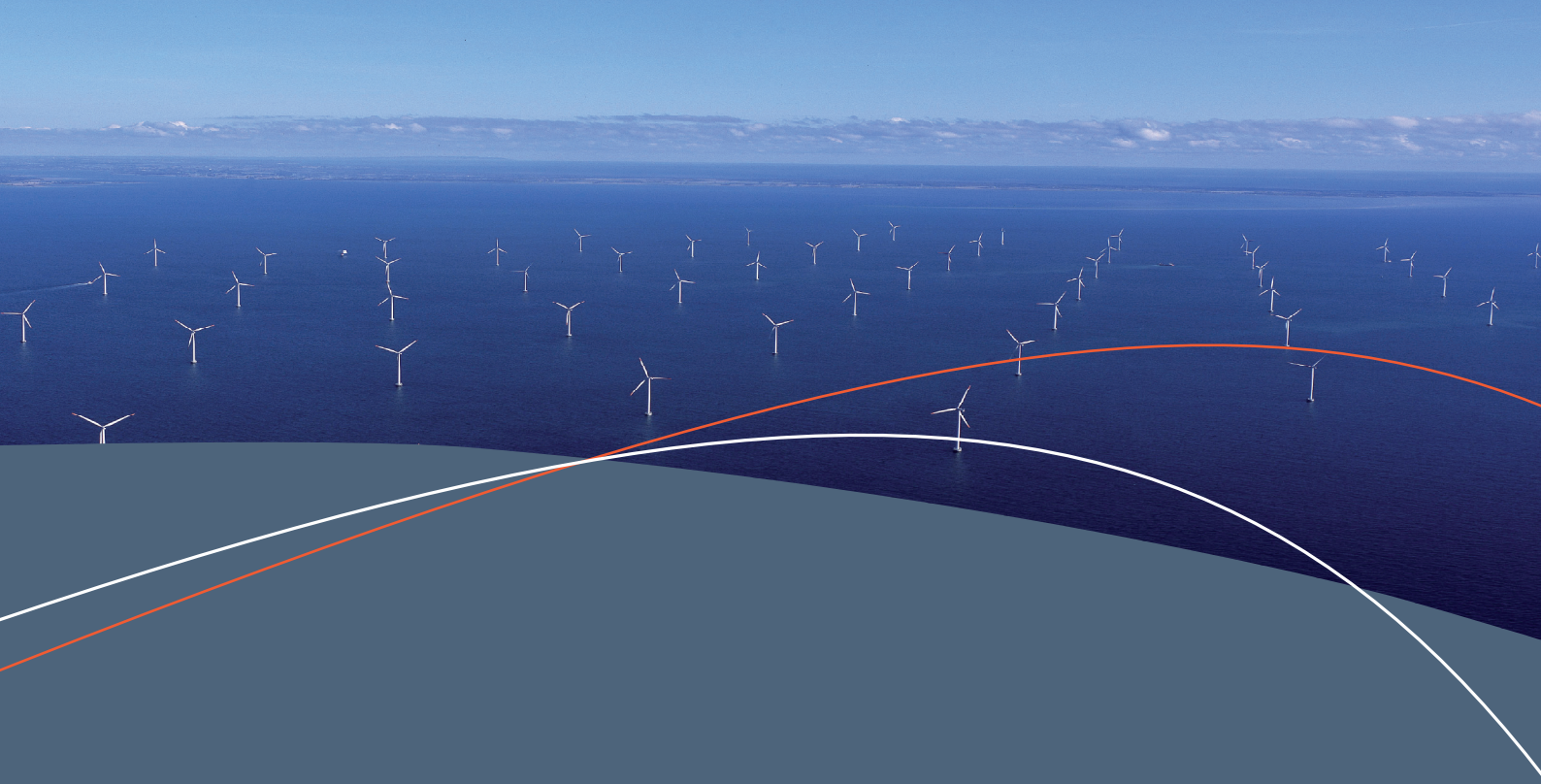

COPENHAGEN STRATEGY ON OFFSHORE WIND POWER DEPLOYMENT

European Policy Seminar on Offshore Wind Power

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Supported by
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Executive Summary

The EU Council of Energy Ministers meeting on 29th November 2004 concluded that the statements and recommendations of the EU Policy Workshop on Development of Offshore Wind Energy, in Egmond, Netherlands, were worth noting. The Council also welcomed the Danish offer to organise in 2005 a follow-up seminar on the Policy Workshop in Egmond. Like the Egmond Policy Declaration (2004) the statements and actions listed in the Copenhagen Strategy 2005 are based on identified obstacles to the development of offshore wind and are intended to focus on the possibilities for solutions, approaches and structural co-operation between parties. The main conclusions of the Copenhagen Policy Seminar on Offshore Wind Power were:

Market Development

- The "one-stop shop office approach" is at this stage recognised as an efficient way Government can contribute directly to lower costs and faster deployment of offshore wind projects. Participants recommend that Member States clearly define division of responsibilities to streamline and expedite procedures as stipulated in Directive 2001/77/EC Article 6 in order to provide for speedy and efficient decision making procedures for offshore wind developments including grid connection.
- Market volume and larger turbines are necessary for achieving further cost reductions which will benefit the whole of the EU. Participants recognise the usefulness of demonstration programmes of full scale projects and coastal onshore prototype tests sites and facilities suitable for accommodating larger offshore prototype turbines as a way to move this process foreward.
- There is enormous potential and benefits of enhanced, EU-wide and global collaboration in wind power related research and development. Participants recommend the establishment under the 7th Framework programme of a Technology Platform for Wind Energy, as proposed by the Informal Competitive Council in July 2004, and call on the European Commission to facilitate such a Platform (COM (2004) 366) with the aim of a more extensive Joint Technology Initiative.
- The Participants call on the Council of Ministers to ask the Commission to initiate a European policy for wind power starting with the production of an Action Plan on offshore wind power deployment.

Grid access, infrastructure and system integration.

- Participants consider the need for long term grid planning essential to enable the integration of large scale (offshore) wind energy. Timely involvement of transmission system operators and technical-industrial expertise is recommended. Any short-term solution should fit into a long term strategic vision, which would take the European dimension into account. Political support to facilitate the issuing of permits to build the necessary grid connections or reinforcements is also considered essential by the participants.
- Participants recommend that short gate closure times which allow trades close to real time should be implemented to allow the value to be realised from short-term exchanges of wind-generated electricity.
- Levelling the playing field is important for large scale integration of wind power in the liberalised electricity market. Participants stress the need for Member States to take the necessary measures to guarantee the transmission and distribution of electricity from renewable energy sources.
- Participants urge further analysis of the integration of renewable energy especially wind energy from a European perspective. Participants call for clarification from the EU-Commission on the interaction between the Internal Market Electricity Directive and Renewable Energy Sources Directive.

Environment

- Participants recommend the promotion of environmental studies that will improve the evaluation and assessment process for the impacts of offshore wind power on the marine environment. These results should be reflected in the information to be supplied by applicants in the project related Environmental Impact Assessments (EIAs).
- Participants recommend assessing plans and projects according to the Directive 85/337/EEC (Strategic Environmental Impact Assessment), the Directive 2001/42/EC (Strategic Environmental Impact Assessment) and the ESPOO-Convention.

- Participants recognise the importance of more efficient consenting procedures which build on past experience and are in proportion to the scale of the project and the perceived impact.
- Participants stress the need to ensure good quality assessments, especially when dealing with sensitive areas and to further develop methodologies for such assessment.
- Participants recommend the establishment and use of marine spatial planning instruments to arrive at optimal site selection. Participants recommend a continuation of a COD like structure, in co-ordination with similar work done in OSPAR, in order to improve transparency of databases and allow for more multilateral co-operation in environmental research.
- Participants propose the establishment of an EU-wide project to develop a modelling tool to assess cumulative impact.

I. Introduction

"Developing Europe's potential for using renewable energy will contribute to security of energy supply, reduce fuel imports and dependency, reduce green house gas emissions, improve environmental protection, decouple economic growth from resource use, create jobs, and consolidate efforts towards a knowledge based society". This view offered by the EU Commission in (COM (2004) 366) encapsulates the spirit of the Copenhagen Strategy on European Offshore Wind Power Deployment.

EU Governments have agreed to both European and national commitments on the development of renewable energy resources. Member States of the EU-25 have committed themselves to reach a 21% share of renewable electricity by the year 2010. The EU Council of Energy Ministers at their meeting on 29th November 2004 concluded that the process of setting new targets on renewable electricity for 2020 should start at the end of 2005 on the basis of the Commission report, with a view to its finalisation by the end of 2007. Further on 29th September 2005, the European Parliament adopted a resolution[1] stressing the importance of setting mandatory targets for 2020 and calling for a 20% target for renewable energy in the EU´s overall energy consumption by 2020. To achieve these objectives there is an important role for wind power and for several Member States offshore wind-power has a key part to play.

Although in the long term the prospects for offshore wind power are promising, the technology faces a number of challenges in terms of technological performance, impacts on the local environment, competition for space with other marine users, compatibility with the European grid infrastructure and secure integration in the energy system, as well as being fully competitive in the European liberalised electricity market.

The Copenhagen Policy Seminar on Offshore Wind Power was held in central Copenhagen Thursday 27 October 2005 as a parallel event to the Copenhagen Offshore Wind Conference and Exhibition 25-28th October 2005. This Policy Paper - Copenhagen Strategy 2005 on European Offshore Wind Power Deployment - was finalised with input during the Conference. Participants included representatives from European Governmental authorities, Transmission System Operators, Wind Power Developers, and Non Governmental Organisations etc.

Like the Egmond Policy Declaration (2004) the statements and actions listed in the Copenhagen Strategy 2005 are based on identified obstacles to the development of offshore wind and are intended to focus on the possibilities for solutions, approaches and structural co-operation between parties. The subjects dealt with in the Copenhagen Strategy are;
- Market Development
- Grid access, infrastructure and system integration
- Environment

[1] European Parliament resolution on the share of renewable energy in the EU and proposals for concrete actions (2004/2153 (INI)), Committee on Industry, Research and Energy, A6-0227/2005: http://www.europarl.eu.int/oeil/file.jsp?id=5199472

The Copenhagen Strategy does not reflect formal positions of the Government authorities involved but does reflect the collective learning and experience of the participants and may be used to maintain a focus on offshore wind on the European political agenda.

II Market Development

The rapid development of wind-power technology has continued in recent years. Turbines are increasing in size and today very large wind-farms are established or are the subject of feasibility studies in many countries. The market for offshore wind power is influenced by the rate of technological development as well as the rise in world energy prices in general. Governments also strongly influence deployment of offshore wind power through establishment of market framework conditions.

Participants of the Policy Seminar recommend that Member States clearly define, streamline and expedite procedures in order to provide for speedy and efficient decision making procedures for offshore wind developments. A recent IEA study[2] on offshore wind experiences inter alia concludes the provision by Government of "one stop shop offices" – whereby developers have to communicate with only one official contact point to handle administrative and legal matters – in conjunction with clear and rationalised procedures have been a success.

Participants recommend a continuation of the exchange of information on Member States' regulatory frameworks, accelerated consent regimes for infrastructure extension, and procedures based on evaluation of previous experience in applying these.

The Egmond-Declaration recommended that EU Governments should secure a long term stable investment regime for wind power. In order to arrive at long term stable investment, participants recommend an increased collaboration between the wind-power industry, utilities and financial institutions to finance offshore wind power initiatives (EIB, EBRD, ECAs, Structural Funds, commercial banks etc).

Participants recommend the Council of Ministers ask the European Commission to initiate an EU policy for offshore wind power to facilitate increased cooperation among Member States.

Participants recognise that different national support systems for offshore wind exist, and support the work of the Commission to evaluate EU Directive 2001/77/EC on the promotion of electricity from renewable energy sources. As for cross-border projects, Member States should ensure that national differences are not obstructive.

Participants also recognise the rapid cost reductions of wind power technology in recent years (some 80% per kilowatt hour in the last twenty years). The costs of offshore wind, however, still remain high compared to onshore wind. This strong record of cost reductions gives confidence for further cost reductions in the future and also for lower future Government financial support.

Cost reductions depend largely on experience, market volume and technical progress. Therefore participants recognise the usefulness of demonstration programmes of full scale projects as a way to move this process forward.

Cost reductions are also a function of larger turbines, economies of scale and further learning-curve effects. Therefore, availability of near shore and onshore coastal prototype test sites for large offshore turbines is

[2] Offshore Wind Experiences, International Energy Agency 2005, by Till Stenzel and Rick Sellers, Renewable Energy Unit, IEA: http://www.iea.org/dbtw-wpd/Textbase/Papers/2005/offshore.pdf

important for reducing costs. Participants recognise the usefulness of locations for the establishment of near shore test sites for prototype testing of larger wind turbines e.g. including wind turbines higher than 150 m that require special light marking for air traffic.

The European Wind Industry, organised through EWEA, has highlighted the enormous potential and benefits of enhanced, EU-wide and global collaboration in wind power related research, through its Strategic Research Agenda[3]. EWEA also considers further international co-ordination necessary in the field of market development such as European cooperation on developing and monitoring various payment mechanisms and their compatibility, reduction of administrative barriers (as mentioned in Art. 6 of the renewable Directive 2001/77), grid planning and access (as mentioned in Art. 7 of the Renewable Directive 2001/77), system integration and public acceptance. Against this background EWEA has advocated the establishment of a Technology Platform for Wind Energy[4] in order to establish structures necessary for the implementation of common research and technological development and demonstration programs in Europe, and bring together all stakeholders, to minimise duplication of effort. Such a Platform could also form the basis for a European policy on offshore wind power.

R&D plays an important role in reducing the costs of wind power and thereby also developing further the European Union's leading position in the world market. In 2004, European wind turbine manufacturers had a global market share of more than 80%. A prerequisite for developing this position is to have substantial increased funding of R&D for offshore wind power. Both for long-term and short-term R&D activities there is a need for continued and substantial R&D funding from the European Commission and Member-States. It is noted that long-term funding for wind energy was initially removed under the 6th Framework Programme. This funding for R&D is necessary as a complement to the R&D funding from the European Wind Industry. Participants therefore call on the EU-Commission, power companies, TSO's, Member-States, the European Wind Industry and research institutions to co-operate in the development of innovative solutions for offshore projects with a strong focus on cost reductions and mitigation of unwanted environmental consequences.

Participants acknowledge that offshore wind power may have an overlap with developments in wind power in general. The different characteristics of Offshore Wind Power would however require specific attention in the overall set-up of a Technology Platform for Wind Energy. For example:

- Market: further cost reductions require an increased market to allow for the realisation of economies of scale and further technical progress including: further reliability improvements; operation and maintenance optimisation needs; different foundation solutions for self supporting constructions and for coatings and materials; technology able to withstand aggressive salty conditions; different wind and wave, ice and tidal loads; and new types of co-operation, including contracts with different parties, and higher investment and insurance costs.
- Grid Issues: the connection and transmission of offshore wind power faces similar challenges to those surrounding the integration of wind power in general. However, again the marine environment and offshore nature of supply imply different and specific challenges. The proper grid integration of renewable energy sources is important for maintaining security of supply and is therefore important for the European industry and Community. (See III – Grid access, infrastructure and system integration)
- Environment: the marine environment provides areas for wind farms which differ significantly from the onshore environment as to habitats of benthic organisms, fish, mammals, seabirds, bird migration as well as safety requirements, personnel and risk management. There is a need to further develop methodologies for assessing impact of established and planned offshore wind-farms on the environment, e.g. assessing the cumulative impact at a local and regional level. (See IV – Environment)

Participants urge parties involved in the establishment of the European Technology Platform for Wind Energy with the aim of a more extensive Joint Technology Initiative and to structure the platform in such a way that it will:

[3] Prioritising Wind Energy Research – Strategic Research Agenda of the Wind Energy Sector, EWEA July 2005
[4] IBID p.37

- contain an independent chapter for offshore wind power;
- allow for international co-operation between all relevant public and private stakeholders;
- allow for both long term research and short-term operational measures;
- be transparent in activities and results.

Several states have conducted comprehensive research in the field of offshore wind energy. In relation to a Technology Platform for Wind Energy participants recognise the Strategic Research Agenda (EWEA, July 2005) for the European Wind Energy Sector up to 2013. Long term R&D-priorities include:
- wind resource estimation and mapping;
- availability of robust, low maintenance offshore turbines;
- state of the art laboratories for accelerated testing of large components;
- planning and design processes for Trans-European grid with sufficient connection points to serve future large scale wind power plants;
- research and development of storage systems.

Short term operational measures include:
- standards and certification;
- acceptable operational/technical system integration measures;
- communication strategy as to the findings on impacts from wind farms on the eco-system, targeted at the general public and policy makers.

III Grid access, infrastructure and system integration

The establishment of new forms of co-operation between different players in the field of offshore wind power and the European electricity network is considered essential in order to reach existing targets.

The Egmond Policy Declaration acknowledged that the integration of large scale offshore wind power requires further research to find optimal technical and least-cost solutions to large scale grid integration. Following this recommendation, work has started between the European Commission, ETSO, EWEA and some representatives from Member-States to focus on priority issues and possible solutions for the integration of offshore wind into the electricity system. Participants acknowledge that this programme of work, which may also serve as input for the programme to be implemented in the Technology Platform for Wind Energy and the Technology Platform for the Electricity Networks of the Future, is ongoing.

Participants welcome recent efforts to establish a European Technology Platform for Wind Energy and suggest among others the following issues to be considered for specific R&D activities:
- Improvement of wind forecast quality (increased predictability);
- Generation management for wind installations;
- Imbalance management - assessment of the need for back-up/reserve- and balance capacity when wind power is fed into the electricity system;
- Demand-side-Management; e.g. instruments / mechanisms to coordinate demand and production for RES-E;
- Temperature-monitoring of overhead lines in areas with high wind energy penetration
- Frequency assessment and general evaluation of grid bottlenecks;
- Storage technologies (to be coordinated as a system integration issue e.g. the use of hydrogen, compressed-air storage, short term storage (fly wheel storage), heat pumps, pumped storage, wind-hydro systems).
- Deepwater offshore technology.
- Transmission technologies and design.

Participants have also taken note of the results of the DENA-study (2005) on the Planning of the Grid Integration of Wind Energy in Germany Onshore and Offshore up to the Year 2015 and call upon relevant authorities (amongst others UCTE, ETSO, Member-States, energy research institutions and wind industry) to select issues from this study on which similar analyses could be undertaken in other EU countries and on the EU network. Participants recommend considering the establishment of a cross border offshore grid.

Participants consider the need for long term grid planning (at local, regional, national and EU levels) essential to enable the integration of large scale (offshore) wind energy. Timely involvement of transmission system operators and technical-industrial expertise is recommended. Any short-term solution should fit into a long term strategic vision, which would take the European dimension into account. Political support to facilitate the issuing of permits to build the necessary grid connections or reinforcements is also considered essential by the participants.

Participants call for clarification from the EU-Commission on the interaction between Internal Market Electricity Directive and Renewable Energy Sources Directive.

Long term integral grid planning should result in overviews of infrastructure investments required for a smooth operation of the European electricity network. Participants believe the requirement for grid expansions and reinforcements due to large scale wind developments should be approached and financed by TSOs in the same way as upgrades following increases in other forms of renewable electricity production or conventional power supply and on basis of long term integral system and grid planning.

Participants recommend exploring the extent to which support under Structural Fund budgets and the Trans-European Networks (TEN-E) may be made available for the development of infrastructure (hardware) developments in the new member-States and/or interconnector capacity in the European electricity network. Action: EC, ETSO, EWEA, other interested parties.

In the context of liberalised markets, changes in trading patterns and increased electricity trade, participants call for a stronger focus on:

- interconnection: definition of required sizes in different regional markets and exchange of information on flows and programmes;
- implications and adequate measures of large scale integration of wind energy for the security of supply in the European electricity network;
- Grid codes and other technical requirements should reflect the technical needs and be developed in cooperation between TSO's, the wind energy sector and independent public bodies.
- When developing grid requirements, it should be recognised that in areas of low wind power penetration levels excessive technical requirements such as fault-ride-through capability and voltage control possibilities are not needed.
- Costly requirements should be included only if they are technically required for reliable and stable power system operation. Action: Regulators, TSO's, UCTE, ETSO, NORDEL, EWEA

Both the trends towards more distributed generation and the specific characteristics of wind energy imply the need to continue development of new technical solutions for integrating and balancing power output from larger wind farms.

Participants recommend that market mechanisms which allow trades close to real time should be implemented to allow value to be realised from short-term exchanges of wind-generated electricity. Gate-closure times for wind power should be reduced compared to current practice in many Member States.

Levelling the playing field is important for large scale integration of wind power in the liberalised electricity market. Participants stress the need for Member States to take the necessary measures to guarantee the transmission and distribution of electricity produced from renewable energy resources. Member states may also provide for priority access to the grid system of electricity produced from renewable energy sources (in

accordance with article 7 in the directive 2001/77/EC). Participants agree that curtailment of wind farm output should not be seen as a barrier to priority dispatch. Curtailment of wind power should be restricted to situations where normal grid operations are endangered.

IV Environment

By the end of 2004 offshore wind power produced more than 2.200 GWh in Europe avoiding the equivalent of approximately 1.5 million tonnes of CO2 per year to be released into the atmosphere. Given the commissioning of planned projects on schedule this picture is expected to increase considerably in the short to medium term in many Member States.

Participants acknowledge that onshore wind has an important role in many Member States and that the cost of production generally is lower than that from offshore wind. However, in many Member States suitable areas for onshore wind are scarce. In addition there are often limits to the extent the general public can accommodate large scale onshore wind power development. For those countries offshore wind power provides an attractive alternative.

A stronger focus on public acceptance is vital in some Member States. Participants recognise the need for an enhanced public awareness of the eventual environmental benefits and technological possibilities of offshore wind power e.g. by increasing transparency of existing knowledge on affiliated benefits and possibilities for co-ownership.

Participants recognise the importance of more efficient procedures which build on past experience and are in proportion to the scale of the project and the perceived impact.

Participants stress the need to ensure good quality assessments, especially when dealing with sensitive areas and to further develop methodologies for such assessment.

Participants acknowledge that it now appears that within the present state of biological knowledge it will be possible to find suitable areas for offshore wind farms in areas of low importance for conservation resources, as marine mammals, birds, fish or benthic communities. Participants recommend a continuation of a COD[5] like structure in co-ordination with similar work done in OSPAR[6] in order to improve transparency of databases, better use of GIS based data and standardised data exchange and allow for more multilateral co-operation in environmental research.

Member States should further co-operate via international co-ordinated and/or joint research projects or research programs with the aim of initiating projects including development of methodological standards (e.g. the D-DK Research agreement established to strengthen the exchange of ideas, information and data and thereby enhance common knowledge regarding the possible effects of offshore wind power on the marine environment).

Research undertaken in different Member States has already helped to establish a body of knowledge on the possible effects from offshore wind power on the marine environment. The complexity of marine ecosystems makes it necessary to continue this environmental research to help better prediction of the effects of offshore wind power and identifying appropriate sites for wind power development. The results can also be used to compare the effects of wind power with other human activities, including other forms of electricity production. Improved knowledge will help to increase acceptance for offshore wind power.

[5] Concerted Action for Offshore Wind-Energy Deployment, EC Contract: NNE5-2001-00633

[6] The 1992 OSPAR Convention is the current instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. It combined and up-dated the 1972 Oslo Convention on dumping waste at sea and the 1974 Paris Convention on land-based sources of marine pollution.

Participants recommend that authorities should consider the results of environmental studies in the information to be supplied by applicants in the project related Environmental Impact Assessments (EIA's). In order to fill the present biological knowledge gap the possibilities to implement a certain standardisation of international research methods should be explored. In that respect the common definitions and approaches will have to be established in EIAs and SEAs (including representative cause-and-effect-chains and identification and assessment of (cumulative) environmental conflicts and their solutions in connection with offshore wind projects).

Suitable areas/locations for wind power in the offshore environment may compete with nature conservation and areas of visual importance as well as other traditional human use such as fishery, sea transport, yachting and military interest. Participants recommend the establishment and implementation of marine spatial planning instruments to arrive at optimal site selection.

Participants propose the establishment of an EU-wide project to develop a modelling tool to assess cumulative impact e.g. undertaken under a COD like structure.

Large turbine design is an essential element in approaches towards further cost reductions. Therefore, participants urge Member States to resolve and streamline demands for aerial markings of turbines – in particular for the next generation of taller turbines.

Participants note that the European Commission, EWEA, Nature Conservation NGO's and representatives from Member-States have established an ad hoc working group; this group aims to improve efficiency in national consent and decision making procedures and streamline practical requirements for the implementation of (Strategic) Environmental Impact Assessments and the Birds and Habitat Directives by clearly defining priority issues. Guidance from this Group helps to further define priority issues in the environmental field. There is also other guidance for instance under the Bern and OSPAR Conventions. Participants stress the need for consistency between existing and future guidance documents. Such documents should take into account the respective documents of the OSPAR Working group on the environmental impact assessment of human activities (EIHA) as well as the existing Standards for Environmental Impact Assessment.

Participants recommend Member States perform a Strategic Environmental Assessment (SEA) (Directive 2001/42/EC and Directive 2003/35/EC) to identify and assess (cumulative) environmental conflicts and their solutions, and to give better insight into the topics that need detailed consideration in project related Environmental Impact Assessments (EIA's) (Council Directive 97/11/EC). Authorities could also consider doing this on an international level.

V Other Issues

The Participants call on the Council of Ministers to ask the Commission to initiate a European policy for wind power starting with the production of a n Action Plan on offshore wind power deployment.

Participants recognise the level of offshore wind power deployment varies between the North Sea- and Baltic Sea- , Atlantic- and Mediterranean Regions and recommend greater knowledge transfer between Member States and between Regions.

Participants ask the Steering Committee of this policy seminar to prepare a follow up meeting in 2006 in order to review achievements made. Participants ask Germany to consider hosting the follow up meeting.