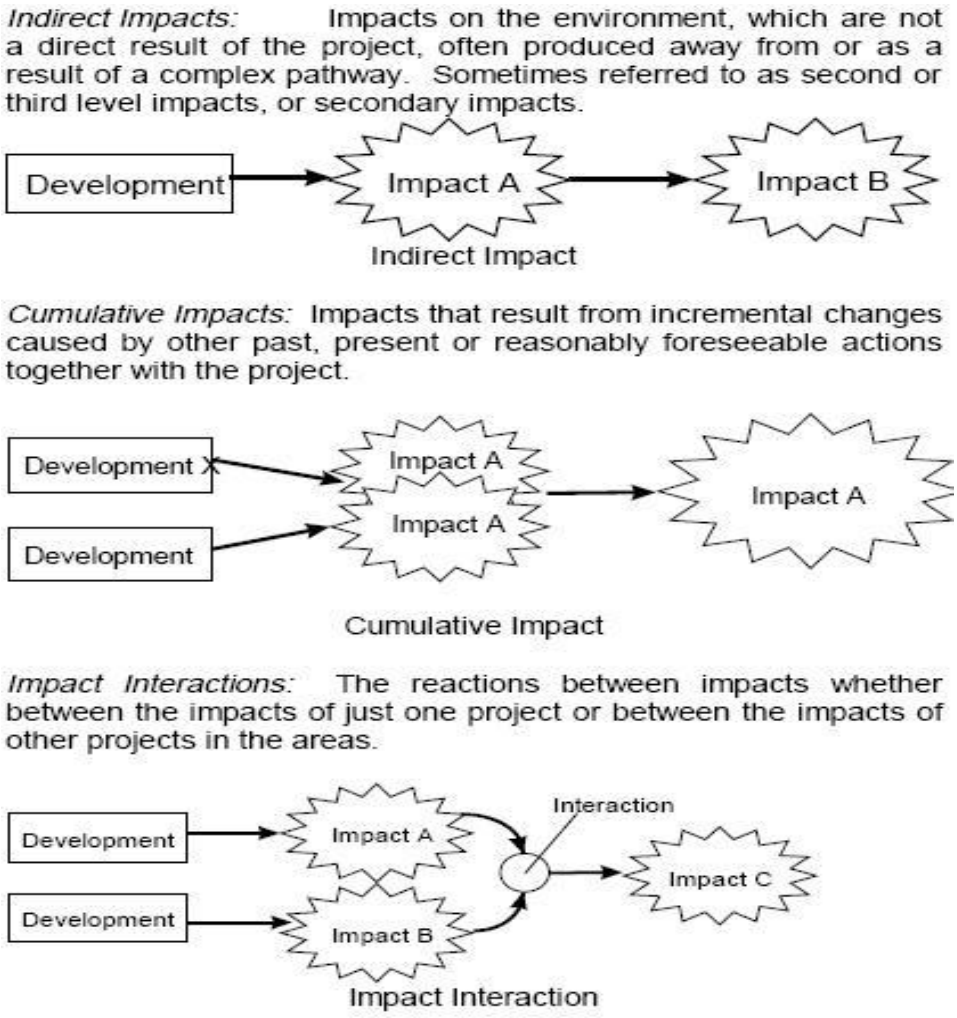

Figure 4: Indirect impacts, cumulative impacts and their interaction (ec.europa.eu, 1999).

- ***EU SEA DIRECTIVE***

EU SEA Directive (2001/42/EC), which came into force in July 2004, is a critical step on the further application of SEA focusing 'on the assessment of the effects of certain plans and programmes on the environment' (Ec.europa.eu, 2008). The main purpose of the EU SEA Directive is to ensure that environmental impacts and consequences in the environment of certain plans and programmes (energy plans included) are identified and assessed during their preparation process, and before their final adoption; towards the implementation of sustainable development and is to be based on the precautionary principle (Ec.europa.eu, 2008).

More precisely, in the Article 3(2)(a), SEA is required for plans and programmes that might have possible impacts on areas which belong to the Natura 2000 network, according to Habitats Directive 92/43/EEC and Birds Directive 79/409/EEC [Annexes I and II to Directive 85/337/EEC] (Ec.europa.eu, 2003).

Speaking of plans and programs at national, regional or local level, according to Article 6 it is mentioned that Member States *''shall designate the authorities and/or bodies to be consulted which, by reason of their specific environmental responsibilities, are likely to be concerned by the environmental effects of implementing plans and programmes* (Ec.europa.eu, 2003)*.''* These competent authorities or authority are the ones which the Member States designate as responsible for performing the duties arising from the SEA Directive, as described in Article 2 (Ec.europa.eu, 2003). According to article 5, it is mentioned that a description of reasonable alternatives encompassing mitigation measures should be considered; as well as that the implemented plan or programme should comprise the consideration of *''secondary, cumulative, synergistic, short, medium and long-term, permanent and temporary, positive and negative effects and impacts* (Ec.europa.eu, 2003 p.15)*.''*

When it comes to monitoring, in Article 10 Member States have the responsibility of monitoring the significant environmental impacts of the implementation of plans and programmes in order *''to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action* (Ec.europa.eu, 2001)*.''* In the same article, existing monitoring arrangements *''may be used if appropriate,''* with a view to avert duplication of monitoring. However, in

Article 10, there is no determination of which authority or body is responsible for monitoring, but that may involve private organisations in the collection of environmental data (Ec.europa.eu, 2002). In spite of being applied only to plans and programmes, SEA Directive brings greater attention to the higher policy level in the decision making process, as EIA and SEA move up the decision making tiers (Sheate et al., 2003). This fact has made countries and organisations such as the South Asian Association for Regional Cooperation (SAARC) and the Association of Southeast Asian Nations (ASEAN) to consider of applying the same concept, by creating a similar SEA legislative tool (Alshuwaikhat, 2005).

- ***EU HABITATS AND BIRDS DIRECTIVES***

The EU Habitats and Birds Directives (92/43/EEC and 79/409/EEC respectively) comprise the cornerstone of nature conservation policy of EU, as the most influential parts of European legislation, provided for the protection and conservation of plants, species and their habitats. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), in accordance with the above Directives form the Natura 2000 network; which in turn contributes to the *"Emerald network"* of Areas of Special Conservation Interest (ASCIs), established by the Bern Convention (1979) on the conservation of European wildlife and natural habitats (European Commission DG ENV, 2009).

- ***EU BIRDS DIRECTIVE***

The EU Birds Directive **(**Directive 2009/147/EC is the codified version of the Directive 79/409/EEC as amended) has under its protection all wild birds, their nests, eggs and habitats within EU; and as a consequence, all member states are responsible to classify Special Protection Areas (SPAs) (See Appendix G) in order to protect rare or vulnerable birds in Europe (annex I, 194 threatened species), as well as all migratory birds being regular visitors (snh.org.uk, 2010). There is a big stress on migratory species and their protection (being the main wild bird species) according to Article 251 of the Treaty, which naturally occur in the European territory (Eur-lex.europa.eu, 2009). Man's activities and in particular destruction and pollution of

birds habitats in the EU territory must be avoided, while simultaneously special conservation measures concerning the birds habitats should be undertaken; in order to secure their survival as well as reproduction in their area of distribution (Eur-lex.europa.eu, 2009). According to article 4, the categories of birds under this Directive are dived into **(a)** species in danger of extinction; **(b)** species vulnerable to specific changes in their habitat; **(c)** species considered rare on grounds of small populations or restricted local distribution; **(d)** other species requiring particular attention for reasons of the specific nature of their habitat. Except for the above categories, the same article includes regularly occurring migratory species not listed in Annex I, taking into account their need for protection in the geographical sea and land area where this Directive applies; in regard to breeding, moulting and wintering areas and staging posts along their migration routes.

Moreover, Article 5 prohibits deliberated disturbance of the mentioned birds particularly during the period of breeding and rearing, in so far as disturbance would be significant related to the objectives of the Directive.

When it comes to research on birds, in Article 10 particular attention is suggested to be paid to research and work on the subjects listed in Annex V. According to this Annex and in combination of Article 10, research and work related to this master thesis, should be made on: **(a)** national lists of species in danger of extinction or particularly endangered species, taking into account their geographical distribution, **(b)** listing and ecological description of areas particularly important to migratory species on their migratory routes as wintering and nesting grounds, **(c)** listing of data on the population levels of migratory species as shown by ringing, **(d)** assessing the influence of methods of taking wild birds on population levels, **(e)** developing or refining ecological methods for preventing the type of damage caused to birds (Eur-lex.europa.eu, 2009).

Given a scientific research study based on 15 EU Member States (for which sufficient data was available) on the journal *''Science''* in August 2007, it is shown that bird species listed in Annex I of Birds Directive are performing better (positive breeding and population trends) within EU, than in other European countries (Donald et al., 2007). This fact indicates that through the designation of Special Protection

Areas (SPAs) the efficiency of Birds Directive is high, when it comes to the protection of many of Europe's most threatened birds from further population decline.

- ***EU HABITATS DIRECTIVE***

The EU Habitats Directive is a major contribution by EU for the implementation of the Biodiversity Convention agreed by more than 150 countries at the 1992 Rio Earth Summit; by having a big number of wider regulations, such as related issues to the conservation of priority natural habitats and priority species (snh.org.uk, 2010).

Article 3 defines the establishment of the Natura 2000 network as a *''coherent European ecological network composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II* [Special Areas of Conservation, conserving 189 habitat types and 788 species identified in Annexes I and II (JNCC, 2010)].*''* This network includes Special Protection Areas classified under the Birds Directive; and this new set of international nature conservation areas introduced by the Habitats Directive: the Special Areas of Conservation (snh.org.uk, 2010).

Moreover, Article 3 mentions that there should be a representation within each country's territory of the natural habitat types and the habitats of species (the list must include a map of the site, its name, location, extent and the data resulting from application of the criteria specified in Annex III). Article 4 mentions that the above list should include also the species in Annex II [those considered to be most in conservation need at a European level (excluding birds)]; that are native to the above habitats of species and that the list should be delivered within three years of the notification of this Directive. There are also sites of Community importance (see Appendix H) (there are specific criteria for the selection of those sites in Annex III), identifying those which host one or more priority natural habitat types or priority species (have to be included in the special protected areas in six years at most).

According to Article 6, Member States shall take all compensatory measures prerequisite to ensure that the overall coherence of Natura 2000 is protected; when it comes to projects (wind farms included) which shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives,

and it will proceed only after having ascertained that it will not adversely affect the integrity of the site concerned. Moreover, the Special protected areas are included in the Articles 6(2), 6(3), 6(4) and comments that are made in relation to the Habitats Directive will apply mutatis mutandis to sites classified under the Birds Directive (snh.org.uk, 2010). According to Article 8, Member States should communicate to the Commission the estimated costs of measures in order to protect the Natura 2000 network, and the scope of co-financing sought from EU funding sources. Special management of features of the landscape which are of major importance for wild fauna and flora (in relation to development policies), should be undertaken based on Article 10, which is essential for the migration, dispersal and genetic exchange of wild species.

Strict protection is also mentioned in Article 12 and 16 to animals in Annex IV (animal and plant species of community interest in need of strict protection which most of them are also listed in Annex II) related to deterioration or destruction of breeding sites or resting places, and disturbance especially during the period of breeding, rearing, hibernation and migration. Let it be known that there is a guidance document in the context of Articles 12 and 16 on the strict protection of animal species of Community interest [as well as on Article 6 related to management of Natura 2000 sites (clarification of the concepts of alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission) and on Article 8 related to financing Natura 2000].

When it comes to research, Article 18 defines that Member States and the Commission shall encourage the necessary research and scientific work having regard to the objectives set out in Article 2, including exchanging information as well as transboundary cooperative research between the Member States. Furthermore, Article 22 refers that promotion of education, and general information on the need to protect species of wild fauna and flora should be hammered out in order to conserve their natural habitats.

- ***NATURA 2000 NETWORK***

The importance of Natura 2000 network (established in 1992) is that each site (25.000 sites at the end of 2007) is proposed on a national list under evaluation: on the basis of its relative value, its importance as a migratory route and transboundary site if

it is both, its total surface area, the co-existence of the various types of species and habitat in concern; as well as its unique character as a biogeographical area (Delpeuch, 2010). As a result, when it comes to birds' population trends for Annex I, they have been better than other bird species in EU over the past decade (European Commission, 2004). Furthermore, in 1992, EU launched the LIFE Nature Programme, which has played a key role in establishing an efficient SPA management by implementing more than 300 LIFE Nature projects in regard to birds (European Commission, 2004). In addition due to the need for international collaboration for the protection of migratory birds throughout their flyways, EU ratified in the context of Natura 2000 the African Eurasian Waterbird Agreement (AEWA), which is bringing together 118 countries to protect 255 migratory waterbird species (AEWA, 2010). In addition, Important Birds areas (IBAs), sites particularly important for bird conservation made by the EU Partnership of BirdLife International, have been widely used as reference for the designation of Natura 2000 sites under EU Birds Directive (Birdlife.org, 2010).

- ***INTERRELATION OF SEA, NATURA 2000 AND BIRDS AND HABITATS DIRECTIVES***

Finally, there is also a relation of SEA Directive affecting Natura 2000, and it occurs: through reference to Habitats and Birds Directive in the definition of the scope of SEA Directive [Article 3(2) (b)]; through the information to be included for the environmental assessment [Annex I (d) of SEA] for plans likely to have a significant effect on Natura 2000 sites; and finally through Article11(2) of SEA Directive, where coordinated or joint procedures should include the Habitats Directive (European Commission DG ENV, 2009).

3.6. Norwegian wind energy legislation and EIA

Wind power plants comply with the latest regulations in 2009 for EIAs, and they are also clarified in accordance with other laws, guidelines and regulations, such as the: Energy Act, Planning and Building Act, Cultural Heritage Act, Pollution

Control Act, Nature Management Act, thematic conflict assessments and wind power guidelines for planning and locating of wind power plants (NVE, 2009).

- ***ENERGY / PLANNING AND BUILDING ACT***

Construction and operation of wind power plants are covered by the Energy Act of June 1990, (§ 1-1; last amendment of the law in 19 June 2009). It appears from the Energy Act § 3-1, that a plant for the production, transformation, transmission and distribution of electric energy of high voltage (1000 V or more) cannot be built or operated without a license by the Energy Act; in order to avert damage to the natural and cultural values (§ 3-5) (NVE, 2009).

EIAs related to any energy project (as well for as wind power projects) are pursuant to the Planning and Building Act, which in many paragraphs refers relevant regulations. According to Chapter VII-a, the proposal of an EIA should explain the purpose of the plan or application, the need for studies and plan for participation; as well as it mentions that the proposed programs should be sent and posted for comments for public inspection (Lovdata.no, 2009).

- ***PRESENT REGULATIONS RELATED TO IMPACT ASSESSMENTS***

The present regulations related to impact assessments of 2009 on the planning and building proceedings (Planning and Building Act) are promoted by the Ministry of the Environment, in order to ensure that concern for the environment and society is taken into account during the preparation of plans or actions (Lovdata.no, 2009).

In Chapter II (scope and responsible authority), §2 (h) it is mentioned that plans for national parks and other protected areas greater than 500 km^2 (or greater than 250 km^2 in some cases) should always be treated in accordance with the regulations. In § 4, the criteria for assessment of the significant effects of plans and actions (related to the present master thesis) shall be treated in accordance with the regulations, if they: **(a)** are located in/or come into conflict with areas of natural environment; **(b)** are located in/or come into conflict with important intervention-free natural areas (natural areas in Norway without major intervention, that are more than a mile in linear distance from the heavier technical interventions such as major power

lines, roads etc) or pose a threat to endangered habitats, endangered species or their habitats, priority species or their functional areas, selected habitats, or other areas that are particularly important for nature's diversity; **(c)** are located in the larger natural areas and important open areas in cities and towns; and **(d)** they conflict with current policy provisions or policy guidelines issued, pursuant to the Planning and Building Act. It has to be mentioned here that responsible authority's assessment of whether a plan or an action can have significant impacts, should be based on information supplied by the proposed set and the other present and known knowledge. Responsible authority shall, if necessary contact relevant authorities to clarify whether the criteria in § 4 are applicable.

In Chapter III and § 6 (plan or assessment program), it is mentioned that the assessment program should explain the purpose of planning or action and the issues that are considered important in relation to the environment and society. According to § 7, the proposed plan or program with the proposed EIA must be sent for consultation to relevant authorities and NGOs; and has to be posted for public inspection, with the deadline to make a feedback statement being at least 6 weeks after the notification. EIA program shall be determined within a reasonable time, normally no later than 10 weeks after deadline for comments (according to § 8, if concerned authorities have considered that the project may conflict with national or major regional considerations, they can submit an application to MoE, and the latter will give advise that will be provided as a notice to the EIA within two weeks). Paragraph 9 mentions that an EIA shall be based on present knowledge, and where such knowledge is not available on important issues there should be a necessary degree of obtaining new knowledge. Moreover, § 11 refers that the responsible authority can decide whether there is a need for additional studies or additional documentation on specific conditions, by dispatching a report (not shorter than two weeks of preparation) to those who have made the EIA. An environmental follow-up program is necessary in paragraph 12, in order to monitor the effects of the project; by taking a position on any unforeseen impacts, heading to appropriate improvement measures.

When it comes to the requirement framework for the content of an EIA, Appendix III includes what shall be prepared, which is related to: **(a)** the

implementation of an EIA; and **(b)** an EIA study. As regards the implementation of the EIA, the content and its purpose, a timetable for its implementation and the relevant objectives set out by the policy guidelines or regulations have to be taken into account. As regards the EIA study process, it should be based on a description of key environmental and social conditions; as well as on a provided description and assessment of the effects of the plan (related to the present master thesis), including nature's diversity (flora and fauna). Measurements in relation to other completed and planned projects in the considered development area should be carried out, related to potential significant cumulative effects. A brief account of the basic data and methodology used to describe the above effects shall be given; as well as any professional or technical problems in data collection and use of data and methods, including several alternative solutions.

- ***NATURAL MANAGEMENT ACT***

The Law on Management of nature's diversity or Natural Management Act (last amended in 2009) focuses on biological, landscaped and geological diversity, and ecological processes in order to be taken care of, by sustainable use and protection (Lovdata.no, 2009).

The goal is that species and their genetic diversity are maintained in the long run, and that species occur in viable populations in their natural distribution areas. According to § 7, the principle of public decision making has to be respected; while in § 8, public decisions that affect natural diversity should be reasonably based on scientific knowledge about species' population situation, habitats distribution and ecological condition. Furthermore, in paragraph 9 the precautionary principle is taken under consideration; referring that it should be applied, granted that decisions without adequate knowledge about the effects may have negative impacts on the natural environment, and also postpone or fail to meet management strategies. According to § 11, the cost of environmental degradation should be covered by the developer of a project, preventing or limiting damage to natural diversity.

Chapter III (about species management) mentions that a designation of specified priority species is planned: **i)** when species have a population situation and population development which is contrary to their genetic diversity in the long run; **ii)**

when species have a significant share of their natural distribution and genetic characteristics in Norway; and **iii)** when there are international obligations related to the species. Chapter V (Area Protection) calls to attention (related to birdlife) that protected areas shall contribute to the conservation of: **a)** variation width of habitats and landscapes; **b)** species and genetic diversity; **c)** threatened natural and ecological function areas for priority species; **d)** large intact ecosystems, also so that they may be available for individual outdoor activities; **g)** ecological and landscaped relationships nationally and internationally; and h) reference sites to monitor developments in nature. These areas include national parks, natural reserves, biotopes as well as marine protected areas. According to paragraph 45, when a particular nature type is in great peril of disappearing, the King may lay down restrictions and ban on business which could further threaten the habitats continued existence.

In Chapter VI (selected habitats), the government puts forward an action plan to ensure the nature type by selection of a nature types, where active management or other types of measures are a prerequisite for the safeguarding of nature kind. In paragraph 53, it is pointed out that there should be a selection of nature types, so that deterioration of habitats prevalence is avoided. Before the decision to intervene in an instance of a selected nature type is taken, the consequences for the selection of that nature type have to be clarified. In addition, § 69 puts stress on the correction and mitigation measures (based on polluter pays principle) and obliges those who violate the law or decision pursuant to the Act, to implement measures preventing deterioration of natural diversity.

- ***GUIDELINES FOR PLANNING AND LOCATING OF WIND POWER PLANTS***

Guidelines for planning and locating of wind power plants have also been published in 2007, given the fact that in 2006 the government established a new overall target of 30 TWh/year increase in renewable energy production and energy efficiency in 2016, compared to 2001 (NVE, 2007). Therefore, MoE and the Ministry of Petroleum and Energy have published in cooperation with relevant directorates, guiding principles for planning and locating of wind power plants; in their effort to avert conflicts with various stakeholders.

It is important to be mentioned that this policy does not refer conditions that are specific to the establishment of offshore wind power plants, related to maritime transport, fisheries, and aquaculture-related businesses. Nevertheless, where the guidelines are relevant, they shall be included in the planning and location of offshore wind power plants. According to paragraph 3.2 some areas covered by various types of protection that should be taken into account related to biodiversity are: (a) sites and wetlands of international status in accordance with Ramsar Convention; as well as (b) areas protected under Nature Management Act (national parks, nature reserves, landscape areas; and in some cases natural memories).

In paragraph 3.4, biodiversity is taken under consideration when it comes to selecting locations and installing wind farms, by mentioning very large conflict potential areas that should be avoided such as: **(a)** living areas (habitats of species) of species which are "critically endangered", "severely threatened" or "vulnerable", (Norwegian Red List 2006); **(b)** living areas of species of Bonn Convention and of Berne Convention's list II; **(c)** areas with very important habitats (value A, DN-guide Nr.13, Mapping of habitats); **(d)** very important wildlife areas (DN-Manual 11: Wildlife Survey); **(e)** very important freshwater sites (value A, DN-15 Manual: Survey of the freshwater sites); and **(f)** areas with vegetation types in the categories "acute threat" and "severely threatened", (Truete vegetation types in Norway, Fremstad and Moen 2001). In addition, other types of areas that can create high conflict potential are areas with rich biological diversity, several important ecological functions and habitats for species; as well as migratory routes (fall / spring) for birds.

Furthermore, according to paragraph 3.5, very large conflict potential might occur: **i)** in large contiguous INON sites where parts constitute wilderness embossed areas; **ii)** in INON sites running unbroken from sea to mountains; and **iii)** in INON sites found in regions having very little sites left.

In paragraph 4, the establishment of regional plans for wind power is mentioned and recommended, with the need for regional plans for wind power varying in different parts of the country. In some areas, it may be natural that several counties are working together to assess and possibly develop a regional plan for wind power. When it comes to the establishment of a regional plan, it is recommended that

a plan program should be prepared to clarify the limits, terms and purpose of planning; as well as describe the alleged issues that will be discussed. In the proposed plan program there should be a simple appraisal of the planned area, based on existing knowledge of wind conditions, network capacity and important environmental considerations. Information on wind and energy plans should be obtained from NVE before planning is set in motion.

The context and procedure of planning work of regional plans on wind power is described in paragraph 4.3., consisting of two phases. First phase starts with the preparation of the plan program, which is a survey and systematization of knowledge about the important considerations in the different parts of the planned area. It should be emphasized that the assessments made must be verifiable, and the quality of data base should be visible. On this basis, mapping work should be planned in the second phase, assessing conflict potential for the different parts of the planned area at any establishment of wind power plants. Municipalities and counties shall conduct an evaluation process involving local experts, politicians, directorates and ministries, which will provide expert comments and propose conditions (NVE, 2009). Finally, paragraph 6.3.1 refers that based on the above assessment program; the developer sets in motion the formal process by contacting the responsible authority and included stakeholders, and by making a briefing on the plans in order to conduct an EIA.

- ***THEMATIC CONFLICT REVIEW***

Concluding, an important part of licensing procedure for wind farms is the thematic conflict review (White Paper 11, 2004-2005). Conflict assessments systematize and categorize information about possible conflicts between the planned wind farm and the various sector interests; and thereby aim to facilitate the clarification of these through the licensing process (NVE, 2009). DN gives an overall grade for the consequences for the natural environment by categorising the projects by the following general grading scale: **i)** Category A: No conflict; **ii)** Category B: Minor conflict; **iii)** Category C: Moderate conflict (but possible to reduce conflict by mitigation measures, such as minor adjustments of the wind farm as a relocation/removal of a small number of wind turbines); **iv)** Category D: Large conflict; and finally **v)** Category E: Very large-scale conflict, where mitigation measures will not be able to reduce this potential conflict.

4. Empirical Finding Results

In this chapter, secondary data from relevant reports as well as primary data from interviews are presented, related to the central problem statement.

4.1. Smøla Wind Farm Case Perspective

This chapter presents data from reports and scientific papers, regarding the Smøla wind farm case. It includes the chronology of the controversy on the bird collision issue, as well as scientific reports undertaken related to the discussion topic.

4.1.1. Chronology

According to the report of the 29th meeting of Berne Convention in November 2009, the case and chronology of Smøla wind farm is thoroughly described: everything was set in motion with the establishment of a wind farm complex (phase I and II, of 18km^2) in the Archipelago of Smøla, in an area of exceptional importance for White-tailed Eagles, having there the most important and dense breeding concentration along the Norwegian Atlantic coast; as well as other bird species (see Appendix I) (birdlife.no, 2009). The EIA report prepared for that wind farm was asked by Statkraft to be prepared by NINA in 1999, based mainly on limited existing knowledge of that time, supplied with some field surveys (NINA, 1999). The EIA included 4 red-list species and it was found that the impact of the wind project would be relatively moderate (notably on White-tailed Eagle). The Norwegian Water Resources and Energy Directorate (NVE) granted the concession to Statkraft for both Phases I and II on the 20th of December 2000.

However, based on the correspondence between the Ministry of Environment (MoE) and the Ministry of Petroleum and Energy in July 2001, MoE proposed pre

and post studies in regard to Phase I of Smøla wind farm, before Phase II was to be realised, even if given a concession (which should be maintained); as well as the establishment of mitigating measures as obligatory. MoE believed that phase II could have substantial negative consequences regarding crucial environmental values. Phase I (20 turbines) of the wind farm was completed in 2002 and Phase II (48 turbines) was constructed in 2005; based on a rather limited study of Phase I, with systematic assessment of collision mortality appear to have been undertaken in 2006. At the 27th Standing Committee meeting of Berne Convention in November 2007, Norwegian government informed Standing Committee that a new research project would be conducted until 2010-2011; in order to improve the background information on wind farms and their impacts on birds, concerning both pre and post construction phases (birdlife.no, 2009). At the 28th meeting of the above Standing Committee in November 2008, Norwegian government gave information about the project being carried out by NINA until 2010-2011, as well as about several mortality surveys [there were over 2400 pairs of breeding White-tailed Eagles, and trends were positive (species removed from red-list)]. Birdlife International stressed the urgency of an on-the-spot appraisal to be conducted in 2009, granted that annual mortality of White-tailed Eagle by collisions with wind turbines was considered twice the natural rate; as well as the overall negative impacts on the local population of these birds would become apparent in the future (birdlife.no, 2009).

Thus, Norway was reported to Bern Convention by Birdlife International, with the claim that it did not consider the environment to a satisfactory degree when issuing the licence for the construction of Smøla wind farm (Statkraft.com, 2009). Bern Convention travelled to Norway in June 2009 in order to investigate whether Norway is in breach of international commitments, and made a report which was presented during the 29th Berne Convention's meeting.

4.1.2. On the spot appraisal and 29th Berne Convention's meeting

According to the comments and conclusions of the on the spot appraisal on Smøla, it was stated that the precautionary principle was not applied, based on observations of White-tailed Eagles having nests inside the wind farm (island of

Smøla is harbouring the highest European breeding concentration of this species). Furthermore, the fact that considerable amount of bird collisions (especially White-tailed Eagles starting being monitored in 2006) were noted down [26 casualties in 3 years (see Appendix K)], drew the conclusion that collision risk was initially underestimated (birdlife.no, 2009). ''*Economic motives against nature values''* as well as the long procedure of designation reserves areas in Smøla, as it was stated, played an important role for promoting an accelerated process of licensing of the wind farm. Moreover, they stressed in their report that especially during 2000-2001 that the designation procedure was even stopped. Similarly, it was mentioned that complaints of NGOs as well as statements from MoE and DN often seem to be minimised or denied; as MoE and related agencies seem to have the highest political weight in the process of licensing wind farms. The lack of a national plan and SEA for wind power for the 3TWh goal was pinpointed. Furthermore, long-term observations including most recent data, the measurement of cumulative impacts, and the use of the experience from former monitoring and studies, were some of the actions suggested to be prepared before an EIA is made. Regional plans should have 10-15 years perspective, containing assessments of environmental topics, and not only individual projects. Finally, they suggested early warning systems for turning off wind turbines during intensive migration periods, unfavourable weather conditions, fledging, nesting as well as courtship periods of rare species (birdlife.no, 2009).

In the presentation after the on the spot appraisal, NVE expressed the opinion that the licensing procedure had been correct, and that it granted the licence mindful of that bird collisions might occur; emphasizing that Smøla wind farm was the major contributor for the 3TWh goal for wind power energy within 2010. When it came to DN, the Directorate expressed its awareness that cumulative impacts of wind farms should be studied; as well as follow up studies for all wind farm projects should be required. On the contrary, NOF mentioned that DN should demand and not request further investigations and mitigation measures regarding wind farm licensing, as it happens in the licensing procedure for hydropower projects (birdlife.no, 2009). NINA disagreed with the proposal that a full moratorium should be applied in Smøla wind farm; on grounds that pre and post construction studies should be undertaken while the wind power plant is under operation. Nevertheless, according to their view, EIA processes should be improved in the context of desktop and field work on birds.

On the 29th Convention's meeting on November 26 for the Smøla wind farm and other wind farm projects in Norway, Norwegian Government replied officially to the on the spot appraisal report. It noted that population trend in Norway as well as in Smøla is positive (see Appendix J), comprising more than 3000 pairs in the country. According to the governmental report, white tailed eagles do not bread every year; thus, the real population size is likely to be even higher than the recorded territories with breeding activity per year (Norwegian Government, 2009).

When it came to the licensing of Smøla wind farm, the government replied that the municipal plan identifying possible sites for wind farming was approved late by the municipality in February 2001, due to strong local opposition. In addition, the government stated that the project Sea Eagle (NOF) was not mentioned in the report of June 2009, which was an extensive investigation on the sea eagles' population on Smøla. Besides this statement, it was also noted that all complaints and statements from NGOs and DN were taken into account, even though not all of them were regarded vital for the final licensing decision. Furthermore, according to Norwegian government SEA is not needed, and the present licensing process is considered to be more suitable for assessing cumulative impacts than a national plan (Norwegian Government, 2009). As regards the licensing authority issue, they stated that they *''will consider whether the role for the Directorate of Nature Management in the process could be further strengthened*;*''* dismissing the June 2009 report referring that DN must guarantee necessary investigations and mitigation measures in the process of wind farm licensing (Norwegian Government, 2009).

Finally, their opinion was that the obligations under Berne Convention and other international conventions were fulfilled, and that the permit for Smøla wind farm was based on an open process.

In the end of the 29th meeting of Berne Convention, relevant recommendations (No144) were given to Norwegian government. The most considerable recommendations were related to: the development of regional plants but in the context of a SEA; the improvement of the transparency of EIAs; the need for shutting down turbines in crucial periods of the annual bird circle (pair formation, reproduction, fledging, migration); as well as the need for designating new conservation areas, based on selected habitat types (Berne Convention 144, 2009).

4.1.3. NINA research on Smøla wind farm

From 2007 (until 2011) the Norwegian Institute for Nature Research (NINA) is making extensive research on the interaction between wind power and birds, with the project related to the Smøla wind farm called *''Pre and post construction studies of conflicts between birds and wind turbines in coastal Norway* (based on the discovery of numerous sea eagles collisions with wind turbines in the spring of 2006).*''* This project aims to obtain increased knowledge about how wind power may affect birds adversely in coastal areas of Norway; contributing to a better planning process (e.g. maneuverability, aerodynamic constraints, visual perception, hunting techniques, bird age, habituation, nesting, feeding, local movement patterns, light and weather conditions, topography and wind turbine location in relation to major and local flyways) (sintef.no, 2006).

In 2008 report, when it comes to breeding success in white tailed eagles, is mentioned that after fieldwork in 2007, the minimum population on Smøla was estimated to be 68 pairs. Furthermore, in Smøla commune 29 fledglings were produced in 2007, where only one of them was produced within the wind farm in 2007 (four successful breeding attempts have occurred in the wind farm area since 2002). This low productivity within the wind farm area in 2007 contrasts with the higher productivity in the rest of Smøla commune, which was better than for many years (the production in the border zone to the wind farm was also satisfying) (birdwind, 2008).

The latest NINA report available (2009), mentions that in 2009 (up to December 1) the most frequent victims were willow ptarmigans and white tailed eagles (Birdwind, 2009). Furthermore, electrocution is regarded to be a major problem as well, as more than 120 electrocuted birds were recorded colliding with Smøla's electricity grid system. It is suggested that removal of electrocution traps could partly be a compensation for the wind-turbine induced mortality occurred, e.g. to white tailed eagles.

The results regarding the white tailed eagle are different in many aspects: *''the fact that juveniles from Smøla use almost the entire Norwegian coastline, may have implications for site selection of future wind-power plants along the Norwegian*

coast,'' the report pinpoints (see Appendix L) (Birdwind, 2009). From data collected, young sea eagles of local origin will be primarily on Smøla during the first autumn, winter and in the following early spring. It is highlighted that all mortalities of tagged juveniles associated with wind turbines have been observed in autumn and early spring (two during the first autumn and two during the following spring). It is added that most juvenile birds spend most of their time on the ground, so it is probable that the birds sitting underneath the rotor-swept area escape from being hit. Knowledge from the movements of night roosts on Smøla should preferably be at hand before wind-power plants are planned in dense white-tailed eagle breeding areas. As regards the breeding success inside the wind farm area, there was one successful breeding, producing one chick in 2009, being slightly better than the results from 2008. This fact contributes to a trend during the last breeding seasons of poor breeding success inside the wind farm area, while the border zone surrounding the plant has experienced better reproductive success. Except for the lower breeding success inside the wind power plant, the territory density during the breeding seasons 2008 and 2009 has shifted southwest compared to the pre-construction period, where it was more or less in the area where the wind farm is now established. The explanation to this shift in high density areas is probably due to a mix of factors involving: increased disturbance, increased mortality and loss of habitat. This shift explains also the low number of chicks produced inside the plant area during the last breeding seasons.

Similarly, a higher percentage of adults in a control area (outside the wind farm) and a higher percentage of sub adults in the wind farm area, could indicate that adults are either behavioral displaced away from the wind farm area, or that there is a higher percentage of adults than sub adults killed inside this area (Birdwind, 2009). Social behavior is very important for pair bounding and can possible impose a greater risk due to decreased awareness of the surroundings; leading to collisions with wind turbines for adult eagles. Hence, it is highlighted that more long-term studies are needed, in order to test the assumption about social behavior imposing greater risk to collision than the other flight activities. The present study report showed that moving flight is the most observed activity both in the wind power plant area and the controlled area outside the wind farm (in both age categories); caused by frequent flights of eagles under or between man-made structures, in order to reduce their journey time when rising young. The high amount of adults found killed could be

therefore explained by the moving flights of eagles in relation to parental care, imposing a higher risk for adults than for juvenile eagles. The white tailed eagle has a peak activity during the offset of breeding period, and this should be carefully considered when looking at possible long-term effects of the wind farm on the eagle population on the area of Smøla (Birdwind, 2009).

4.2. Conceptual Interviews

The chapter of conceptual interviews presents the results of the empirical components, found by face to face, phone and email interviews undertaken within the context of this academic research.

4.2.1. Smøla Wind Farm

When it comes to the Smøla wind farm case, Kjetil Bevanger, Dr. Scient., senior research scientist in the Norwegian Institute for Nature Research (NINA) and the head of the research on Smøla for in the project *''Birdwind,''* generally expressed the opinion that the EIA of that project was mainly restricted on existing data; due to assumption that existing knowledge about Smøla was quite good. Nonetheless, NINA pinpointed in the EIA report that they could foresee problems with white tailed eagles and collisions with wind turbines. As regards the population of white tailed eagles on Smøla, he mentioned that in 2009 they counted the highest number of birds ever been observed, *''but it seems as if they are moving*;*''* with the biggest density have moved out of the wind farm. In the question of whether this movement is caused by change in birds' behaviour towards the wind farm, he answered that it is difficult to define the term *''behaviour*;*''* even though the remaining birds are pressed out of the power plant. He admitted that it is reasonable to believe that this movement is caused by the wind farm; however, they cannot conclude in results until 2012, when research will be

over. When it came to bird collisions, he frankly conceded that there is much more danger with thousands of birds being killed by electrocution caused by collisions with power lines, than with bird collisions with wind turbines.

Kjetil Aa. Solbakken, executive secretary in the Norwegian Ornithological Society (Birdlife Norway), was very much concerned about the white tailed eagle population on Smøla and its interaction to the wind farm. According to him, Smøla is a very special area since there are small islands and swallow waters around the island; thus, white tailed eagles breed quite densely in the interior of the island, but they feed out around the island. Hence, any movement of the population out of the wind farm might be dangerous. In this context, he emphasized that the whole island of Smøla should be itself a big lowland Ramsar site; as there are no Ramsar sites on Smøla, but recently several protected areas which were established after the wind farm development.

On the other hand, Tormod Schei and Bjørn Iuell, senior environmental advisors in Statkraft AS (the company which owns Smøla wind farm) highlighted that collisions of birds with wind turbines are less important than a decrease on their population. They argued that 5-6 killed eagle birds on Smøla on average per year have not so far negative impacts on the overall population, referring statistics that buildings and cats are a bigger source of collisions with birds, than wind turbines. Moreover, they emphasized that during that time, NOF and all parties included were afraid of a decrease in reproduction success; since they were many nest areas, and that nobody believed that there would be an actual large number of bird strikes. *''That came as a surprise for everyone, including the ornithologists,''* they stressed. Similarly, they continued by saying that *''we built phase I and nothing happened, no accidents no nothing;''* thus, for that reason they built phase II.

When it came to adult mortality of birds due to collisions, they expressed the opinion that this fact does not affect the population of the birds, and that cabling is the one which creates big bird mortality. Furthermore, according to their opinion collisions on Smøla come from resident eagles and some grouses, and not by migratory birds; with the latter, colliding on the grid, but not on the wind farm. *''Collisions happen during breeding periods because they fight territories around the turbines,''* they highlighted. Besides, they mentioned that *''the challenge on Smøla is what are the cumulative effects, if on the neighbour islands wind farms will be built,*

as well as on the mainland and along the coastline of Norway.'' They pinpointed that it is impossible for one project developer, who goes to build a wind farm on an island, to have a total view of all effects of other neighbouring wind power plants. *''We do not have the resources to sit down and spend 20 years on that,''* they concluded.

4.2.2. Migratory Routes

NOF highly stressed that when conducting an EIA, companies usually look at the breeding birds; when migratory birds are not given importance and *''that it is the real issue.''* According to Kjetil Solbakken, NOF has been struggling to include migratory issues in EIAs; however, they have not managed it due to their lack of human capacity, *''being totally unable to comment on all EIAs.''*

When it comes to Smøla, he pinpointed that immature sea eagles start breeding after 5-6 years after their birth, and during this period they migrate (do spreading) up and down in the Norwegian coast; from the city of Stavanger in the south and all the way up to the north. *''They even go to inland in Norway and to Sweden and Finland,''* he underlined. Thus, he pointed out that *''if you have these ''killer'' wind farms in the coast; they will kill immature birds in migration.''* His conclusion was that *''big mortality from wind farms, might actually push the situation from being a healthy population to a sink unhealthy population.''* Furthermore, he highlighted that white tailed eagles are doing spreading, waiting for 5-6 years until they get mature; hanging around in order to find their own breeding territory. He stressed that the impact of Smøla wind farm is *''that you kill some residents as well as passing birds. If you kill the passing birds, that might affect other areas as well.''*

In addition, barnacle goose and the entire population, a migratory species established mostly in Spitsbergen, might migrate on a good day through Smøla; and *''this is very dangerous when we talk about migratory routes.''* As regards offshore wind power plants, he claimed that there are millions of individuals of birds travelling along the coast especially spring and autumn; so, regardless of where offshore wind farm will be established, they will affect the main migratory routes of birds, like

seabirds and water birds. *‘’The casualties drop in the water, and there is no way you can actually measure the effects,’’* he highlighted.

NINA pointed out that especially on the Smøla case, GPS data from around 50 young eagles is being collected, related to their migration along the Norwegian coast. *‘’A particular bird went up to Lofoten and back 3 times,’’* the head researcher on Smøla pinpointed and continued by saying that *‘’they have even been to Sweden.’’* His main concern was that *‘if we have 100 Norwegian power plants along that Norwegian migratory route, that could be dangerous.’’* Therefore, he emphasised that a main objective is to predict where one can put new power plants with an acceptable level of conflict. *‘’When the high hazard period is coming, we think that asking Statkraft to shut down the plant for 2-3 hours is the best option,’’* he concluded.

Odd Kristian Selboe, Jo Anders Auran and Snorre Stener, senior advisors in DN, stated that by the use of e.g. bird-banding, satellite tracking and several ornithological observation stations on strategic places at the seaside of Norway; as well as general flyways of all kinds of birds are recorded. However, they highlighted that *‘’the problem is to point out smaller and defined areas were birds will be affected minimally.’’* Concluding, they mentioned that due to the fact that the shoreline of Norway is the major bird flyway, birds will be anyhow affected in some degree.

4.2.3. Baselines Studies

According to NINA and Mr Bevanger, it is important that *‘’we should be able to predict in what area we do have an acceptable level of conflict, so we can be proactive in this sense;’’* when it comes to cumulative, long term and indirect impacts. He pinpointed that Smøla is a lesson to be learnt about being more careful during the EIA procedures, and that EIAs so far have been made on existing knowledge; *‘’which is not enough.’’* For him, it was crucial that baseline studies in connection to EIAs should be put into the law, and that it should not be up to energy companies to decide what should be done on the issue. Moreover, he pointed out the fact that during the last 10 years, energy industry and environmental authorities argue on who is going to pay for baseline studies. *‘’The energy industry says that the government has*

responsibility to make available this baseline data, while the authorities say that companies should pay for that,'' he highlighted.

NOF mentioned that there was quite much knowledge on white tailed eagles in the Smøla case; however, in many other areas there has not been the same amount of knowledge beforehand; and often, fieldwork has been done in inadequate amount. Timing of fieldwork is also important for Kjetil Solbakken: *''in some cases we might have some fieldwork in September, not really the time of the year to discover any breeding birds or any unique bird species.''* He pointed out that breeding periods depend on species; nevertheless, the main breeding season is from May to June and July. *''Except for covering that, you need to cover the migratory aspects and the wintering aspects, as well as very important bird areas in wetlands at all times a year,''* he added. Lastly, he concluded by emphasizing that *''you need to take into account a whole year at least in the fieldwork of the EIAs.''*

Statkraft also agreed that baseline studies are not very much sufficient, by stating that they should be obligatory in the laws. The primary thorn for them was how to establish baselines studies. *''Remote areas have old data, and not of good quality,''* they pointed out. Nonetheless, they questioned if it is possible to make a national database, pointing out that birds are moving objects. *''No biologists today can give you a baseline for the total country; we may not be able to come up the next 20 years, because you need 200 biologists going on mapping; and this is very expensive,''* they noted.

Regarding cumulative impacts as part of baselines studies, NVE admitted that assessing cumulative impacts is not a straight forward exercise; and that Norwegian authorities have recognised that well developed methodology suitable for measuring cumulative impacts does not exist. Nils Henrik Jonhson, senior advisor in NVE, stated that DN is responsible for a project in collaboration with NVE, to find methodology for assessing cumulative impacts for Norwegian conditions. One of the main focus areas of the above project is connected to birds, by developing proper methods for before-after investigations on wind farms.

Conclusively, DN conceded that there is need for a better understanding, knowledge and systematically surveillance of bird activity along the Norwegian coast. Besides, they underlined the severity of a too high knowledge gap existing today in the *''way too accidental''* process of measuring cumulative effects of wind power plants.

4.2.4. National and Regional Plans

Statkraft totally disagreed with a master plan for wind farms, as well as to some extent with the existing regional plans; mentioning as an example the Rogaland county, where according them *'' the present regional plan is actually killing all the initiatives for wind farm development.''* They emphasized that firstly one must find the best wind capacity areas, and then *''find what all these possible wind farm areas are in conflict with.''* By highlighting the negative side of the Norwegian hydropower master plan in the 1980's, they supported that a master plan is not a useful tool to develop power plants; describing it as a barrier, which did not focus on the resource base. Therefore, they stated that *''if we suggest that a master plan should be made, it should not be built on very wrong assumptions, not being just another bureaucratic barrier.''* According to Tormod Schei, the lesson learnt from the hydro power master plan is that is a new master plan must actually create new wind power; without coming up with *''so many barriers and requirements that will be impossible to do it.''*

Nils Henrik Jonhson from NVE, pinpointed that it is challenging to foresee how long it takes to undertake a regional plan; however, a couple of years from formal start up to final approval *''could be a qualified guess.''* In the question of who has to pay for regional and national plans, he replied that the counties themselves are financially accountable for supporting them. On the other hand, he conceded that the government was the one which paid for the national hydropower and river protection plans. *''Regional plans vary in methodology and the effort/resources that each county put in to it,''* he highlighted.

Dr Bevanger from NINA expressed the opinion that it is a challenge for counties and municipalities to have enough knowledge to be exact, when planning regional plans. *''Definitely it is not an optimal situation,''* he pinpointed. According to him, these regional plans are making a rough picture of suitable areas for wind farm establishment. *''It remains to be seen if it was a good decision,''* he claimed for the regional plans. Similarly, Dr Bevanger noted that 10 years ago NINA asked DN to make a thorough master plan for wind energy for the whole Norway, as it was hammered out for hydropower. According to his personal experience, a master plan for wind power should have taken place in the context of the hydropower master plan.

''We have a rough picture on how birds are using the areas, and in my opinion there is not enough detailed information,'' he highlighted.

According to DN, the way regional plans affect the licensing process is critical to be emphasized. They called to attention that in December 2009, NVE gave licenses to four wind power plants in Rogaland, without mentioning the regional plan of that county in their press release. They claimed that NVE's decision came vastly in conflict with that regional plan. Speaking of SEA, they pinpointed that NINA will conduct this spring a study on regional plans and whether they meet the requirements of a SEA.

The executive secretary of NOF expressed the opinion that the central government through OED picks places without taking serious environmental protection measures. *''If it is economically sound it will be developed,''* he noted. Moreover, he claimed that *''when planning starts, they make the analysis they want to get away from people, and preferably out of sites of rich and influential people, especially on the southern coastline, next to the capital where there is not a single project.'' ''Most of the projects are placed out in very poor municipalities, which they really want development and they agree. There is a dirty game going on,''* he highlighted. On the other hand, he conceded that regional plans are a big step forward in this context; as well as that Norway should also have national plans for wind energy. Nevertheless, he supported the main problem is that actual planning takes place before regional plans are applied. *''Decisions are taken,''* he concluded.

4.2.5. Strategic Environmental Assessment

According to NOF, Norway should absolutely apply SEA for wind energy. *''The environmental side of the country really believes we need SEA, but the people who make the decisions they do not want it,''* the executive secretary commented.

On the contrary, Nils Henrik Jonhson from NVE stated that it is not obvious that a SEA is a better option for onshore wind power development; *''probably not,''* Nils Henrik Jonhson underlined. He expressed the opinion that there is need to be defined what a SEA for wind power is really about. However, he stated that the offshore Energy Act, which was passed by the Parliament in April 2010, presupposes

through its white paper that a SEA will be carried out in 2011, for offshore wind power areas chosen for further investigation.

Similarly, Statkraft stressed that SEA has to be clearly defined as a term. *''If it is related to a master plan we would say no,''* Tormod Schei replied. Both senior managers pinpointed that the implementation or not of a SEA is a political issue. According to their opinion, it is much more beneficial firstly to assess wind resources, propose plans for wind development; and then, have an environmental evaluation of these plans. They emphasized that *''if you start a big countrywide assessment, it takes the next 10 years, and nothing happens.'' ''A lot of politics and interests are involved in that, especially with environmental organisations not wanting wind power,''* they highlighted.

Dr Bevanger from NINA claimed that SEA should be implemented for wind power, as a process providing knowledge on all topics that should be taken into consideration; like cumulative effects that wind power plants may have on birds. *''The issue must be looked as a total area, from South to North, because birds are using the whole area,''* he argued. For offshore wind power development, he pointed out that SEA might be too expensive yet necessary; due to the need for monitoring on how seabirds use space and time along the Norwegian coastline. The coast of Norway is filled up with birds migrating to the North in spring and to the South in autumn; and NINA does not have exact knowledge on how these migratory birds move. Especially during winter time, North Sea is filled out with seabirds of Norwegian populations both from the north and south in order to find food. Thus, he concluded that *'' there is a huge job to be done, in order to map how the open sea areas are used by birds.''*

4.2.6. Licensing Procedure: DN and NVE

Kjetil Bevanger from NINA highlighted that communication between DN and NVE in the past was not good enough. However, their relations are absolutely making headway as they are working now more together that they did before. *''I think everything can be better though,''* he added. In the question of a possible Veto of DN in the licensing decisions of NVE, he answered that whether there is such a

disagreement between NVE and DN, it should be taken up to the relevant ministries at and decided there, a political level. Regarding whether joint responsibility of both directorates in the licensing decision would be beneficial, he underlined that possibilities exist for DN to be more included in environmental issues related to NVE.

Kjetil Solbakken from NOF noted that MoE and its directorate should have more real influence. *''It would be a good thing if the ministry of environment had a Veto, that they could say no,''* he pinpointed. According to him, NVE is the core of the problem in EIAs and implementing SEA, under OED. *''We make complaints during the EIAs to NVE and do not get any support, like in Smøla wind farm,''* he highlighted. Furthermore, he mentioned that DN cannot express its own opinion freely on these issues, supporting *''whatever they are told to.''* Therefore, according to his opinion, independent comments come only from the NGO sector.

On the contrary, the senior managers from Statkraft noted that DN should not have a Veto. For them, neither DN nor other groups should have Veto on licensing decisions, as many aspects and opposite interests of the Norwegian society have also to be considered. Moreover, Tormod Schei argued that it is difficult to answer whether NVE and DN should give licences for wind power plants together. *''In hydropower we can see that if NVE gives a licence and DN says no, politicians say no; there are many strong interests in Norway,''* he concluded.

Nils Henrik Jonhson from NVE stated that he does not agree that a joint responsibility is a good idea, *''if that means that both authorities should be given equal rights to grant licenses.''* According to his opinion, it would be too bureaucratic as well as it is against EU ambitions of streamlining decision processes for renewable energy. He emphasized that DN is responsible for submitting thematic conflict assessments for each project, by giving an overall view and a possibility to compare projects. Furthermore, he highlighted that when NVE decisions are appealed to OED, the final decision is often a political solution; where affected ministries like MoE are consulted. Therefore, his opinion is that a joint responsibility for the process already exists; regardless of the will of the Parliament to have more wind power installed in Norway. He continued by stating that all relevant factors are taken into consideration when applications are evaluated, and that NGOs are totally given time and space to express their opinions. As a matter of fact, NVE decided in 2008 to deny licenses for Havsul II (800 MW) and Havsul IV (350 MW) offshore wind farms; as well as for

Fræna and Haugshornet onshore windfarms. *''Those decisions are easily neglected when BirdLife Norway regularly (also through the Smøla/Berne process) accuses NVE of minimising the impacts on biodiversity and birds,''* he concluded.

4.2.7. EU Birds and Habitats Directives and Natura 2000 network

NOF highlighted that Norway should absolutely implement the EU Birds and Habitats Directives, as well as join the Natura 2000 network. The executive secretary supported that the Nature Management Act is actually quite good in many aspects; *''but it is new and we do not really know what it means,''* he underlined. Moreover, he emphasised that most of the present Norwegian network of about 2000 protected areas, (15% of the total areas) is on the mountains, protecting rocks and reindeers; and that there is a huge need to protect lowland high productive areas. *''In Natura 2000 you have to have a representative network of every kind of nature type within your territory, and this is lacking here,''* he pinpointed. Norway has protected many national parks, which many of them are located in mountains and high forest areas; as well as on Spitsbergen. When he was asked why Norway does not apply these EU Directives, he replied that *''it is too expensive and politically unacceptable*;*''* due to the fact that *''it affects the life of the Norwegian voters.''* Moreover, he highlighted that by implementing these directives, Norway will have to protect areas in the low land, around Trondheim and Oslo as well, *''where people might want to develop these areas into industry or something else.''* Therefore, according to his opinion these EU Directives are quite offensive for the Norwegian society.

Tormod Schei from Statkraft mentioned that Europe has a sacred view of nature, *''something that you adore and protect.'' ''Norway has another culture; here we hunt, we have a lot of guns, we fish and we use rivers for energy,''* he emphasized. According to his opinion, these EU Directives reflect more the European philosophy, rather than the Scandinavian one; and therefore, this is the reason why Norway has not implemented these Directives yet. In addition, both Statkraft seniors advisors underlined that *''Norway thought at that time that our legislation was more than good enough.''* Nonetheless, they agreed that Natura 2000 network contains a lot of important data on birdlife that one can find.

DN claimed that Natura 2000 is an efficient network, also in terms of monitoring bird habitats. However, the goal for Pan-European countries not committed to the Habitats Directive as Norway, is to develop Bern Convention's Emerald Network to the extent that it can be a similarly good instrument. Hence, they underlined the intention given to implement Emerald Network at the same level as Natura 2000.

4.2.8. Wind Energy and Environment: Cost Benefit Analysis

Tormod Schei from Statkraft pinpointed that humanity needs to protect animals and biodiversity; however, it also needs energy for society. *''The alternative is coal fired plants which is worse; and wind is a part of the solution,''* he highlighted.

Kjetil Bevanger from NINA expressed the opinion that is most important to take a holistic view in the issue, like ''*what is the cost of global warming;''* when today countries use traditional economic models. Furthermore, he stressed that the environmental protection part is a very small fraction of the total. Nonetheless, he emphasized that complications arise when international conventions are violated.

''We need this money in order to develop the society here on this island,'' Kai M. Holmen from Smøla municipality (Næringssenter KF) pointed out; concerning the financial benefits that the municipality gains from Smøla wind farm.

Contrarily, Kjetil Solbakken from NOF stated that energy development has grown very fast, letting energy companies have big control in the name of national security. He expressed the opinion that the loss of biodiversity is not really a fact that people are concerned about. At the same time, he underlined that *''when it comes to the economy, everybody cares.''* NOF recognized the value from wind energy, *''but the value is not there when you destroy valuable nature.''* Therefore, for Kjetil Solbakken, if wind farms are placed on sites where conventions have been signed to have them protected, *''it is not really a good sign of nature conservation.''* Concluding, he expressed the opinion that the current Norwegian wind energy development is not as sustainable as it should be. *''It is not good sign that big NGOs fight hard against it; we should be on their side,''* Kjetil Solbakken highlighted.

5. Analysis

In this chapter, analysis is divided into two parts: ***(a)*** Assessing the efficiency of Norwegian EIA and licensing procedure for wind farms within the context of bird conservation; and ***(b)*** EU and Norwegian comparison of legislation and EIA processes in regard to birdlife.

5.1. Assessing the efficiency of Norwegian EIA and licensing procedure for wind farms in the context of bird conservation

While analyzing the EIA procedure in the Norwegian wind energy sector, it has to be highlighted beforehand that EIA is considered as an instrument for sustainable development; as it has already been mentioned in chapters 3.1 and 3.1.1, on Sustainable Development and EIA respectively.

- ✓ ***EIA STEPS AND PROCESS***

Starting from ***screening***, Norwegian regulations for EIAs state that screening must be carried out under specific requirements even from 5 MW wind power plants or more. Wind power plants of 5 MW capacity usually consist of 2-3 wind turbines, which generally speaking cannot drastically affect birdlife. Thus, this EIA requirement for screening is regarded relatively functional and efficient.

As regards ***scoping***, it is related to the determination of coverage of the EIA study, which includes baseline studies and environmental monitoring. The question of implementing a SEA for wind power arises at this point, granted that exhaustive environmental studies on all impacts should not be a part of an individual EIA.

Besides, SEA except for being a sustainability tool is a very costly, time-consuming and fairly complicated procedure. Concerning the need of a SEA more focus is highlighted later on, when it comes to the evaluation of the regional plans. However, according to primary data as presented in the conceptual interviews, SEA is absolutely needed; at least for offshore wind power development.

- ***BASELINE STUDIES***

Next step of an EIA is related to ***baseline studies and the identification of environmental impacts***, which is according to the conceptual interviews a major problem in the EIAs for wind power plants; when it comes to bird protection. Based on chapter 3.1.1 on EIA, the big majority of collecting baseline data is usually undertaken during scoping. DN, NINA, NVE, NOF and Statkraft conceded that there is a lack in existing knowledge on birds and their functions; which knowledge is the backbone of baseline studies. One should measure indirect, long term and cumulative impacts based on at least one year of observations, on seasonal grounds. NOF pinpointed that knowledge on breeding (mainly May-June) as well as wintering and migratory periods is inadequate. Norway's coastline is an interconnected birdlife area, being an indivisible part of the European territory birdlife network (see Appendix Q). For that reason, DN emphasized that there is a need for a better understanding, knowledge and systematically surveillance of birds' activity; granted that most of wind power projects are and will be established along the coastline of Norway.

The fact that immature white tailed eagles from Smøla do spreading up and down in the Norwegian coast (see appendix L and M), while other birds migrate from Spitsbergen to southern Norway and vice versa, emphasizes that developing wind farms along the Norwegian coastline should be based on sufficient baseline studies; in order to avert bird collisions during sensitive periods. General flyways recorded so far are not sufficient according to DN, when it comes to point out smaller and defined birds' areas. This is another reason indicating that baseline data on bird functions in Norway lacks of quality. Furthermore, according to chapter 3.4 on the impacts of wind farms on birdlife, functions of birds like soaring, reproductive rates, fertility, mortality, growth rates, diurnal and nocturnal migration as well as behavior of resident and passing by birds have to be studied and included in baselines studies.

Under Norwegian legislation only migratory routes should be taken into account, without even being mandatory; as mentioned in the wind farm location guidelines. It is understandable when Statkraft states that adult mortality of white tailed eagles in Smøla due to collisions does not affect the whole population. Nevertheless, sustainable development presupposes that the protection of birds and their habitats is of outmost importance; especially when it comes to white tailed eagle, being a bird species for which Norway has a global responsibility.

- ***BASELINE STUDIES: MEASURING CUMULATIVE IMPACTS***

There is no specific methodology measuring ***cumulative impacts*** of wind power plants, even if EIA regulations refer that measurements should be undertaken related to potential significant cumulative effects; with DN and NVE working collectively for that purpose. Data collection on cumulative impacts should be focused on historical trends, existing regulatory standards and development plans and programs (Ec.europa.eu, 1999). However, this process is time-consuming and possible results might be at hand after 2016, when Norway's renewable energy production goal might have been outweighed. Cumulative effects need to reflect the movement of birds and interdependence on sites, as well as to cover impacts of collisions and habitats loss at a flyway level (DIT, 2004). According to Statkraft as well as DN, remote areas have old data of bad quality, making a bounden duty for better knowledge on birds' flyways and movements. This need emerges especially concerning offshore development where bird mortality can be hardly measured, on grounds that dead birds fall into the sea after collisions. Statkraft supports that baseline data is expensive to be gathered when are nonexistent or insufficient, especially under the condition that companies have to undertake this process; which might take many years to be hammered out. Nevertheless, wind power growth in Norway should be sustainable and baseline data should be sufficient when it comes to birdlife; regardless of the amount of time needed for its accomplishment.

It is most critical for this point of analysis, to underline the importance of NINA's statement that Smøla is a lesson to be learnt about being more careful during EIA procedures, when it comes to existing knowledge on birds. NINA reports on Smøla mention lower breeding success of white tailed eagles inside the wind farm

area, as well as movement of bird's density outside the power plant area. Smøla island drives white tailed eagles breed quite densely in the interior of the island and feed out around it, due to its neighboring small islands and swallow waters. Therefore, lost of their habitats due to movements of density might be dangerous for their basic functions, as being a common threat for all bird species. Bird collisions, breeding disfunctions due to construction of wind power facilities (which might disrupt feeding or breeding behaviors) as well as lost of habitat, are serious reasons to be considered before choosing an area for wind farm development. Loss of habitat quantity and quality is a primary cause of most bird populations declines as well (GAO, 2005). Hence, in this occasion the need for a master plan and SEA arises again.

- ***BASELINE STUDIES: IMPACT IDENTIFICATION/ENVIRONMENTAL MONITORING***

Norwegian EIA regulations mention that identification of significant impacts a plan or an action might have, should be based on present and known knowledge. This most crucial part of EIA is too ambiguous, without specifications in the EIA regulations which are already general; as applied for all energy projects, and not only for wind power plants. At this point a big legislation gap can be observed, especially connected to § 9 of the regulations mentioning that *''where knowledge is not available on important issues, there should be a necessary degree of obtaining new knowledge;''* as well as to § 11, which refers that ''*the responsible authority can decide whether there is a need for additional studies.''* Dr Bevanger shed light on the financial aspect of this issue: during the last 10 years, energy industry and environmental authorities argue on who is going to pay for baseline studies given that this procedure is fairly expensive. Therefore, a political question emerges at this point related to the costs of baseline studies, the responsible authority covering them as well as the degree of new knowledge that *''should''* be obtained; whether and when the authorities decide is prerequisite. In fact, obtaining additional environmental data depends on numerous different aspects, which emerge political issues mostly concerning the data collection's range, time and cost; as well as responsible authority. Companies should obviously not be accountable for full scale baseline studies, but for collecting resent data and making some environmental monitoring. Full scale measurements of data regarding birds should be state's onus with all costs included,

based on national plans for wind energy development; as have already two times been established (3TWh in 2010 and 30TWh by 2016 respectively).

Environmental monitoring, as directly connected with high financial costs, is of appreciable consideration at this point; as well as of special reference for the next sections. Baseline, impact and compliance monitoring have to be strengthened in regulations, with regard to the exact definition of responsibility in order to be undertaken. Baseline and impact monitoring are devoid of will, backdrop knowledge and financing resources, as it has already been mentioned. Nonetheless, latest regulations impose compliance monitoring as an environmental follow-up program (which was not a part of the EIA regulations when Smøla wind farm got licence, but imposed later); which can provide viable data in the context of baseline studies for future developments. In fact, this is a salutary step for the protection of birds and promotion of sustainability, which however burdens financially the companies. Therefore, as it is thoroughly analysed later, a national plan and SEA assist companies undertaking good quality EIAs, so that environmental costs are apportioned efficiently between Norwegian state and companies.

- ***MITIGATION MEASURES***

Mitigation measures arise again the issue of lack of adequate baseline data, when it comes to preventative measures; granted that corrective and compensatory mitigation measures are not vastly needed, if precautionary principle is well respected beforehand. There has been a lot of discussion on shutting down wind farms during migratory seasons, with NINA suggesting that 2-3 hours depending on migratory periods would be the best option. This measure could be applied so bird collisions with wind turbines could be averted to a reasonable extent, especially during spring period when massive migration occurs. According to Øyvind Byrkjedal, Meteorology Adviser from Kjeller Vindteknikk AS, typically around 60% of annual wind production comes from winder season (October-March); with annual variation (summer vs. winter) not having a large geographical deviation. Technical challenges will be faced, due to maintenance of the rotating parts of wind turbines, if shut down.

However, according to Geir Wang, Statkraft Specialist/QA inspector in Smøla wind farm, by putting the main service down during migratory periods, conflicts

between birds and turbines could be reduced. As a matter of fact, turning off wind farms in the coastline of Norway for some periods might not be the most catastrophic mitigation measure affecting the profitability of a company. Hence, it could be included in legislation as an effectual preventative mitigation measure to avoid bird collisions with wind turbines. Forecasting migration intensity can improve, be a prominent investment and reduce the operational costs of collisions between wind turbines and migrating birds (Belle, 2007).

Regarding Berne Convention recommendations, except for migration also pair formation, reproduction, and fledging are reasons that might lead to shutting down wind farms during these periods. Nonetheless, this issue is complicated and further research needs to be carried out before ending up to suggestions and conclusions. As regards electrocutions of birds caused by collisions to power lines connected to wind farms, Statkraft has already taken effective measures in Smøla wind farm by creating underground cable networks. Hence, this solution even if expensive may contribute to the avoidance of many birds kills, especially when it comes to red list and threatened bird species.

- ***STAKEHOLDER INVOLVEMENT IN EIAS***

When it comes to ***involvement of stakeholders in EIAs,*** the duration of EIA procedure (over 16 weeks, as long as enough baseline studies have been undertaken) is considered adequate for all relevant stakeholders' involvement. The procedure is fairly democratic, where the developer has to announce repeatedly his/her plans and programs in public during EIA process. NOF expressed its dissatisfaction for not having the capacity to comment on all EIAs; however, this is a problem of NGOs and their internal functions, and not of Norwegian EIA regulations.

On the other hand, the ***weight of comments*** from NGOs and DN, as well as the weight of an EIA taken into account by NVE in the licensing decision have been controversial issues, not only related to the Smøla wind farm; but also to present wind power development in Norway.

Regarding Smøla case, systematic assessment of collision mortality appeared in 2006, even though MoE proposed from July 2001 pre and post construction studies as well as obligatory mitigation measures before construction of phase II. Hence, at

that point a strain atmosphere between MoE and OED can be observed (with NINA confirming that), based also on complaints of Berne convention for rapid Norwegian wind power development (*''economic motives against nature values''*); so that the 3TWh goal in 2010 to be accomplished. In fact, NVE has expressed the opinion that Smøla wind farm was the major contributor for the 3TWh goal for wind power energy within 2010. Thus, this is the reason why OED and NVE are accused from Berne convention as well as from NOF to have the highest political weight in the process of licensing wind farms; even if Norwegian government denied it. Nevertheless, Dr Bevanger from NINA pointed out that DN and NVE have significantly normalised their ties, with room for better bilateral understanding and communication left available.

Therefore, the question of joint responsibility of DN and NVE in the licensing decision comes to the fore at this point; with Dr Bevanger stating that it would not a bad option for DN to be more included in the licensing process of wind farms. In this case, the possibility of a Veto from DN (as NOF has proposed) might be a sticking plaster over the situation; granted that cooperation between the directorates and the relative ministries is often more constructive, than open confrontation. Similarly, Statkraft dismisses a potential Veto of DN to NVE for licensing wind farms; due to their opinion than DN has a protectionist approach towards nature. Let it be known that many different interests are involved in licensing procedures of many wind energy projects (see Chapter 3.2. on wind energy stakeholders). Nonetheless, sustainable development, as Norway is committed to, presupposes that all the above interests have to be treated respectfully; and this issue is always controversial. Nature and birds are incapable of speaking for themselves; and this is a reason that most of the times human interests are given more stress and importance, as stated by NOF.

- ✓ ***JOINT RESPONSIBILITY OF DN AND NVE***

On the other hand, ***joint responsibility*** of DN and NVE in giving wind plant licenses might be most bureaucratic, as well as against EU ambitions of streamlining decision processes for renewable energy; and this is totally a reasonable reflection. Furthermore, DN is also responsible for submitting thematic conflict assessments, and therefore it has the potential to express its reservations concerning conditions where birds and their habitats are at stake. Nonetheless, this question would not emerge if it

had not been for that many complaints from Birdlife Norway as well as from Berne Convention; stressing that there is a gap between environmental protection and accomplishment of national renewable energy goals.

When it comes to ***cooperation***, according to NVE and Nils Henrik Jonhson, a common methodology for before-after investigations should be developed between NVE and DN; replying to NOF, with the latter supporting that DN should demand and not request mitigation measures with regard to wind farm licensing. Therefore, the need for strengthening the role of DN in wind farm licensing procedure is fair and meaningful; especially when Norwegian government took it under consideration, as stated in their reply report to Berne Convention. In a nutshell, further strengthening of the role of DN should be supported. However, in the question of DN's interference in the licensing decision, a conclusion is hard to be drawn (as it is not directly related to the research question of the present master thesis), given the controversial political reverberation it encompasses; which could be a topic for further research.

- ✓ ***MASTER AND REGIONAL PLANS***

As it has been mentioned earlier, the need for a ***Master Plan*** for wind power development comes to surface, especially when wind offshore development is under planning in Norway. Statkraft emphasized that a master plan is not an efficient tool, as it overprotects natural areas and hampers wind power development. Making a master plan is time consuming; however, it is undertaken on sustainability grounds. Wind power growth can coexist with protection of natural values in Norway, given the huge wind power capacity along all the coastline of Norway. In fact, regional plans can be established instead of a national plan for wind power, being the alternative solution of Norwegian Government on the issue.

Nonetheless, these ***Regional Plans*** are not mandatory, as belonging to the guidelines for planning and locating of wind power plants. Therefore, it is up to each county or municipality to decide on undertaking them or not. Let it be known that the above guidelines are not suitable for offshore wind power development in Norway, which makes regional plans incapable of coordinating the offshore wind industry in the country. Dr Bevanger from NINA expressed his reservations for the efficiency of regional plans, pinpointing that local authorities have a rough picture on how birds are

using the areas; lacking of sufficient baseline data. Similarly, DN also mentioned that regional plans were not even taken into account when NVE gave concession to four wind power plants in Rogaland. As it can be observed, many adversities arise when regional plans are not taken into consideration; as well as when the ability of counties to undertake environmental assessment plans related to birdlife is debatable.

At the best of times, establishing regional plans is a brave move ahead towards a more sustainable wind power growth in Norway. However, the fact that they are not obligatory by law, as it is under the guidelines for planning and locating of wind power plants, might lead to complications concerning birdlife. Given the situation, assessing and foreseeing effectively negative impacts on bird populations in an efficacious way sounds most ambitious, based on the existing legislation. When Norwegian Government establishes goals for wind power production in the country, it endangers their success without taking under serious consideration organised pre assessments of impacts; that this industry might have on birds' population. Smøla wind farm, the biggest contributor for the 3TWh wind power capacity goal in 2010, has complications with bird collisions; and that might be to a big extent due to lack of a national wind power master plan (as recommended from Berne Convention). The present target to sharply increase renewable energy production and energy efficiency to 30 TWh per year in 2016 compared to 2001, has led around hundred applications for onshore and offshore wind power production to arrive on the scene. Hence, a master plan could be earnestly considered as a one-way street supporting sustainable wind power development in Norway; being respectful towards birdlife, as well as profitable for companies and beneficial for local communities.

- ✓ ***GUIDELINES FOR PLANNING AND LOCATING OF WIND POWER PLANTS***

The guidelines for planning and locating of wind power plants are recommendations for wind power development, and as already mentioned not required. In paragraph 4, it is referred that the need for regional plans for wind power varies in different parts of the country. Thus, as it can be understood, the combination of these suggested guidelines and the phrase *''the need…varies in different parts of the country''* is way too ambiguous and easily avoidable. Hence, companies are able not to follow these guidelines, due to the lack of sufficient baseline data on birdlife. NOF has already mentioned that they are struggling to include migratory routes in

EIAs; nevertheless, the high cost of making environmental monitoring makes wind power companies not to include many functional aspects of birds in their EIAs. Regional plans for wind power development are one step forward for covering costs of assessing and collecting data, as addressed to state authorities. Nonetheless, regional plans as optional do not evade problems arising when assessments of direct, indirect, long-term and cumulative impacts are made insufficiently. Coastline of Norway consists of many interconnected bird areas (see Appendix L and M); therefore is hard to predict and mitigate various impacts, when a master plan is not implemented. When it comes to cumulative impacts, regional plans are not an optimal solution. These plans are recommended; hence, whether a county undertakes a regional plan for wind power and the neighboring county does not, cumulative impacts on birds are hard to be measured effectively beforehand. In these guidelines, it is mentioned that several counties can work together to assess and possibly develop a regional plan for wind power. Nonetheless, the question at this point is what happens in case they do not, as having the right according to the not binding guidelines. In addition, all relevant impacts will be insufficiently covered and ironed out, like long-term and indirect related to migratory routes and other functions of birds.

- ✓ ***STRATEGIC ENVIRONMENTAL ASSESSMENT***

Hence, ***SEA*** can be an efficient alternative solution, as a sustainability tool for assessing environmental impacts of onshore and offshore national or regional wind power plans.

As mentioned in chapter 3.1.3 on SEA, SEA can overcome EIA's drawbacks by taking into account environment issues earlier in the decision-making procedure, and by ensuring that the strategic actions and plans do not create irreversible damage from impacts that may occur. Therefore, SEA is an efficient tool when national or regional plans are implemented, on grounds that it can undertake scoping and identity at an early stage many negative impacts on the environment (baseline studies). In the present case, various issues related to birdlife can be tackled, if in the context of a national master plan for wind power energy (optimal solution) or of regional plans (Berne Convention's suggestion), a SEA is applied. In most of cases, EIAs encompass only direct impacts on birdlife, and usually cumulative impacts are pretty close to

impossible to be effectively measured. SEA deals with larger-scale impacts, such as those on biodiversity and global warming in more efficacy than individual EIAs.

On the same wave length, according to theory a good-quality SEA facilitates the identification of development options and alternative proposals in order to achieve sustainable development. Thus, granted that regional plans are not the optimal solution, SEA can be a very efficient tool for an early identification of unpleasant impacts on bird population in Norway, in the context of gathering good quality baseline data. SEA includes baselines studies, on grounds that an EIA is not responsible for the prediction of all impacts; especially on plans for wind energy growth in Norway, where impacts on birds multiply depending on the multiplication of wind farm projects in an area (cumulative effects).

On the contrary, Norwegian Government stated in the Berne convention report that SEA is not needed, as well as that licensing process is considered to be more suitable for assessing cumulative impacts than a national plan; however they do not give any reasons for this decision. NVE and Statkraft also turned down the idea of implementation of SEA, with the latter expressing its concern that SEA will contribute to bureaucracy and blockage of the Norwegian wind power development. At this point, amid fears for blockage of wind energy deployment in the country come to light, as well as financial reasons are implied when it comes to Norwegian government's stance. SEA is a fairly expensive procedure, which needs substantial time and resources in order to identify all potential impacts of wind farms on birdlife. By preparing a SEA for wind power, many negative impacts on birds can be identified and mitigated, contributing to an efficient collection of baseline data for present and future wind energy developments. Thus, companies will be able to avoid exhausting baseline studies and environmental monitoring, being a way to accelerate the expansion of Norwegian wind energy industry in an effectual way.

Nonetheless, according to DN, NINA will conduct this spring a study on whether regional plans meet the requirements of a SEA. This fact indicates that SEA is considered as a constructive solution by environmental authorities and NGOs, like NINA, NOF and Berne Convention. Furthermore, Dr Bevanger mentions that a SEA for wind power in Norway will be able to measure cumulative impacts of wind farms, granted that birds are using the whole area from South to North of Norway.

- ✓ ***OFFSHORE WIND ENERGY DEVELOPMENT***

The present guidelines for planning and locating of wind power plants are not suitable for the establishment for offshore wind power in Norwegian territorial waters. One can realize that this inadequacy of guidance might induce even more unfavorable complications related to the minimization of negative impacts on birds along the coastline of Norway.

As a matter of fact, MoE (Harald Noreik and Knut Grønntun, senior advisors) emphasizes that guidelines for offshore wind farming would be desirable. Norway has just passed a legislation on offshore renewable energy production; where according to DN, NVE is leading (DN is participating) a process of identifying sea areas suitable for offshore wind power. When these areas will be chosen for further investigation, government's white paper mentions that a SEA will be undertaken in 2011; which is a fairly brave move ahead for the sustainable growth of Norwegian wind power sector. In fact, applying SEA for offshore wind power is not an unusual procedure; with Northern Ireland lately implementing a SEA for the same energy needs (northernireland.gov.uk, 2009).

Under a SEA, monitoring on how seabirds use time and space along the Norwegian coastline can be undertaken; thus, the sparking fears of NINA for that issue can be minimized. According to NOF, Havsul offshore wind farm (first in Norway given a license) will affect the bird cliffs in Runde in Southern Norway, where the biggest sea-bird colony in Southern Norway exists; with sea birds having a huge foraging area in the sea. NINA also mentioned that a monitoring program will be implemented by the company Vestavind for the next 10-20 years in Havsul I offshore wind farm. At this point, one shall observe that similar problems as in Smøla case arise, when a combination of poor baseline data and bad location of wind farms takes place. As it has been pinpointed before, companies shall not pay for full scale monitoring programs, but respective state authorities shall have collected enough baseline data; within the context of a national or regional plan including SEA. Denials of licensing from NVE Havsul II (800 MW) and Havsul IV (350 MW) offshore wind farms might not even occur, if SEA had already been implemented; so that companies could be capable of choosing the most appropriate offshore wind farm locations, in order to protect birdlife and expand Norwegian wind energy industry growth.

5.2. EU and Norwegian comparison of legislation and EIA processes regarding birdlife

This part of analysis is focused on the way birdlife is interwoven to EIA procedures of wind power projects in EU legislation. By comparing the above procedures with the Norwegian ones, a better picture can be drawn in regard to an efficient legislation framework able to minimize negative impacts on bird population in the European context; as well as promote sustainable development. As a matter of fact, in the first half of analysis the lack of good quality baseline data on birdlife in Norway has been highlighted. Therefore, useful implications by the following comparison come to the fore, which can be used for the enhancement of an effectual protection of birdlife in Norway in regards to wind power growth.

Norway has adopted the EU EIA and SEA Directives, without applying the SEA Directive for wind power plants; and being able to accept the EU Birds and Habitats Directives, as well as join the Natura 2000 network. Contrarily, European Commission is aware that there are environmental risks from the inappropriate location of wind farms; as well as that wind power development should be carried out in a drastic and balanced way, not leading to significant damage to sensitive bird and other conservation areas (European Parliament, 2009). On the above grounds, EU countries have implemented EIA, SEA, and Birds and Habitats Directives which contribute to the Natura 2000 ecological network; being a transboundary system of exchanging information, especially on bird populations.

- ✓ ***NATURAL TYPES OF HABITATS IN NORWAY AND EU***

According to Norwegian legislation on EIAs, natural parks, protected areas, nature reserves, intervention-free natural areas (INON), endangered habitats, endangered and priority species as well as their habitats have to be taken into account while undertaking an EIA. When it comes to protected areas in Norway, almost 15 per cent of mainland Norway is protected (2000 areas), with a large proportion of it consisting of mountainous areas (see Appendix O). A number of other habitat types,

such as coastal and marine habitats where most of birds live in, are not yet adequately represented (see Appendix N); even though Norway has an international responsibility to safeguard a representative selection of fjord and coastal areas of types which are not found anywhere else in the world (Environment.no, 2009). It is interesting to underline that none of Norwegian national parks include the skerries off the coast; as well as fjords are very poorly represented (Appendix P). Furthermore, when it comes to INON areas (natural areas in Norway without major industrial intervention), according to NOF statistics and trends are negative; with the energy sector topping the list of this lost.

According to the executive secretary of NOF, protecting rocks and reindeers on the mountains and high forest areas as well as on Spitsbergen, and not lowland high productive areas, is not an optimal solution; mainly caused by government's fear of political cost and loss of prosperous venture opportunities along the coastline of Norway.

At this point, a political issue emerges again based on the fact that various interests in Norway conflict over potential development areas in the Norwegian coastline; with nature and its representatives being looked down and downplayed, in front of human development growth and societal needs. It is hardly acceptable for societies when areas become natural protected, instead of being of many kinds of financial exploitation. In addition, all these hundred different wind power projects planned to be established in Norway, need an extensive electricity grid to export wind power to Europe, as this is a long-term political vision for European energy security of electricity supplies. New extensive cables and lines have to be built, which is a very expensive process; especially with the local inhabitants living nearby wind power plants, not willing to disburse for this infrastructure development. Therefore, multiple barriers for wind energy industry growth come to the fore, which are more critical for Norwegian society in contrast to weight of birdlife. Nevertheless, should Norway desire not to renege on its commitments to sustainable development, it has to find the golden mean and protect areas in lowland by its coastline; which are unique and highly valued natural sites globally.

Nature Conservation Act refers that designation of specified priority species and natural types of habitats is planned. The designation of selected habitat types and priority species is a brand new tool for sustainable development as mentioned in

Natural Management Act, which underlines problematic Norwegian environmental regulations of the past on the matter. The need for designating new conservation areas based on selected habitat types in Norway had already been highlighted in the latest Berne Convention, when it came to the Smøla wind farm conflict. On the same wave length, the executive secretary of NOF called to attention that Nature Management Act seems quite efficient in many aspects. However, the fact that the above Act was lastly amended in 2009, as well as that the designation of the habitat types and priority species is planned for the first time in Norway, hit confidence about its effectiveness.

On the contrary, ***EU Habitats Directive*** is related to the conservation of priority natural habitats and priority species, comprising the Special Areas of Conservation. Moreover, there should be a representation within each EU country's territory of natural habitat types and habitats of species, a procedure which has started most successfully from 1994; in comparison to Norwegian Management Act, which now imposes similar designation. Priority natural habitat types and priority species are also included, as well as strict protection when it comes to destruction and disturbance of breeding sites or resting places; especially during periods of breeding, rearing, hibernation and migration. All the above procedure under Habitats Directive includes exchange of information as well as transboundary cooperative research between Member States, in order to conserve species' natural habitats. As a consequence, knowledge is being obtained constantly and transferred among EU States, assisting decisions makers with viable data during wind farm planning, when it comes to interactions with bird populations.

- ✓ ***OFFSHORE WIND FARM DEVELOPMENT AND MARINE PROTECTED AREAS***

Furthermore, Natural Management Act mentions that *biotope* as well as *marine protected areas* should also be avoided when it comes to industry developments, including offshore wind power plants. However, an area of only about 2700 km^2 of Norway's marine waters is currently designated as protected, under Nature Conservation Act (Environment.no, 2009). This comes in contradiction with the Convention for the Protection of wetlands; where Norway as a member must ensure that areas' ecological function keeps pace with the acquisition of best possible knowledge about their values and tolerance limits, based on a sustainable manner. Sea

birds (and white-tailed eagles in particular) are strongly associated with aquatic habitats for hunting and feeding; making them vulnerable to any changes in the water systems that would have an impact on the prey base (Birdlife.org, 2002). For that reason, DN stated that the implementation of the county protection plans for mires, wetlands, deciduous broad-leaved forests, rich deciduous forests and important coastal sites for seabirds will be completed in 2010. There are remaining plans for mires and wetlands in Finnmark and seabird localities in Møre og Romsdal; but they will be approved by the Government in 2010. A marine protection plan has been set in motion in 2009, and there is ongoing work for 17 areas/localities in the first phase, which consists of 36 areas. As it has been mentioned before, these plans are fairly new and now starting to be implemented; especially when EU applies SEA for offshore wind energy plans in the context of Natura 2000 ecological network, as described further on. Hence, barely few are in a safe and accurate position of expressing their satisfaction about the effectiveness of these marine protection plans for birds. Nonetheless, these marine protection plans are absolutely a positive step forward to the correct direction, which is sustainable development and conservation of birdlife in Norway; especially in regard to offshore wind power expansion in the Norwegian coastline.

- ✓ ***NATURA 2000 AND EMERALD ECOLOGICAL NETWORKS***

On the same wave length, Norway has also signed the Berne Convention for vulnerable animals and birds in order to protect them and their habitats. Nonetheless, EU Birds Directive is purely focused on birds and not on all animals in general; being more precise and organized about bird habitats. As one can observe, Norway is isolated from a big European bird network as ***Natura 2000*** is; which is a unique bird monitoring ecological system. Natura 2000 contains data available without country boundaries in European Union territory, except Norway; notwithstanding that the country is an important interconnected area for birds to the rest of Europe.

Natura 2000 is a representative network of every kind of nature type within European territory; a network which was lacking in Norway, and barely now a similar one will start taking place according to the new regulations of Nature Management Act. For that reason NOF supports that Norway should implement the Birds and Habitats Directives, as well as join the Natura 2000 network. Similarly, DN

recognizes that Natura 2000 is an efficient mechanism in terms of monitoring habitats for birds; as well as that Norway is trying to develop the ***Emerald Network*** be a similarly good instrument and at the same level as Natura 2000. Even if it is recognized that Emerald network does not function in European territory as efficiently as Natura 2000 network itself, these two networks are interconnected; with the later being a part of the former. As a matter of fact, Natura 2000 has its own procedures and functions which affect all EU member States; even though these two networks are based on same principles, communicate and theoretically exchange information.

Similarly, Norway by participating in the Emerald network (as contracting party of Berne Convention) is committed to conservation of fauna and flora; when EU Birds Directive is specifically referred on birds, with its regulations implemented in Natura 2000. Under Berne convention, vulnerable species are protected under a general framework which is not as much meticulous in protecting priority species and habitats of birds, as the one existing in Natura 2000. Moreover, many European non EU member countries like Albania, Croatia, and Serbia, as belonging to the Emerald network, are preparing for future work on Natura 2000 and for advance compliance with Habitats and Birds Directives (Council of Europe, 2010). This fact supports the position that Natura 2000 is an ecological network of high standards, protecting efficiently European birdlife.

Speaking of Norway's efforts to raise Emerald network to higher quality levels, MoE nominated eleven Norwegian areas to the Emerald Network in 2007. The oxymoron in this case is that all of these areas consist of national parks, natural reserves and protected areas; which are located in areas not categorized by nature type, as Natura 2000 does (Dirnat, 2007). As it has already been highlighted, coastline of Norway and other lowland areas are the most important bird areas, which are not yet included in the Emerald Network.

- ✓ ***NORWEGIAN RED LIST AND MIGRATORY BIRDS***

Moreover, ***the guidelines for planning and locating of wind power plants***, except for mentioning wetlands and sites of international status (in accordance with Ramsar and Berne Convention that should be avoided), they also stress the avoidance

of habitats of species included in the Norwegian Red List and Bonn Convention; as well as the consideration of bird migratory routes (fall/spring).

When it comes to ***Norwegian Red list***, it encompasses 68 bird species as of 2006 (a new one comes in 2010) (Environment.no, 2008). According to the executive Secretary of NOF this list is not adequate, due to the fact that migratory birds from Bonn convention are not given the importance need; but only vulnerable birds under threat of extinction Bird migratory routes and their avoidance when planning and locating wind farms are included in the relevant guidelines. Nonetheless, these guidelines are not mandatory which may lead companies not willing to pay and gather all relevant extensive baseline data, and finally downplay them in an EIA; based on the fact that migratory routes of birds are insufficient in Norway.

Norway's international commitments to Bonn Convention are definitely supporting the protection of Norwegian migratory species and populations regularly crossing national boundaries. However, Bonn convention involves only endangered migratory birds and protection of their habitats, without including migratory routes to be studied; while in EU Birds Directive all migratory birds are involved. In fact, Bonn Convention is in close contact with EU legislation and Directives as it was highlighted in theory; by urging all participatory countries include in EIAs and SEAs transboundary impacts on migratory species, and impacts on migratory impediments patterns and ranges. Therefore, these two birds related frameworks complete each other, especially when applied in countries that have adopted EU Directives. In addition, as it has been mentioned in Chapter 3.3 on birdlife and EIA, guidelines have been published for incorporating biodiversity into EIA and SEA procedures, within the context of the Convention on Biological Diversity. Thus, after the above facts, EU legislation framework on protecting birdlife seems to be more coherent and flexible in comparison to the respective Norwegian one.

In Natura 2000, each site proposed on a national list is evaluated on the basis of its relative value and importance as a migratory route or transboundary site. On the same wave length, EU ratified in the context of Natura 2000 the African Eurasian Water bird Agreement (AEWA), on the international collaboration for the protection of migratory birds throughout their flyways.

In addition, EU countries have to design *Special Protection Areas (SPAs)* under ***EU Birds Directive,*** in order to protect rare or vulnerable birds in Europe as

well as all migratory birds being regular visitors. Regularly also occurring migratory species are taken into account with regard to their breeding and wintering areas, staging posts along their migration routes; as well as disturbance of the mentioned birds, particularly during the period of breeding and rearing. As it is observed, many different functions of different kinds of birds must be studied (Article 10) and taken under consideration.

According to the scientific research study based on 15 EU Member States mentioned in chapter 3.5 on EU legislation on wind farms and birdlife, it is shown that bird species listed in Annex I of the Birds Directive in Special Protection Areas (SPAs) are performing better with positive breeding and population trends within the EU, than in other European countries. This fact comes in addition to prove that birds are very well protected under the EU legislation and Directives.

When it comes to Norway, migratory routes are not even included in Norwegian EIAs as obligatory, which underlines the importance of the Norwegian legislation gap on coverage migratory issues.

- ✓ ***IMPORTANT BIRD AREAS (IBAS)***

Speaking of bird areas, important knowledge in Norway on the matter is provided by the 52 so-called ***Important Bird Areas (IBAS),*** as developed by BirdLife Norway. Many of the Norwegian Important Bird Areas are seabird colonies, which according to Appendix R are located along all the coastline of Norway. This fact comes to add more cautiousness, when it comes to bird migratory routes in Norway and birds' interaction to wind turbines; as vastly planned to be positioned along the Norwegian coastline. The intention of the IBAS program is to provide an overview of bird sites with a great need for management and conservation; being a substantial work of reference for decision makers within nature management on several levels, regionally, nationally and internationally (birdlife.no, 2010). There is a considerable overlap between the criteria that EU uses to identify its most important bird conservation areas and the IBAS criteria in Norway.

However, the oxymoron is that in Norwegian legislation for wind power development it is not required or mentioned that IBAS have to be used, or tackled when it comes to wind farm planning. NVE replied that IBAS presented by BirdLife are a part of the relevant information for an EIA; however, the researcher was not able

to confirm this information nowhere in the relevant Norwegian legislation framework for wind energy development, in the context of EIAs.

On the contrary, European Union has widely used IBAS as a reference point for the designation of Natura 2000 sites, under the EU Birds Directive (birdlife.org, 2010). BirdLife International has monitored, informed and supported the development and implementation of Birds and Habitats Directives; since the 1980s for the Birds Directive, and the 1990s for the Habitats Directive (birdlife.org, 2010). Hence, at this point one can observe how Natura 2000 encompasses all information from Birdlife International about IBAS, as an integrated part of its network; in contrast with the weight that Norwegian legislation gives on the same areas.

On the same wave length, BirdLife International provides relevant and reliable data, expertise and policy positions to European and national decision makers within the context of the implementation of the Birds Directive and Natura 2000. At the same time, BirdLife International is a member of the European Habitats Forum (EHF), sharing experience about birds and working together towards the development and good implementation of the Birds and Habitats Directives (birdlife.org, 2010). All the above indicate that EU utilizes most efficiently all data available on birdlife through Natura 2000 and Birds and Habitats Directives; especially when this baseline data has to be used for wind power projects in the context of an EIA or a SEA.

- ✓ ***EU/NORWEGIAN LEGISLATION ON WIND FARM MASTER PLANS AND BIRDLIFE***

Ultimately, Norwegian guidelines mention that migratory routes should be taken under consideration while choosing a site for wind farms, regardless that studies on bird migration in Norway are not sufficient; according to DN, as underlined in the first part of analysis. On the other hand, Natura 2000 contains viable information on migratory routes of birds based on constant studies on majority of the transboundary European territory (see Appendix Q); as established by the Bird and Habitats Directives. By exchanging information on migratory routes and other functions of birds like breeding, fledging, soaring etc, EU Member States have the privilege to obtain existing and new knowledge on birdlife, while implementing wind energy master plans.

Norway implements the ***EU EIA Directive*** in order to identify and mitigate direct, indirect and cumulative impacts that could arise from a combination of the

wind project's impacts. Nonetheless, as it is emphasized in the first part of analysis, the lack of baseline data and methodology in identification and mitigation of the above impacts, cast doubts on the efficiency of the Norwegian legislation; even if Norway complies with the above Directive.

Norwegian EIA regulations are not specific describing the collection of baseline data and the acquisition of new information related to a wind power project's impacts on the environment. On the contrary, non-stop studies in Natura 2000, as used for the collection of baseline data on birdlife in the context of EIA, make a tremendous difference at this point; in comparison to Norwegian baseline data collection procedures. Natura 2000 also contributes to a better identification of cumulative impacts of wind farms on birdlife; in contrast to Norwegian legislation, which only refers that cumulative impacts have to be taken into account, without clarifying any relevant methodology. NVE and DN are working on a project for this goal, with problems still remaining until is fully implemented; while simultaneously, Natura 2000 and **EU SEA Directive** contribute at most in measuring cumulative impacts of wind farms.

As a matter of fact, EU collects baseline data for wind energy plans which might have possible impacts on areas, especially belonging to Natura 2000 network, by the implementation of ***the EU SEA Directive***. It is of outmost importance to underline the relation of SEA Directive and Natura 2000, occurring through the reference to Habitats and Birds Directives in the definition of the scope of the SEA Directive; as well as through Article 11 of the SEA Directive, where coordinated or joint procedures should include the Habitats Directive. Contrarily, the optional regional plans for wind power development as referred in Norwegian legislation do not include SEA; except for the offshore wind energy growth along the coastline of Norway, which will include a SEA for the very first time in 2011.

Concluding, EU incorporates Natura 2000 network, SEA, EIA and Birds and Habitats Directives as an integrated mechanism, especially when it comes to birdlife and wind power growth. This organized proactive ecological mechanism in terms of mitigation negative impacts on European birdlife is unfortunately lacking in Norway; even though the country is legitimately able to adopt it, which would be a wise decision towards a more sustainable wind energy growth.

5. Conclusion

It is of outmost importance that Norway improves its present legislation framework towards bird conservation within the context of wind energy development, so that wind power expansion in the country occurs in a sustainable way.

The optimal solution would be the implementation of SEA in the context of a national master plan for onshore as well as for offshore wind power development; based on an extensive mapping of Norwegian bird densities, related to migratory routes as well as breeding and feeding areas. Furthermore, the adoption of EU SEA, Birds and Habitats Directives and affiliation with Natura 2000 Network would be a very beneficial act, towards a more ecological legislation framework. ***Norway has little knowledge on birdlife, in comparison with EU which encompasses the Natura 2000 ecological network; especially when it comes to offshore wind farm development.*** However, compliance with the EU Directives encompasses a high political cost for Norwegian Government.

As regards the conceptual framework on sustainability in the context of EIAs, ***joint efforts principle*** based on stakeholder involvement is theoretically fulfilled; notwithstanding the complaints of NOF about the licensing procedure and weight of EIAs in the final licensing decision. The participation process is considered as democratic, even though NOF expressed its frustration for not been fully taken into account. Therefore, DN' role is suggested to be strengthened during the wind farm licensing procedure, with the question of participating in the decision making being still open to discussion.

Polluter-pays principle is fairly fulfilled, in regard to the correction and mitigation measures as imposed in Nature Management Act. This principle can be seen applied by Statkraft supporting financially the program *''Birdwind,''* on monitoring impacts of the wind power plant in Smøla; as well as by the company Vestavind, in Havslul I offshore wind power project.

Nonetheless, ***precautionary*** as well as the ***integration principle*** are not fully respected, when it comes to identification and mitigation of cumulative, indirect and

long-term impacts on bird populations in Norway concerning wind energy. Even if mentioned in Nature management Act that decisions without adequate knowledge must be given priority as long as uncertainties exist about the outcome of human activity, wind power projects are granted licenses without a complete legislation framework established on baseline studies regarding birdlife in Norway. Baseline studies should support the precautionary principle, and the inadequacy of this data leads to inefficiency in the application of this principle in the context of the EIAs on wind farms.

Smøla wind farm case showed that the lack of high quality baseline data related to birdlife piles pressure on wind energy companies to make extensive and expensive baseline surveys, in the context of an EIA. This is a time consuming procedure in their effort to avert bird collisions, or other complications running deep related to low breeding productivity and movements of bird densities outside wind farm locations; causing biodiversity loss. Similarly, offshore wind farm growth plans should be based on sufficient baseline data on birds; taking under consideration the research on Smøla island, within the context of a SEA.

Should Norway take seriously into account the fact that Norwegian wind power growth shall be promoted for meeting the energy security needs of Europe, all relevant environmental issues and impact assessments have to be given the importance they deserve in the long-run. The goal of 3TWh capacity of wind energy in 2010 should fulfill more sustainability requirements towards birdlife. ***In fact, Norwegian legislation in regard to birdlife should follow more clearly all sustainability directions imposed by Norway, when it comes to wind power.*** The 30 TWh goal for renewable energy production and energy efficiency in 2016 (compared to 2001) has to be successfully accomplished. Therefore, SEA for offshore wind power development is an act towards the right direction for accomplishing sustainable development and mitigating cumulative impacts of wind farms along the Norwegian coastline; where the highest wind resource capacity exists.

On the other hand, if one looks at the big picture and takes a holistic view, humanity is living well beyond the world's environmental limits. Wind energy is fighting climate change as well as provides affordable electricity and higher living standards. SEA, a national master plan and a national grid for wind power could be prohibitively expensive to be undertaken, time consuming, of high political cost;

affecting the lives of Norwegian voters. Hence, their realization might hinder and eventually push back wind farm development in Norway.

Nonetheless, Norway as an efficient and high developed country could slash bureaucratic barriers related to the implementation of a national master plan and SEA. By the same way it implements efficient goals for wind power production, Norway could also plan on taking seriously the environmental effects of wind energy plans; following through on all its sustainability commitments towards birdlife.

6.1. Suggestions for further research

The political issue on how effectual balance regarding offshore wind energy development in Norway and birdlife can be achieved, has not been discussed enough in depth in this master thesis; as related to EIAs and SEA. As a matter of fact, *the question of which authority would be more efficient granting wind farm licences could therefore be addressed for further research.*

An interesting and controversial topic that could also be discussed further on an academic level is related to the coastal management, especially for offshore wind power development. Coexistence of SEA and Integrated Coastal Zone Management (ICZM) for the promotion of sustainable coastal development in Norway puts on the map many different contradictory interests. The application of a discrete policy in regards to ICZM is a major goal for EU, setting an obligation framework for the betterment of the exploitation of natural resources (and offshore wind energy in this case). Norwegian coastline is unique, with fishery industry, Tourism, oil and gas industry, as well as renewable energy having different interests on the area. Therefore, the political cost of any Norwegian government at a time is extremely high, with nature interests always being secondary and undervalued; and the natural environment getting in an awkward predicament. A Master Thesis *on the conservation of biological diversity of Norwegian coastline when it comes to offshore wind energy*; **or** *on the degree of the implementation of SEA and ICZM for promoting coastal sustainable development in Norway*; **or** *on a comparison of EU and Norway's ICZM processes on wind energy*; in parallel with all relevant groups of interest and their political pressure on Norwegian government, would be of course fairly intriguing.

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Appendices

Appendix A: Wind power installed in Europe by end of 2009 (EWEA, 2010)

Appendix B: Wind power installed in Europe by end of 2009 (cumulative) (EWEA, 2010)

	Installed 2008	End 2008	Installed 2009	End 2009
EU Capacity (MW)				
Austria	14	995	0	995
Belgium	135	415	149	563
Bulgaria	63	120	57	177
Cyprus	0	0	0	0
Czech Republic	34	150	44	192
Denmark	60	3,163	334	3,465
Estonia	19	78	64	142
Finland	33	143	4	146
France	950	3,404	1,088	4,492
Germany	1665	23,903	1,917	25,777
Greece	114	985	102	1,087
Hungary	62	127	74	201
Ireland	232	1,027	233	1,260
Italy	1010	3,736	1,114	4,850
Latvia	0	27	2	28
Lithuania	3	54	37	91
Luxembourg	0	35	0	35
Malta	0	0	0	0
Netherlands	500	2,225	39	2,229
Poland	268	544	181	725
Portugal	712	2,862	673	3,535
Romania	3	11	3	14
Slovakia	0	3	0	3
Slovenia	0	0	0	0
Spain	1558	16,689	2,459	19,149
Sweden	262	1,048	512	1,560
United Kingdom	569	2,974	1,077	4,051
Total EU-27	**8,268**	**64,719**	**10,163**	**74,767**
Total EU-15	**7,815**	**63,604**	**9,702**	**73,194**
Total EU-12	**453**	**1,115**	**461**	**1,574**
Of which offshore and near shore	374	1,479	582	2,061

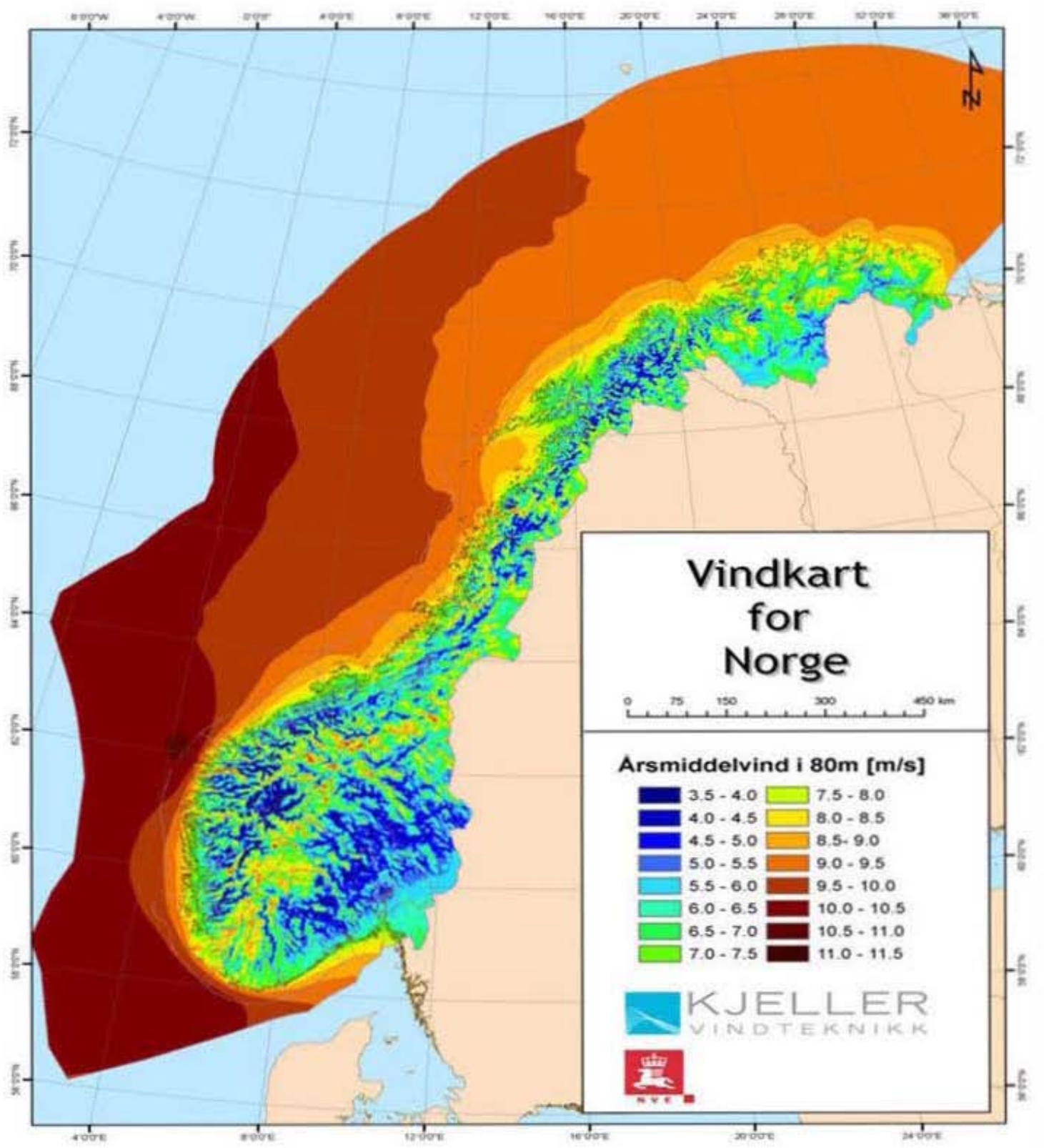
European Union: 74,767 MW
Candidate Countries: 829 MW
EFTA: 449 MW
Total Europe: 76,152 MW

	Installed 2008	End 2008	Installed 2009	End 2009
Candidate Countries (MW)				
Croatia	1	18	10	28
FYROM*	0	0	0	0
Turkey	311	458	343	801
Total	**312**	**476**	**353**	**829**
EFTA (MW)				
Iceland	0	0	0	0
Liechtenstein	0	0	0	0
Norway	103	429	2	431
Switzerland	2	14	4	18
Total	**105**	**443**	**6**	**449**
Other (MW)				
Faroe Islands	0	4	0	4
Ukraine	1	90	4	94
Russia	0	9	0	9
Total	**1**	**103**	**4**	**107**
Total Europe	**8,686**	**65,741**	**10,526**	**76,152**

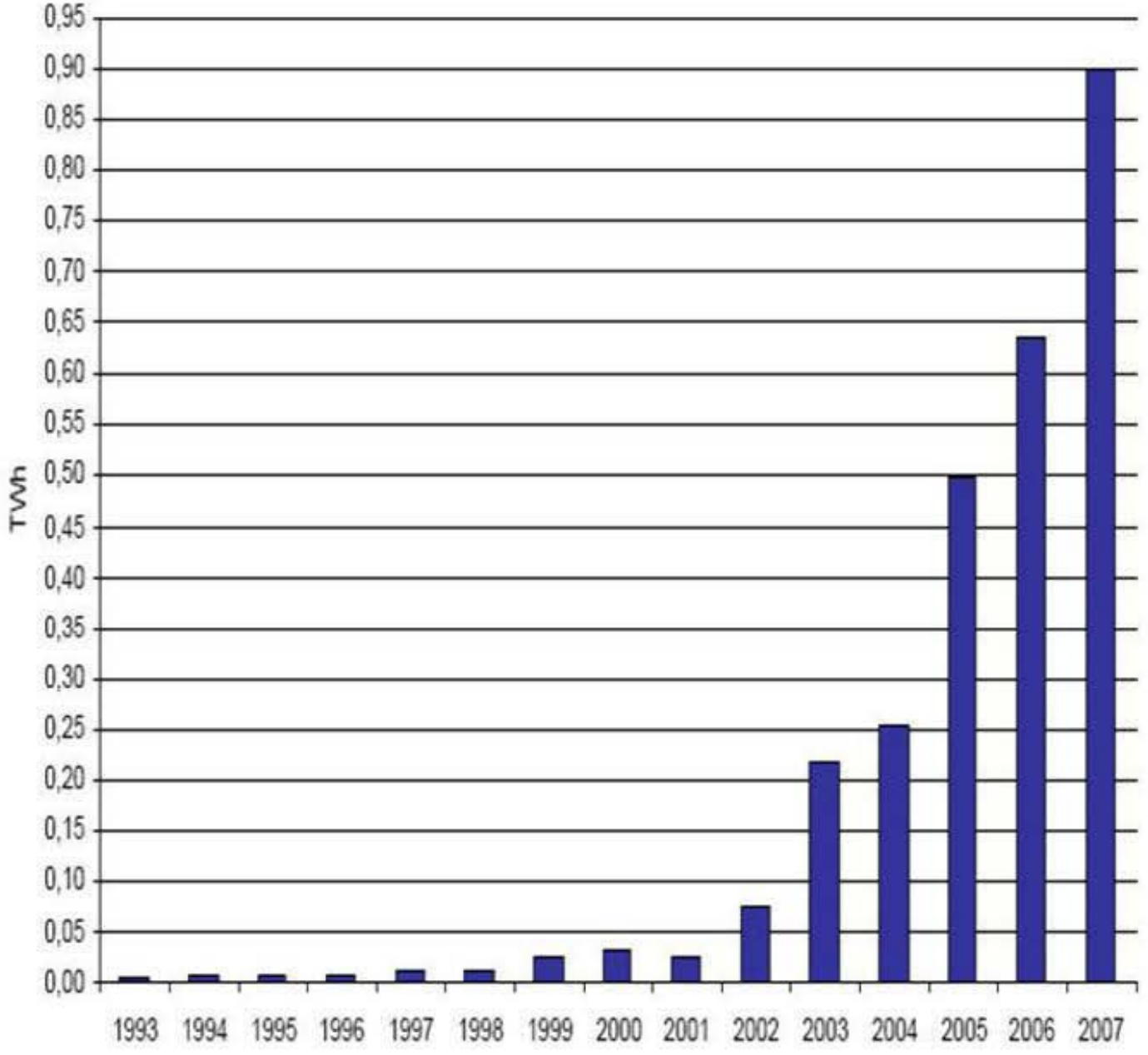
*FYROM = Former Yugoslav Republic of Macedonia
Note: Due to previous-year adjustments, 114.77 MW of project de-commissioning, re-powering and rounding of figures, the total 2009 end-of-year cumulative capacity is not exactly equivalen to the sum of the 2008 end-of-year total plus the 2009 additions.

Appendix C: Wind energy resources in Norway

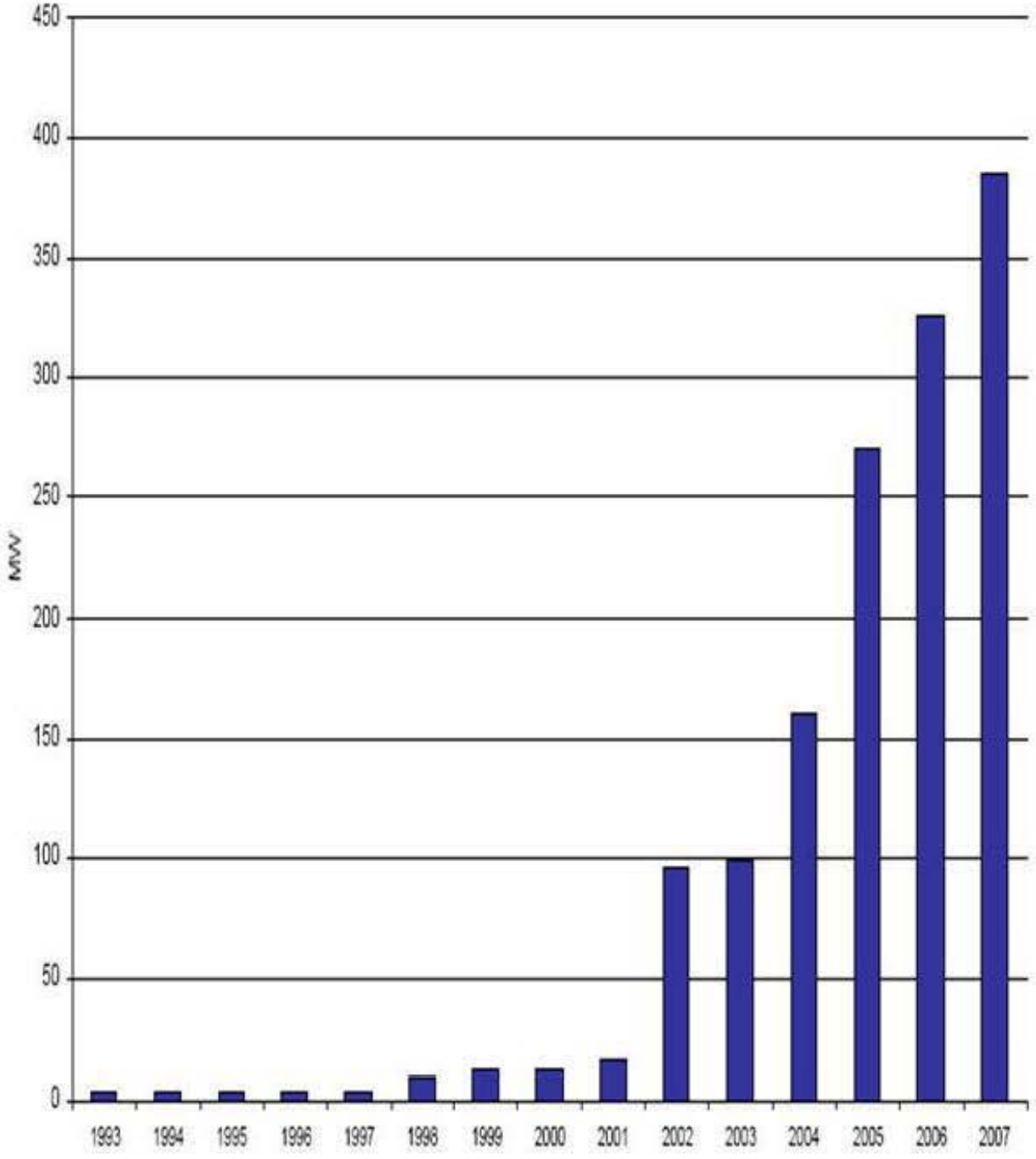
(vindteknikk.no, 2009)



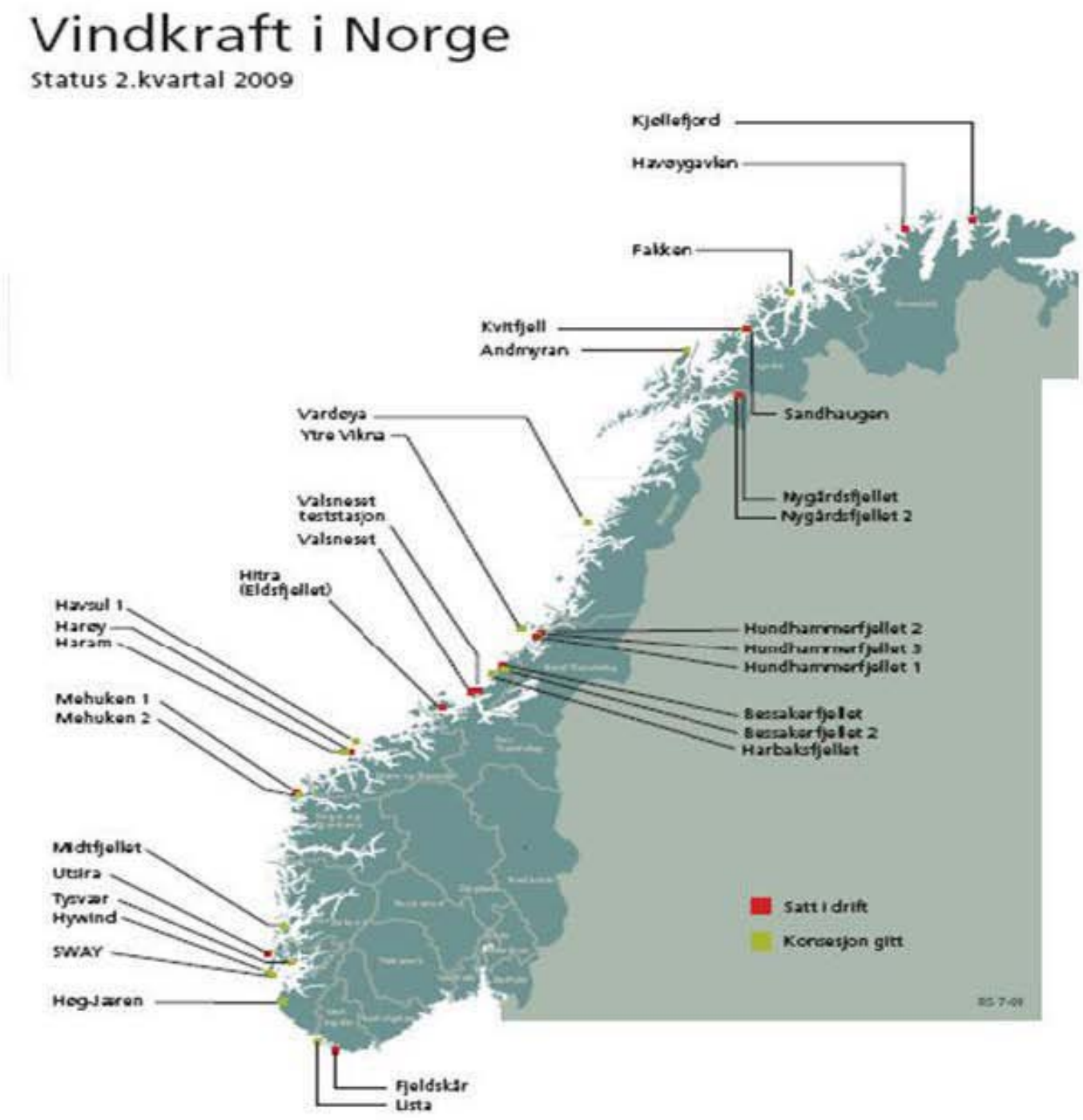
Appendix D: Annual production of wind power (NVE, 2009)



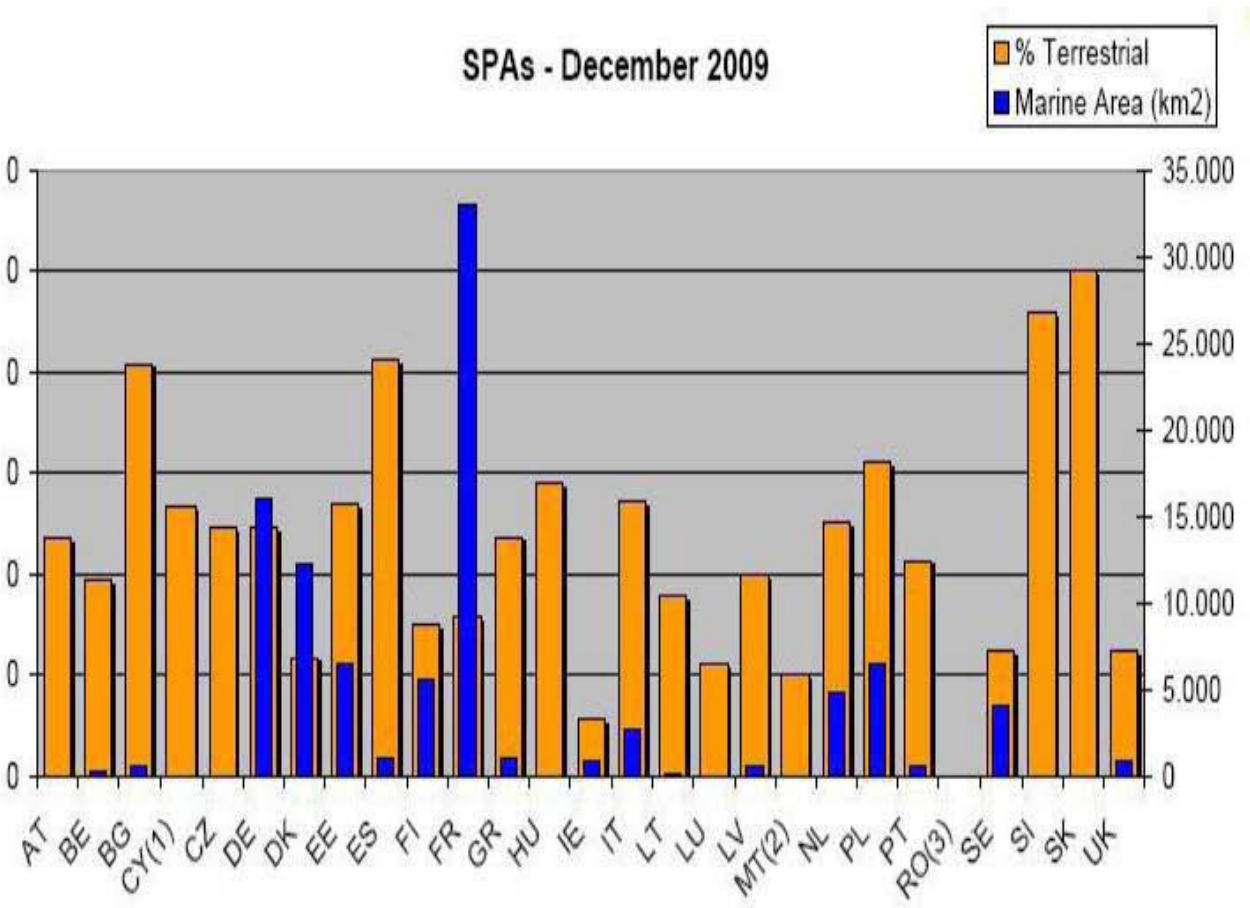
Appendix E: Installed capacity wind power (NVE, 2009)



Appendix F: Planned Wind farms in Norway (NVE, 2009)

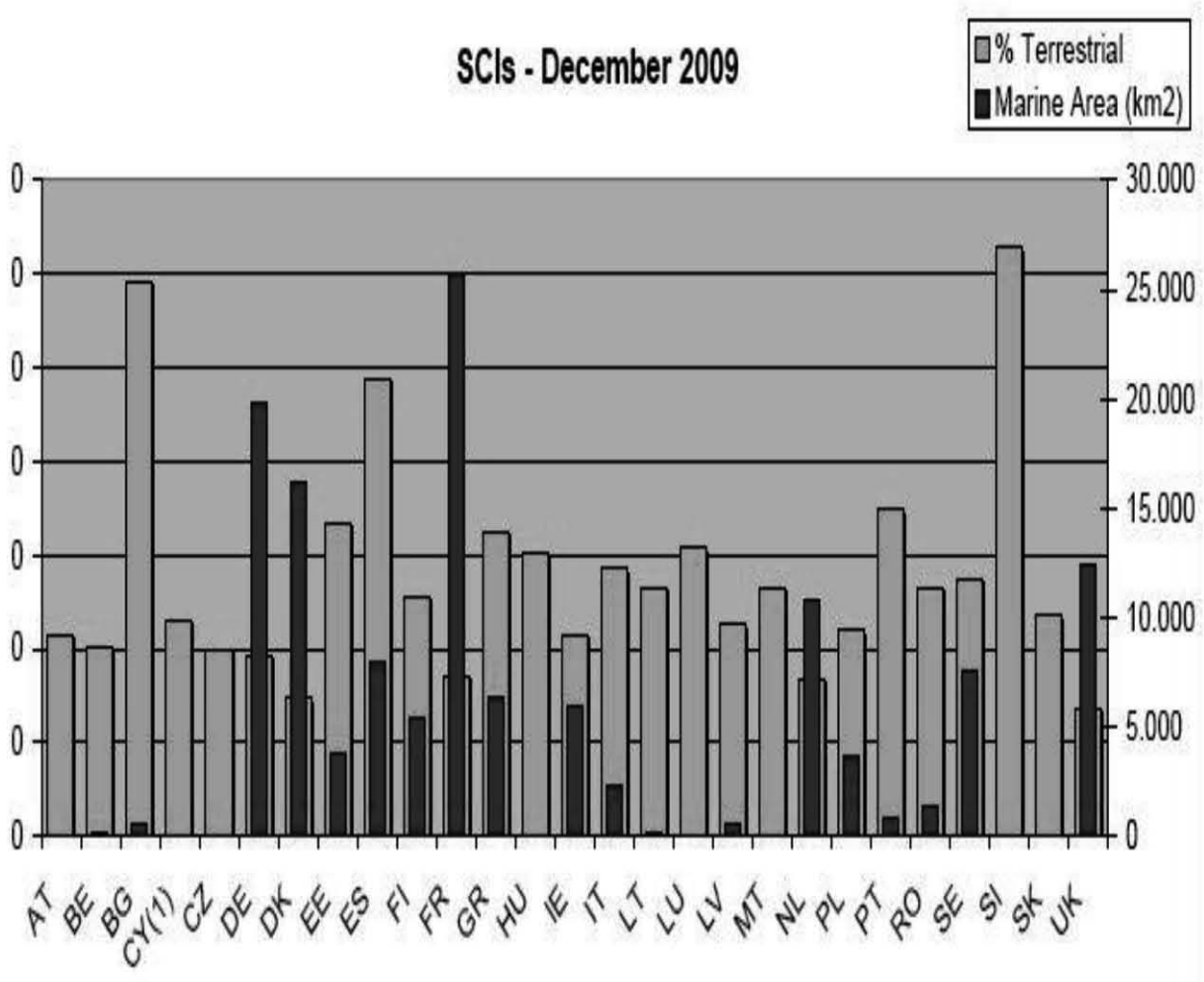


Appendix G: Special Protected Areas (Europa.eu, 2010)

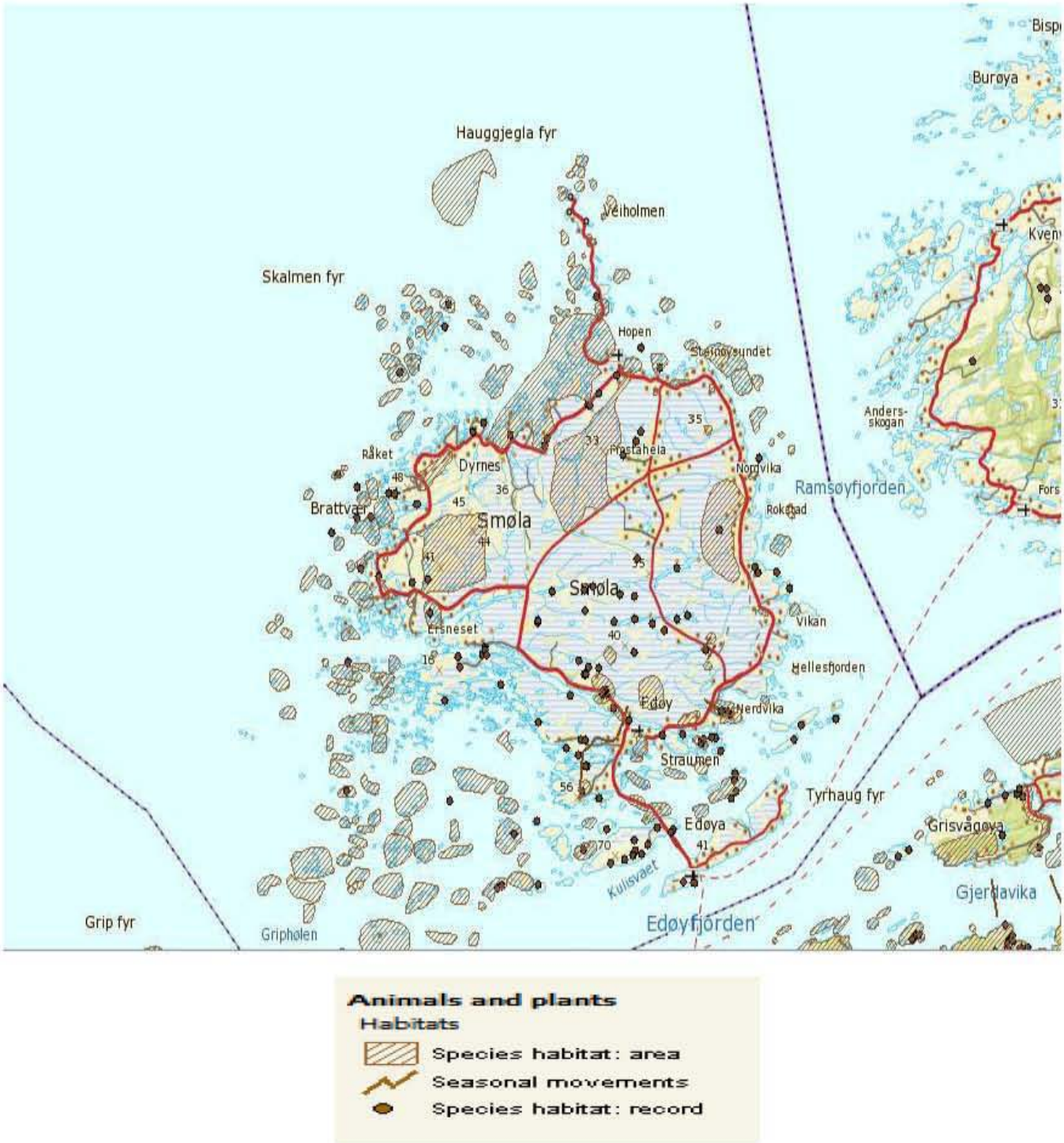


Appendix H: Sites of Community Importance

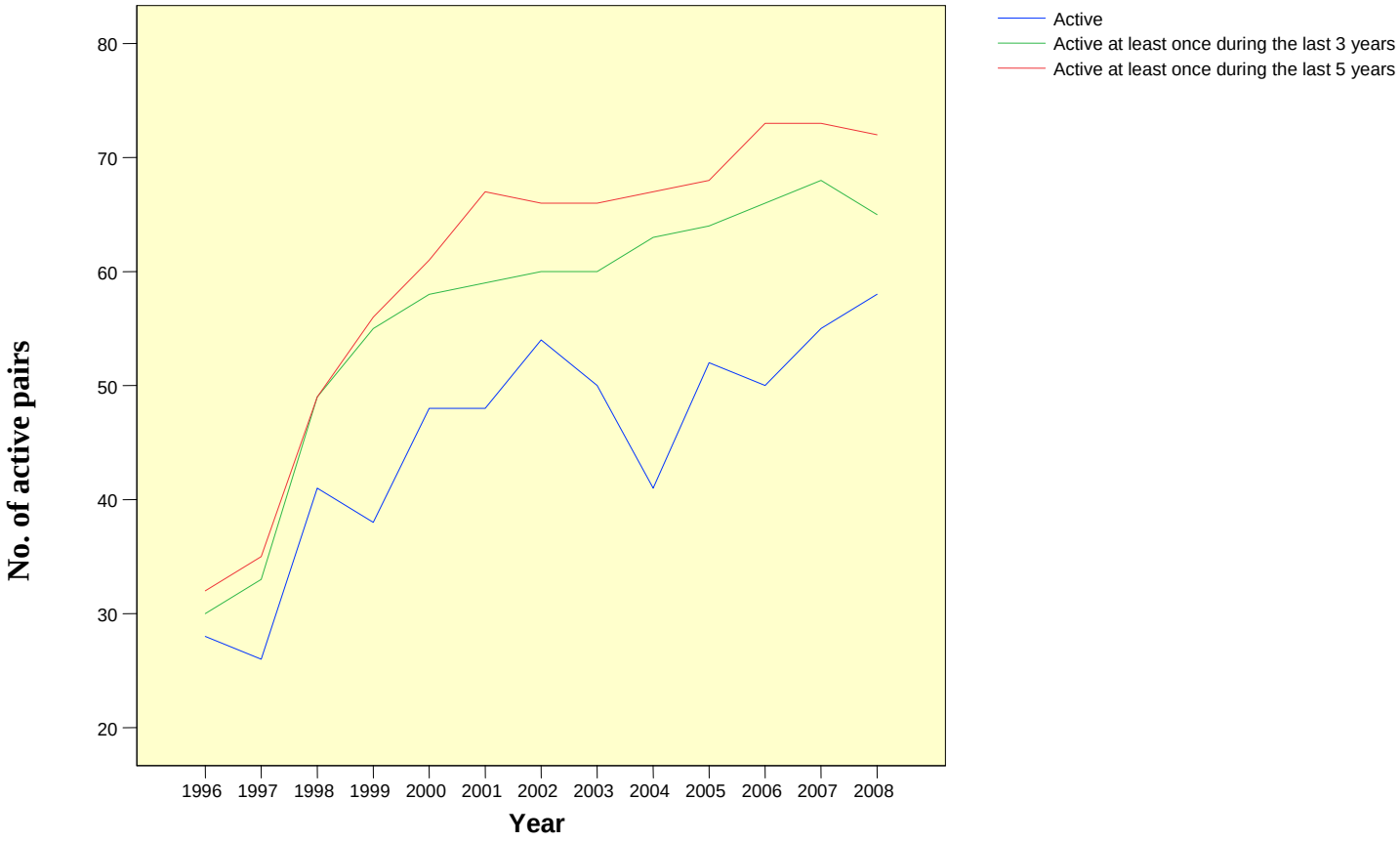
(Europa.eu, 2010)



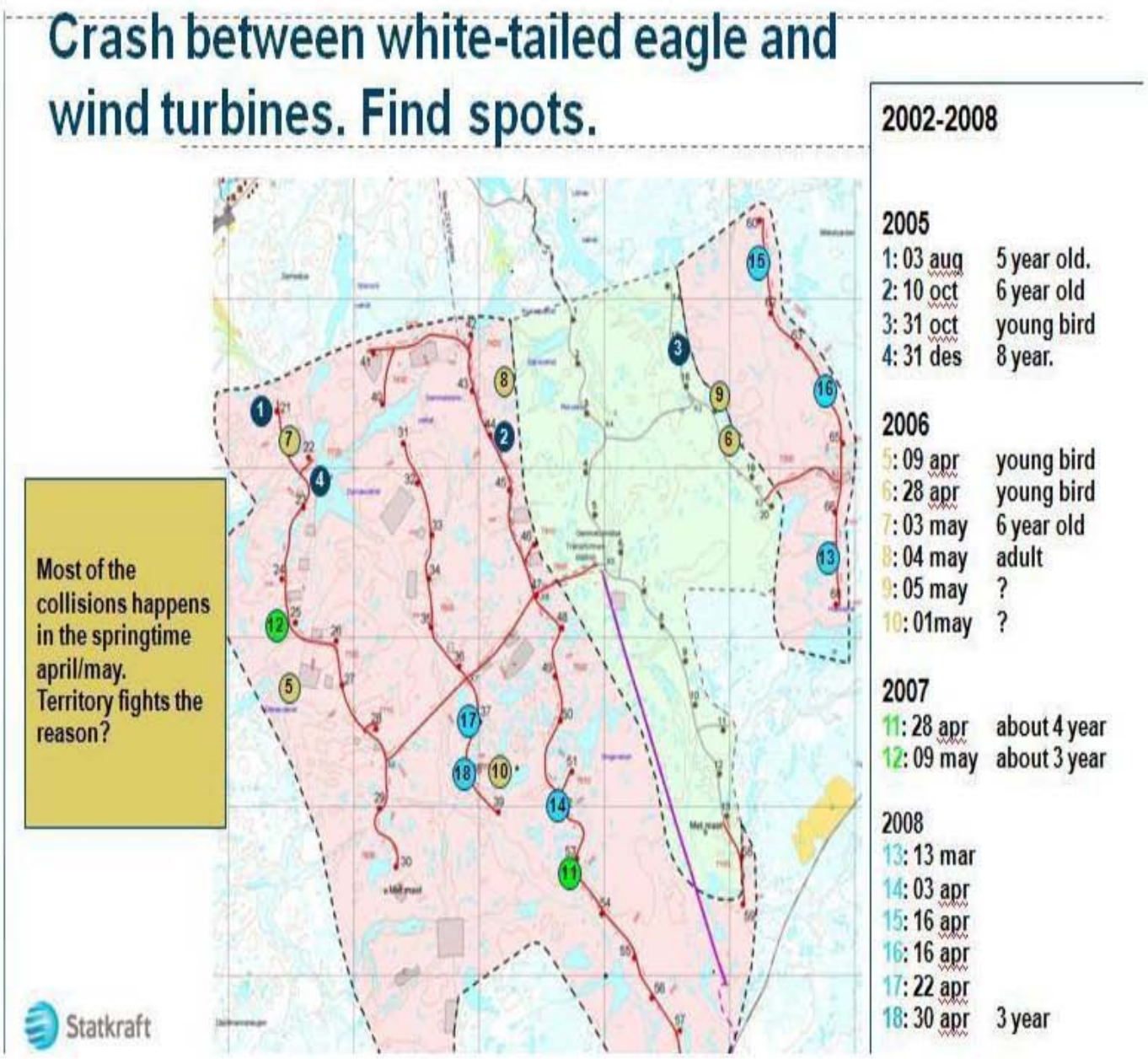
Appendix I: Animals and plants in Smøla (Environment.no, 2010)



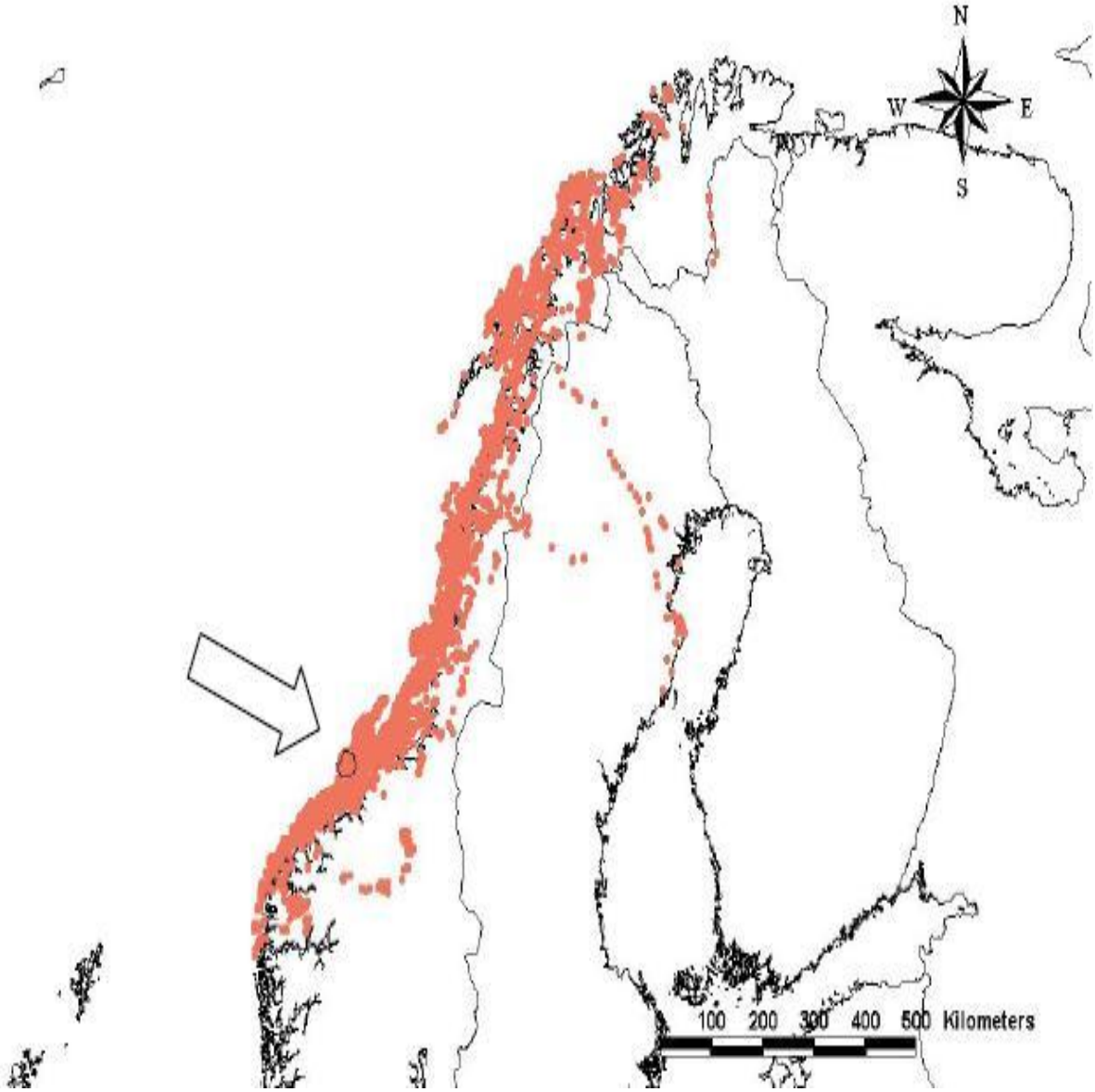
Appendix J: Number of active white-tailed eagle pairs at Smøla from 1996-2008 (Norwegian Government, 2009)



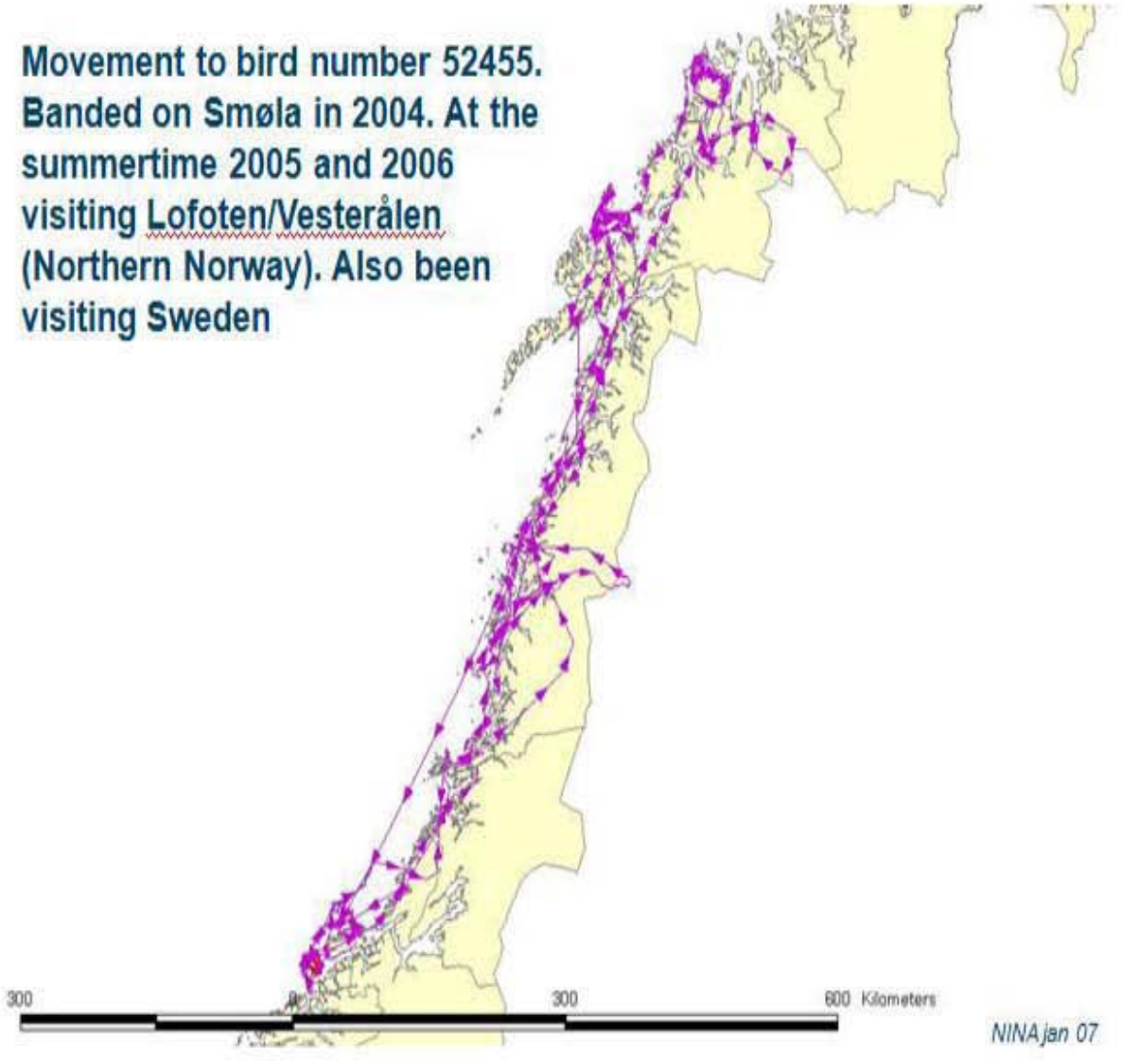
Appendix K: Crashes between white-tailed eagles and wind turbines. Find spots (Statkraft, 2008)



Appendix L: All GPS positions of white tailed eagles from all years 2003-2009 (n = 25 males and 20 females). The arrow indicates the tagging site (Smøla) (Birdwind, 2009)

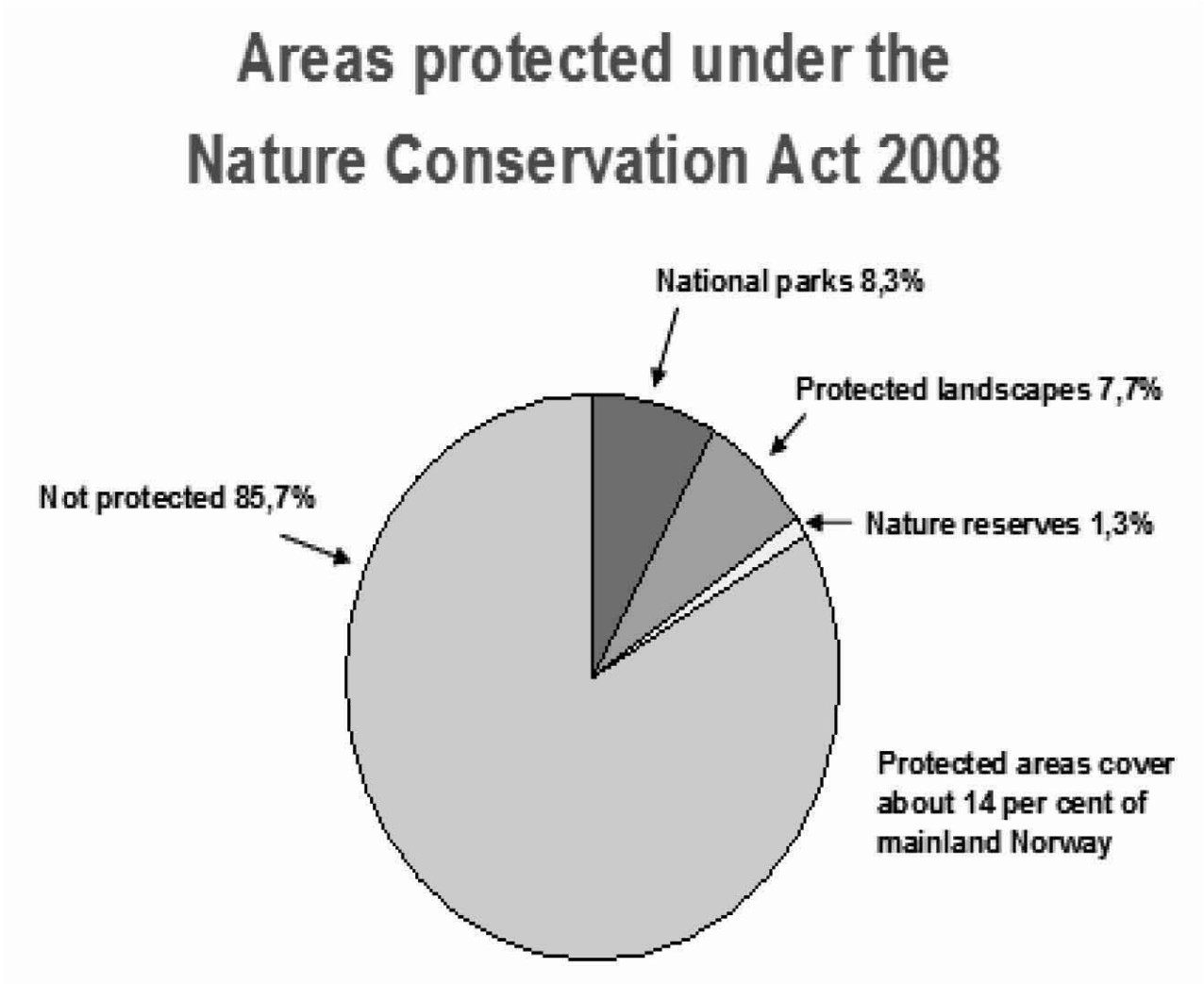


Appendix M: Movements of white tailed eagle (Statkraft, 2008)

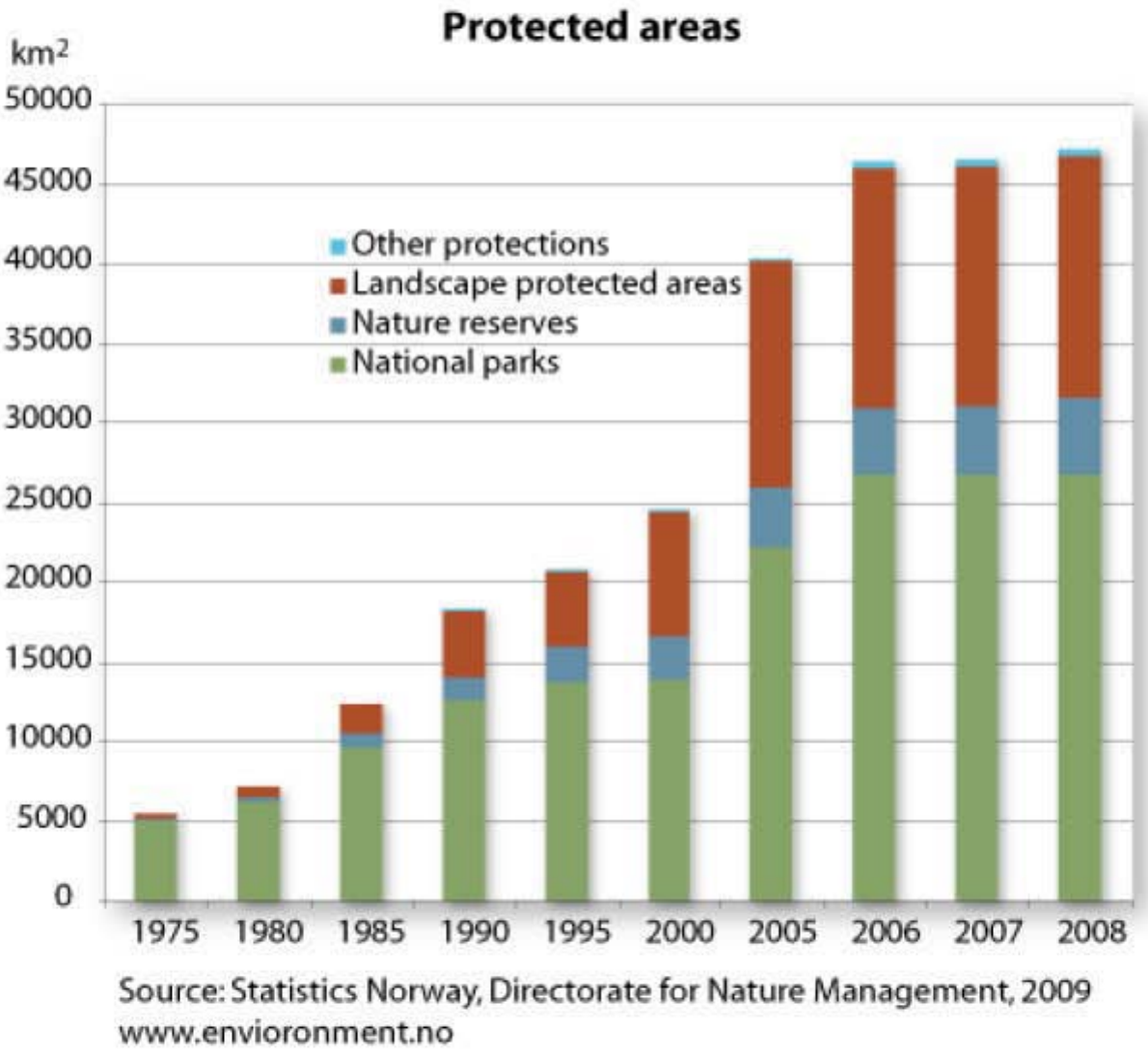


Appendix N: Areas protected under Nature Conservation Act 2008

(Nordicforestry.org, 2008)

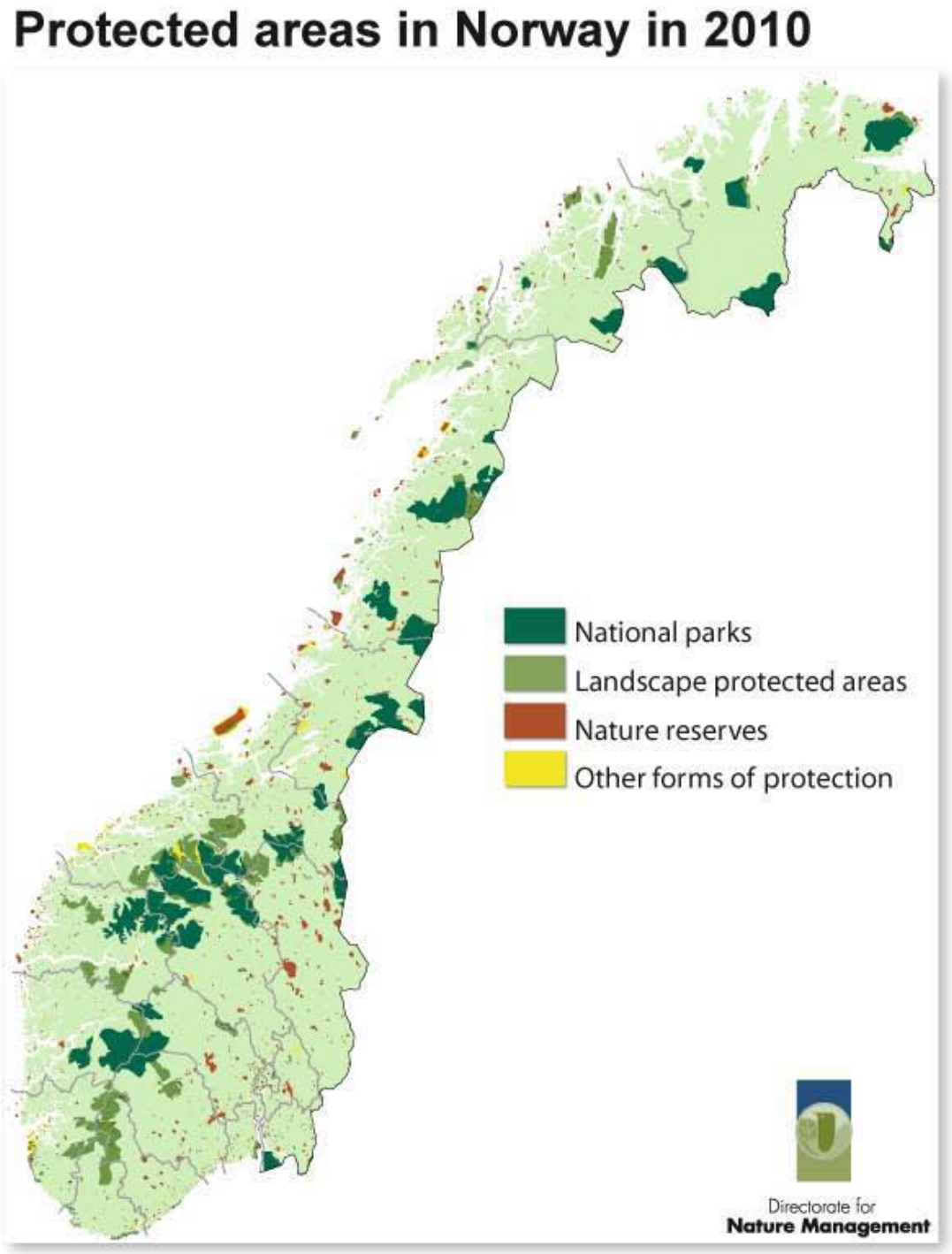


Appendix O: Protected Areas in Norway (Environment.no, 2009)



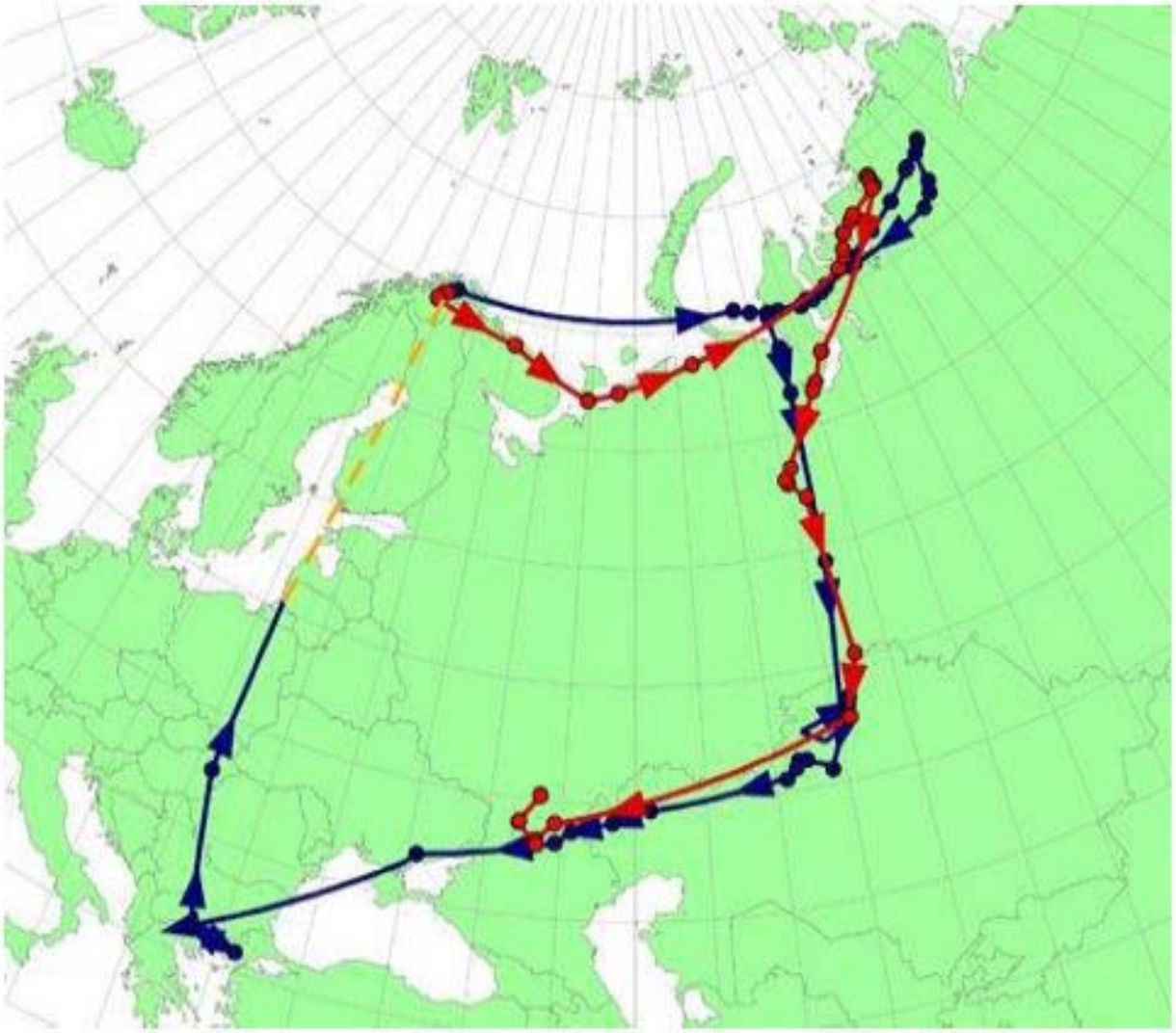
Appendix P: Location of Protected Areas in Norway

(Environment.no, 2010)



Source: Directorate for Nature management, 2010
www.environment.no

Appendix Q: Satellite monitoring of three geese (Dirnat, 2007)



Appendix R: Important Bird Areas (IBAS) in Norway

(Birdlife.no, 2010)