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Wind Energy Technology Platform Secretariat

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PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Introduction

TPWind organised two general assemblies, on 13-14 November 2007 and 12-13 February 2008. The working groups met during these events.

The following sections provide the session orientation packages for the working groups, and the meeting minutes.

The session orientation packages are identical for all working groups. These packages are extensive, as it includes drafts of the Strategic research Agenda. An example of working group meeting agenda is included to the following sections. The full session orientation packages are downloadable on the internal TPWind website: <http://www.windplatform.eu/54.0.html> (login: secretariat, password: windsec).

The working group meeting agendas provide a list of questions to structure the discussions. From the outcomes of the meetings, the secretariat was able to update a draft of the Strategic Research Agenda / Market Deployment Strategy (SRA/MDS) documents.

For the first general assembly, the meeting minutes are under the form of a report and a PowerPoint presentation. During the second general assembly, the working groups focused on improving the SRA/MDS documents. The minutes were provided under the form of a PowerPoint presentation. Separately, the draft SRA/MDS text was updated.

In the following sections, the elements are provided for the market deployment working groups (WG5: Wind Market and Economics and WG6: Wind Policy and Environment).

Example of session orientation package

European Wind Energy
Technology Platform
(TPWind)



Working Group 1: Wind Energy Resource
Meeting n°1
November 13-14th, 2007

Support document

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Prepared by the TPWind Secretariat

October 2007

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Minutes of WG5 meeting n°1

Investment costs

During the past few years, demand increased significantly, and the price wind energy has not been following the expected learning curve. On the contrary, despite historical market growths, the prices increased. This situation is likely due to the increase in the price of materials, but also to supply chain bottlenecks, in a framework of strong demand. This situation will not be solved until 2009, at least.

Uncertainties remain on the future cost of raw materials and their impact on the cost of wind energy. Solutions shall be provided to unlink the price of raw materials to the electricity price.

Bottlenecks in the supply chain are factors limiting the expected benefits from economies of scale on the costs. The influence of supply and demand on the costs shall be scrutinised, and bottlenecks shall be identified. Once identified, improvements shall be proposed, through involvement of manufacturers and sub-suppliers to find common solutions, such as further standardisation of components, and centralisation of manufacturing effort to reduce costs. The supply chain structure will differ from today.

In a longer term, the demand shall stabilize. With a decreasing market pressure, and an optimised supply chain, competition between manufacturers shall increase and prices shall decrease. In this framework, the future shares of smaller manufacturers and new entrants shall be identified.

As the installed capacity will increase, wind power will be confronted to more and more challenging environments. In order to decrease the costs, technological improvements shall be performed. A question remains on how these engineering challenges can be most efficiently managed while supporting growth. The level of investments needed in reducing costs in system, increasing turbine availability, and using new materials shall be assessed.

As a complement, the influence of regulation on the growth process is to be established. A remaining question is to know how regulation has impacted growth, demand and supply activity. Moreover, a comparison between the current market structure and market-driven environments shall be done. An unknown parameter remains on the lasting of this demand driven market, and the future market structure.

How will costs change as penetrations increase – since the best sites will already be gone (including repowering)

Operational cost

Onshore/offshore:

Emphasis is put by the Group experts on improving the system reliability. Main axes for improving reliability have still to be identified, and their ratio investment / benefit shall be assessed. This could be done with support of the expertise gained in other industries (e.g. car manufacturing industry, aircraft industry). Reliability improvements shall be performed:

- at turbine scale, through standardisation of components, and performing condition monitoring.,
- at project scale (??).

For offshore, operational cost reductions might be performed through developing specific offshore systems (e.g. dedicated offshore turbines, dedicated offshore cables, grid interconnections, and foundations). The impact of these developments shall however be assessed. As a complement, further experience may be gained from the offshore industry.

xWhere can reliability improvements be focused, looking at reliability throughout the wind turbine and project system.

xWhat are realistic improvements through condition monitoring.

xResearch needed on how improvements in reliability from other industries.

xCan standardisation of components assist new entrants to the market (improve reliability for smaller turbine suppliers).

Offshore:

xHow can we achieve offshore cost reduction through dedicated offshore turbines, dedicated research in offshore cables, grid interconnection and foundations.

xWhat further experienced can be gained from the offshore industry.

Grid

At project scale, cost reductions shall be performed through grid access harmonisation. This implies to harmonise grid codes, physical access and grid access costs calculation. An optimal way to finance capital improvements and upgrades for grid access projects shall be assessed (??).

At grid scale, in order to enable cost reductions through a large-scale deployment of wind energy, the manageable grid penetration from wind shall be assessed and solutions to improve grid penetration shall be studied. Moreover, the operational management of unbundling between generation and transmission operators is still an open question.

xadditional grid code requirements,

xWhat is required to harmonise grid access (grid codes, physical access and cost)

xHow can reduce the likelihood of ongoing changes to codes

xWhat is the optimal way to financing capital improvements and upgrades for grid access projects

xWhat is the manageable grid penetration from wind

Offshore grid access studies are required – specified locations
xHow can unbundling be managed

TPWind General Assembly: WG 5 Wind Market & Economics

Carlos Gasco
Working Group Chair

8/5/2008

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Meeting Guidelines

Block 1 – Improve competitiveness of wind energy in the current climate and energy crisis

Block 2 – Wind Markets – Grid Access and European Markets

Block 3 – Future energy outlook and regulation for wind

Meeting Guidelines

Block 1 - Investment and Operational Costs (Supply)

Alignment of cost drivers in a growth industry

Cost drivers impacting energy costs (€/MWh):

- **Investment Costs**
- **O&M Costs**
- **Onshore**
- **Offshore**

Assess the potential improvements and definition of priorities.

Meeting Guidelines

Block 2 – Markets (Demand)

Physical European Grid -

Increase the penetration of wind power through:

- Grid codes (harmonise)
- Interconnection (access and availability)
- Offshore (location strategy)

Assess the improvements possible in access and management through research.

European Electricity Markets – Optimise opportunities

Meeting Guidelines

Block 3 – Future energy outlook and regulation for wind

Fossil reserves / security of supply

Environment: CO₂ price

Wind Onshore – 2020/2030 – competitive

Wind Offshore – later – competitive

Wind regulation:

- Necessary to bridge gap
- Harmonisation linked to creation of a European market – Carbon markets

Minutes of WG5 meeting n°2

WG 5 Wind Market & Economics

Objectives

- q The overall objective is for wind energy to become a major modern energy source that is reliable and cost competitive (cost per kWh) in a market situation driven by concern over the impacts of climate change, oil and gas depletion and sustainability. Development will occur within the current context of decentralisation, decarbonisation and globalisation.
- q A further important goal is to ensure that the European industry continues to lead the global market. This goal can be achieved through, as a first step, implementing a 25% wind penetration target by 2030, provided that the process will represent an optimal industrial expansion in Europe.

Policy Framework

There are needs for

- q long term legally binding wind and renewable targets,
- q policies providing a stable and predictable environment to implement the targets,
- q fair and efficient regulation taking into account the positive externalities of wind, contribution to energy independence and industrial development,
- q long term national siting plans and grid capacity plans,
- q simplified permitting procedures,
- q recognition of wind as a public interest investment,
- q policy to support functioning European electricity markets,
- q research into the future market environment
- q review of conventional electricity costs including all externalities.

Revenue Reliability

- q Reliability of wind energy technology is a major focus of the wind energy industry. Improvements in reliability will reduce operational costs and increase investor confidence, having a beneficial economic impact, especially offshore. Reliability research is needed, embracing all aspects of the component, turbine and energy system levels. This links to WG2.
- q To enable massive long-term investments, investment revenue must be reliable. Other working groups will address the improvements to be made in energy assessments.
- q It will be necessary to understand the potential for revenue benefit from ancillary services in order to fully reflect the real value of wind energy.

Costs

- q Investment Cost: The influence of supply and demand on costs needs to be scrutinised and supply chain bottlenecks shall be identified. Once identified, improvements can be proposed, such as further standardisation of components and centralisation of manufacturing effort to reduce costs.
- q Operational costs: Operational costs account for a significant portion of the overall lifetime costs, impacting competitiveness. Research should be carried out to better understand all O&M costs, including areas of potential reduction for offshore costs.

The market will benefit from increased access to maintenance and services companies. Education and employment policy should take into account the likely short term insufficiencies in third party O&M services in a cost competitive manner.

- q Cost of Capital: Reducing the exposure to risk will in turn reduce the cost of capital. The related cost drivers are mentioned through the other working group recommendations; however, review of the sensitivity of different risk categories will allow efforts to be focused.

Grid

- q Wind energy must be manageable for the network operators. At project scale, cost reductions shall be performed through grid access harmonisation.
- q Access will be fair and eased and policy must reflect this objective.
- q New infrastructure will be required to facilitate large scale wind deployment, supported through policy measures. An optimal way to finance capital improvements and upgrades for grid access projects shall be assessed.
- q For offshore, location strategies shall be studied to determine the optimum approach to large scale offshore grid connections.
- q Continued analysis is needed on large penetration levels of wind energy and the consequences in terms of costs and benefits for the system as a whole.

Trading

- q Sophisticated trading structures have not fully developed in the wind market. Analysis is needed of the potential for complimentary trading mechanisms (e.g. derivatives) for wind power.
- q As a complement, pricing efficiency shall be improved through enhanced wind forecasting tools. The market requirements for forecasts need to be understood to feed into the development of forecasting methods.
- q Analysis is needed on how different electricity market structures will affect the ability of wind energy to be sold in the market.
- q Market regulation should be adapted to provide suitable gate closure times.

Minutes of WG6 meeting n°1

Attendees

Arthouros Zervos	NTUA (Chairman)
Claudia Grotz	German Wind Energy Association
Tony Adam	Nordex Aktiengesellschaft
Conall Bolger	Airtricity
Martin Berkenkamp	GE Wind
Albert Jansen	SenterNovem
Christian Lanfranconi	Renewable Energy Oriducers Association (REPA)
Steffen Nielsen	Danish Energy Authority
Rosa Andersen	Danish Wind Industry Association
Dimitrios Kanellopoulos	Public Power Cooperation (utility)
Miguel Ferreira	Megajoule
Gabriela Dinubguez	Gamesa
Frauke Theis	Greenpeace
Geert Palmers	3E

Absentees

Steffen Andersen	Dong energy
Lars Bach Jensen	Vestas Wind Systems A/S
Christian Dahlke	Federal Maritime and Hydrographic Agency
Isachsen Oyvind	NORWEA
Debra Justus	International Energy Agency
Anna Stanford	Renewable Energy Systems Ltd

1. Selection of Vice-chairman

Candidates for vice-chairman: Claudia Grotz, Martin Berkenkamp; Rosa Andersen; Geert Palmers; Tony Adam. **Geert Palmers** and **Rosa Andersen** voted as vice chairman (closed vote).

2. Personal Expectations for the MDS

- Discussion about the role of the group and specifically trying to identify what is the unique remit of this group and distinguished from other groups. It was agreed that unique elements of this group are environment and administration. The policy element within the scope of this group is also evident within the other groups and also does not have such a clear R&D element. The outline format for the minutes and the MDS does not match well with the remit of this group.
- Discussed what R&D 'means' in the context of this group. R&D could mean knowledge sharing, communities of practice, or common practice (e.g. SEA of offshore wind energy in the North Sea).
- Questioned what is common to Europe and what are country-specific issues - although noted that EWEA is investigating this (funded by EC – sending out surveys to each country). Bringing the work done at the European level into each individual country is also the role of the Mirror Group.
- Steffen Nielsen from the Danish Energy Authority gave a presentation on his personal expectations for the MDS. Steffen gave a helpful background to the Berlin Strategy which identified the need for collaboartive projects to test

cumulative impact assessment methodologies. Note that the UK is hosting an international conference on update knowledge on EIA. Germany is researching radar impacts. Steffen discussed the aspiration for a maintained central database of environmental data (or bridging communication between databases in different countries). Steffen noted that there is a European Commission paper on "Guidelines on Wind Energy and Nature Conservation" – this is not completed and another member of the group understands that this is on hold through a lack of resources.

- Discussed how to create (through policy) the conditions needed for private investors to invest in R&D in wind and so to collaborate. Noted that we should not only be looking to manufacturers to invest in R&D – should also look to suppliers and smaller companies. We need to create the secure conditions needed for smaller suppliers to invest.
- Mismatch between grid, resources and administration. Discussed supporting Wind Energy Zones in Europe – where the grid will be developed and where public objection will be minimized.
- Public awareness and grid issues are common issues across Europe and fall within the remit of this group. These are critical issues in many countries.
- **ACTION - All members of the group to send references to related work to the Secretariat. Secretariat to investigate if references can be put on a website that can be visited by members of the group.**

3. Interrelationship with other Working Groups

- WG2 – they will develop the system of the future (e.g. 7 MW machines) and they will have extreme public acceptance issues (noise and visual).
- WG5 – ask what is their vision for 2030 so that we can discuss what we can do to support their market visions.

4. Specific comments on the draft MDS

- Suggestion to refine text in 1.3.2.2.1.1 of key policy areas – to take out some references to markets.
- Public acceptance should be added to the scope of WG6. Support mechanisms should be the work of WG5. Administration should be in the scope of WG6.

5. Elements to build the MDS

The group worked on carefully worded objectives for 2030 and, for some of these objectives, identified key areas for progress. Comments made throughout the discussions under the remaining topics are also noted here.

Objective 1 - In 2030, wind will be the largest contributor to electricity supply in the union providing one quarter of electricity.

Key areas -

- Creation of a framework for strategic planning for onshore and offshore
- Stakeholders and public and administration should come together to plan / identify specific areas for wind energy developments.

Also discussed under this topic:

- May be of particular importance for offshore wind where there are strong conflicts of interest (fisheries, oil companies etc, e.g. in North Sea).
- Albert Jansen noted that there is a map of activities in the North Sea but none of the 'free' areas were developed as wind power because of conflicting interests.

Objective 2 - A European-wide electricity market based on decentralized and strongly inter-connected grid infrastructure and technologies that allow for the full integration of wind.

Key areas -

- Heavy amount of inter-connection between countries
- Markets will need to be aligned.
- The market and the infrastructure (grid and policy) to support physical trading.
- Need all system operators to cooperate.

Also discussed under this topic:

- An interconnector between Germany, UK, Netherlands is being discussed. (Note cross-reference to smart grid and to demand-side management discussed in other groups).
- Ensure markets are aligned and harmonized (question on need for market harmonization – not required if market is not supported in 2030).
- Do we need a framework for an operational market?

Objective 3 - Wind power is no longer an incentive-driven energy source. On the contrary, by its volume and value it will reduce price volatility and the cost of electricity.

Key areas -

- No key areas identified under this topic.

Also discussed under this topic:

- Decided not to introduce objective of competitiveness of wind energy

Objective 4 - The European wind sector is the global centre of excellence, driving innovation and creating large numbers of attractive jobs.

Key areas -

- Training and education in wind technologies.

Also discussed under this topic:

- Opportunity for collaboration with universities and schools. (Note the European Institute for Energy is considering education and training).
- Harmonization of the rules under which the work force functions and the standards by which people work across Europe. (Note not a wind-specific issue).

Objective 5- The public strongly supports wind energy developments. Wind energy is perceived as an element of European identity.

Key areas -

- Noise - technological development can reduce noise levels
- Visual Impact – landscape design, guidelines
- Public acceptance – awareness of benefits, involvement of local communities

Also discussed under this topic:

- Aspiration that wind turbines are perceived as a positive part of the landscape, as the traditional wind mills were considered a part of the landscape. Discussion of how wind turbines can be seen in the future as part of the landscape heritage.
- Need a better understanding of how wind turbines can better integrate into the landscape. [Note there is some existing research on landscape architecture and wind turbines].
- Possibility of giving communities economic benefits of wind farms developed locally.

Objective 6 - Administrative procedures are no longer an obstacle to development; they are coordinated, stream-lined and efficient.

Key areas -

- No key areas identified under this topic.

Also discussed under this topic:

- Administrative procedures include EIAs, planning applications for wind farms and for grid expansions, permits.

Objective 7 - Wind power is optimally integrated into the natural environment. Informed decisions and planning ensure minimal impact on the local environment.

Key areas -

- Better understanding of cumulative impacts of off-shore and on-shore.
- Information sharing (monitoring data)
- Spatial planning

Also discussed under this topic:

- Wind energy can have a positive impact on the environment (e.g. birds nesting near wind farms in Ireland) - do these positive impacts need to be researched, 'advertised', maximised?
- Impacts on flora and fauna and birds will require more than 30 years of monitoring / research to understand [Noted that research is going on to see if colouring turbines will reduce impacts on birds; also note research that was funded by European Commission to prepare "Guidelines on Wind Energy and Nature Conservation" - this is on hold at the moment because of lack of resources].
- Need for guidance on how decision makers balance various impacts - climate protection should be given equal weight to nature conservation?

WG6 - Wind Policy and Environment

Arthouros Zervos

8/5/2008

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Vision/Objectives and key areas

- In 2030, wind will be the largest contributor to electricity supply in the union providing one quarter of electricity.
 - § Creation of a framework for strategic planning for onshore and offshore
 - § Stakeholders and public and administration should come together to plan / identify specific areas for wind energy developments.

Vision/Objectives and key areas

- A European-wide electricity market based on decentralized and strongly inter-connected grid infrastructure and technologies that allow for the full integration of wind.
 - § Heavy amount of inter-connection between countries
 - § markets are aligned.
 - § The market and the infrastructure (grid and policy) to support physical trading.
 - § Need all system operators to cooperate.

Vision/Objectives and key areas

- q Wind power is no longer an incentive-driven energy source. On the contrary, by its volume and value it will reduce price volatility and the cost of electricity.

- q The European wind sector is the global centre of excellence, driving innovation and creating large numbers of attractive jobs.
 - § Training and education in wind technologies.

Vision/Objectives and key areas

- The public strongly supports wind energy developments. Wind energy is perceived as an element of European identity.
 - § Noise - technological development can reduce noise levels
 - § Visual Impact – landscape design
 - § Public acceptance – awareness of benefits, involvement of local communities

- Administrative procedures are no longer an obstacle to development; they are coordinated, stream-lined and efficient.

Vision/Objectives and key areas

- Wind power is optimally integrated into the natural environment. Informed decisions and planning ensure minimal impact on the local environment.
 - § Better understanding of cumulative impacts of off-shore and on-shore.
 - § Information sharing (monitoring data)
 - § Spatial planning

Interactions with other Working Groups

- § Public acceptance for large machines (WG2)
- § Grid issues (WG3)
- § Specific offshore issues (WG4)
- § Payment mechanisms (WG5)

Minutes of WG6 meeting n°2

WG 6 Policy and Environment

Geert Palmers - Vice-chairman
Rosa Klitgaard - Vice-chairman
Arthouros Zervos - Chairman

Members of WG6

- q T. Adam
- q S. Andersen
- q R. Klitgaard
- q L. Bach Jensen
- q M. Berkenkamp
- q C. Borlger
- q C. Dahlke
- q G. Dominiguez
- q M. Ferreira
- q A. Friedrich
- q C. Grotz
- q Ø. Isachsen
- q A. Jansen
- q D. Justus
- q D. Kanellopoulos
- q C. Lanfranconi
- q S. Nielsen
- q G. Palmers
- q A. Stanford
- q F. Thies

Structure of the working document

- q 7 objectives
- q Policy and research recommendations

Objectives

The overall objective of the policy vision of WG6 is that:

- q In 2030, wind will be the largest contributor to electricity supply in the union providing one quarter of electricity.

Objectives & research recommendations: EU-GRID

- A European-wide electricity market based strongly inter-connected grid infrastructure and technologies that allow for the full integration of wind.

Research recommendations (coordination WG3)

§ Roadmap for LT development for European-wide grid network:

- Identification of priority grid investments and timeline
- Financing models for LT grid development
- Political/programme wise optimal support requirement
- Matching investments with LT optimal spatial planning

Objectives & research recommendations: VALUE

- Wind power is no longer an incentive-driven energy source. On the contrary, by its volume and value it will reduce price volatility and the cost of electricity.

Research recommendations:

- § Research into how to establish a level-playing field for all energy technologies (e. g. implementation of the polluter-pays principle in electricity generation.)
- § Research into the impact of wind energy on the stability of energy prices.

Objectives & research recommendations: EU EXCELLENCY

- The European wind sector is the global centre of excellence, driving innovation and creating large numbers of attractive jobs.

Research recommendations:

- § Research into the range of skills needed in industry & how to gear educational system to meet needs.
- § Research into benefits of wind energy development in terms of creation of local / regional jobs; local economic benefit.

Objectives & research recommendations: PUBLIC

- The public strongly supports wind energy developments. Wind energy is perceived as an element of European identity.

Research recommendations:

- § Research at the European and member state level into the motivation behind local concerns.
- § Annual survey of public opinion towards wind farms.
- § Research into community benefit schemes
- § Development of communications strategies to respond with common myths relating to wind energy.

Objectives & research recommendations: PROCEDURES

- Administrative procedures are no longer a major obstacle to development on medium term ;

Research recommendations:

- § Development of (a centralized) and coordinated best practices administrative practice – e.g. ‘One Stop Shop’.
- § Pro-active and LT oriented identification of appropriate areas for wind energy development and involvement of stakeholders, the public and administration – avoiding delays due to lawsuits
- § Research on optimal solutions (inc planning procedures, licenses, financing) for repowering WFs in Europe

Objectives and research recommendations: NATURE

- Wind power is optimally integrated into the natural environment. Informed decisions and planning ensure minimal impact on the local environment.

Research recommendations:

- § Recommended EIA format & research on utilization of findings of post-operational monitoring to refine scope of further EIAs.
- § A centralized source of standardized data on environmental baseline and impacts of wind farm development
- § Research into/development of guidelines / tools to assess cumulative impacts and thresholds of impacts

The working process

- q Finalize the policy recommendations
- q Coordinate WG6 recommendations with other working groups (especially WG3 'grid planning & operation, WG4 'offshore')
- q Working Group meeting at EWEC 2008