



WORLD WIND ENERGY ASSOCIATION

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**SUSTAINABILITY AND  
DUE DILIGENCE GUIDELINES**

DRAFT JULY 2004



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## 1 INTRODUCTION

Access to modern energy services is a basic prerequisite for human development and prosperity. However, nearly one-third of the world's population has no access to electricity yet and is therefore excluded from elementary development opportunities.

At the same time as energy demand is projected to grow, climate change is becoming the world's most pressing environmental problem. The third International panel on Climate Change (IPCC) report concluded "human activities have increased the atmospheric concentration of greenhouse gases since the pre-industrial era, leading to global warming". Indeed the Intergovernmental Panel on Climate Change (IPCC) has called for cuts in CO<sub>2</sub> emissions of between 60-70% by the end of the 21st Century.

Fossil and nuclear resources are also facing significant constraints and even depletion within the next decades. This will lead to serious problems for many countries to secure their energy supply based on these resources. The production of fossil oil may even be peaking within a short time-span while demand will continue to increase.

This clearly suggests that current patterns of energy supply and demand are unsustainable. We are living beyond environmental limits and the root cause is primarily mankind's ever-increasing demand for energy – energy supplied in the main from the burning of fossil fuels such as oil, gas and coal – and of uranium.

This seems to present a dichotomy. On the one hand there is a need to increase the availability of energy to cut poverty and facilitate economic activity. On the other increases in CO<sub>2</sub> emissions are leading to climate change and the manifold

risks of nuclear power are threatening mankind. Against this background, non-depleting renewable energy resources, such as wind, have a vital role to play. In the long run, the global energy system can only work when completely based on renewable resources. To achieve this goal, the consequent shift towards renewable energies has to be started immediately.

The World Summit on Sustainable Development (WSSD) in Johannesburg in September 2002 noted that "with a sense of urgency, (there is a need to) substantially increase the global share of renewable energy resources with the objective of increasing its contribution to total energy supplies."

The International Conference for Renewable Energies in Bonn (June 2004) stated that "renewable energies combined with enhanced energy efficiency, can significantly contribute to sustainable development, to providing access to energy, especially for the poor, to mitigating greenhouse gas emissions, reducing harmful air pollutants, thereby creating new economic opportunities, and enhancing energy security through cooperation and collaboration..... Ministers and Government Representatives..... reaffirm their commitment to substantially increase with a sense of urgency the global share of renewable energy in the total energy supply. They share the vision that renewable energies, combined with increased energy efficiency, will become a most important and widely available source of energy and will offer new opportunities for cooperation among all countries."

In the long-term only a 100 % renewable energy supply, when following certain rules, will be able to provide all human beings with sufficient energy in a sustainable way.



## 1.1 Purpose of these guidelines

The World Wind Energy Association (WWEA) has produced these guidelines to promote greater consideration of environmental, social and economic aspects in the sustainability assessment of new wind projects. The guidelines are also relevant to the management and operation of existing wind power schemes. Thorough sustainability assessments should ensure that detrimental social and environmental impacts are avoided, mitigated or compensated. Of necessity, the principles articulated in these guidelines are generic since each project will have its own unique set of circumstances influenced by scale, geographic location, social, legal and political constructs. The guidelines will need to be adapted to the specific context of each particular project.

The principles outlined in this document span the following six elements. Supporting comment provides further guidance where necessary:

- WWEA Policy
- The role of governments and regulatory frameworks
- Options evaluation and risk assessment
- Managing environmental outcomes
- Managing social outcomes
- Managing economic outcomes

The principles have been drafted to assist wind power developers and operators with the evaluation and management of often competing environmental, social and economic issues that arise in the assessment, operation and management of wind power projects.

## 2 WWEA POLICY

### 2.1 Commitment to sustainable development

The WWEA regards sustainable development as a fundamental component of social responsibility and participation, sound business practice and natural resource management.

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Report of the World Commission on Environment and Development, 1987). Sustainable development requires the integration of three components – economic development, social development and environmental protection – as interdependent, mutually reinforcing pillars. Eradicating poverty, changing unsustainable patterns of production and consumption, and protecting and managing the natural resource base underpinning economic and social development are overarching objectives of, and essential requirements for a sustainable future. Renewable energies, by definition, fulfil the sustainability criteria and will therefore deliver indispensable contributions to sustainable development.

WWEA recognises that sustainable development is the collective responsibility of government, business, civil society, consumers and individuals. It is committed to working cooperatively with these sectors in achieving sustainable outcomes.

## 3 THE ROLE OF GOVERNMENTS AND REGULATORY FRAMEWORKS

### 3.1 Governments and sustainability

Good governance within each country, and at the international level, is an essential prerequisite for sustainable development. The World Summit on Sustainable Development Implementation Plan (2002) listed some key sustainability criteria. These include:

- sound environmental, social and economic policies,
- democratic institutions responsive to the needs of people,
- the rule of law,
- anti-corruption measures,
- gender equity and
- an enabling environment for investment.

Governments that establish and maintain sound environmental, social and economic policies create a foundational basis for the pursuit of sustainability. It is from this position - where clear and strong sustainability goals are identified - that governments can clearly establish the appropriate regulatory frameworks.

### 3.2 National and regional energy policies

A national energy policy is the responsibility of Government and should reflect a commitment to achieving sustainability goals and maintaining a strong dedication to the pursuit of renewable energy resources, based on best-practise experiences.

The WWEA encourages countries to have in place national and/or regional energy policies prioritizing renewable energies. Each jurisdiction should clearly set out its renewable energy development strategy so that the rules are known to all and arbitrary decisions are minimised. Basic requirements of renewable energy development and economics

have to be regarded, like the provision of sufficient investment security. Clear national and/or regional policies established by governments contribute to the development of sound guidelines and frameworks that enable both government and industry to work together to achieve collective aims and encourages sustainable growth in energy resources.

### 3.3 Options assessment

National and/or regional energy policies should include a Strategic Assessment process. A Strategic Assessment should incorporate assessment of cumulative impacts, the determination of marine and land use effects and environmental priorities, as well as goals for economic growth. The policies should be framed in the context of the global need to reduce greenhouse gas emissions, to secure domestic energy supply, to increase public and social participation and to promote therefore the uptake of clean renewable energy options. They should also incorporate the three elements of sustainability -- economic, social and environmental -- in energy planning.

A Strategic Assessment process allows the high level identification of environmental, social and economic concerns and the resolution of competing needs. This process is a mechanism by which sustainable development and global trends concerning environmental goals can be reconciled with the management and conservation of natural resources. It should be a participatory, streamlined process, focused on major issues, using common sense and readily available information, and with short and definite time limits for its completion. A comprehensive Strategic Assessment process applied by governments ensures that the best energy solutions are formulated and implemented for regions based on a 'best fit' energy policy, including a timeframe for the implementation of a 100% renewable energy scenario.



One of the potential benefits of going through a Strategic Assessment process is to reduce uncertainty for developers of wind energy projects by prioritizing energy supply options and preferences. Likewise, a Strategic Assessment process should help to define those land or offshore areas that are available for development and those that are off-limits. These may encompass, for example, areas of outstanding natural beauty, reserves or other areas of conservation significance. An adjunct to the Strategic Assessment process is for Governments to provide guidance on which social costs are to be borne by the developer and which are a government responsibility. Project critics sometimes confuse the roles of the developer and those in government determining the policy and development agenda.

### **3.4 Promoting wind power in energy production**

Greenhouse gas emissions have to be considered by governments in energy policy planning. There is no longer any reasonable doubt that greenhouse gas emissions are playing a key role in the increase, and acceleration, of global warming.

Against this background a continuing escalation in fossil fuel use will only make global warming worse. There is a growing international effort therefore to find alternative solutions that are in principle emission-free, but at the same time meet the energy needs of the developed and developing world.

Development of renewable energy resources is an essential part of the solution to this problem. In this context wind powered energy generation has a fundamental role to play. Use of wind for electricity generation is essentially a non-consumptive use of a natural resource. It also produces zero greenhouse gas emissions, a feature that compares favourably when contrasted with alternative methods of electricity generation.

Wind energy generation has a minimal environmental impact, and as a direct result energy policies formulated by governments need to reflect the wholesale benefit of wind energy in the pursuit of lower carbon emissions as well as increased economic, social and environmental sustainability. Government policies and frameworks need to reflect the positive benefits that wind energy resources have on environmental, social and economic sustainability. Regulations need to be structured to promote the uptake of renewable energy projects on land and offshore, and to establish a variety of ownership models including pay-for-itself solutions and equal and fair access to market conditions.

## **4 options evaluation and risk assessment**

### **4.1 Evaluation of alternative energy options**

WWEA believes that broad energy option assessment should be the responsibility of national and/or regional governments as part of their energy development and greenhouse planning strategy.

Governments and project proponents should apply sustainability criteria when comparing project alternatives in order to focus on options that maximise environmental, social and economic benefits and, conversely, eliminate unacceptable alternatives early in the planning process.

Each option is different and it is not always possible to directly compare one alternative with another. It is nevertheless important that relevant comparisons are made in relation to the basic sustainability of a project. This should also include the considerable benefits of integration with other renewable energy forms and storage systems. It should also be realized that an infinite variety of options is never available and fundamental factors such as resource availability and scale of requirements define the possible options that need to be assessed.

The sustainability of an option is relevant to the environmental assessment and regulatory approval processes. Proponents need to demonstrate that their recommended option is sustainable and of net benefit to the community. To facilitate this, early engagement with relevant stakeholders on the comparative benefits of feasible options is recommended.

**Table 1 below describes sustainability aspects in assessing new energy projects.**

**Table 1 Sustainability aspects in assessing new energy projects**

SUSTAINABILITY ASPECTS	CONSIDERATIONS
<p><b>1. Demonstrated need for the project.</b></p>	<p>Assessments should be carried out by regulatory authorities (preferably as part of a Strategic Assessment process) or the proponent to demonstrate a need for the project.</p> <p>These assessments should include:</p> <ul style="list-style-type: none"> <li>• Evidence of likely future energy requirements</li> <li>• Evaluation of a range of alternative energy options (including practicable efficiency measures) to meet those requirements, and</li> <li>• Evidence that the project is the best option to meet those requirements.</li> </ul>
<p><b>2. Economic viability and planned monitoring of economic performance.</b></p>	<p>A high confidence of economic viability should be demonstrated by a detailed cost-benefit analysis. Plans should also be in place for ongoing monitoring of economic performance.</p> <p>The economic viability of each option needs to be considered over the projected life of the facility. Issues such as refurbishment and decommissioning need to be considered when comparing options. Wind turbines have relatively low decommissioning/rehabilitation costs when compared with other power generation options.</p>
<p><b>3. Availability and cost of resources over the projected life of the facility.</b></p>	<p>The availability and cost of fossil fuels may change over the operating life of a power station with availability decreasing and cost increasing. The reliability of the wind resource is a fundamental consideration for wind power options.</p>



<p><b>4. Appropriateness of the technology, levels of efficiency and service required.</b></p>	<p>Projects should use appropriate and proven technology to maximise the benefits to be derived from use of a resource. Comparisons should be made on the efficiency of conversion and the flexibility and reliability of the product provided. The comparison should take account of the level of service required (e.g., some electric systems may require peak load capacity while others may seek stable base load).</p> <p>Wind power projects generally need to be integrated into larger power systems. The intermittent nature of the wind resource often requires support from other types of generation or the integration in combined local energy supply structures. Technological advances are allowing an increasing contribution by wind power into electricity systems.</p>
<p><b>5. Energy payback ratio.</b></p>	<p>Energy payback ratio compares the energy produced during the normal lifespan of a power plant with the energy required to build, maintain, and fuel the generating equipment. A high energy payback ratio is preferred over a low one.</p>
<p><b>6. Distribution and sustainability of economic benefits.</b></p>	<p>The project should provide economic benefits across the local affected community and broader region. Plans should also be in place to monitor the future distribution and sustainability of economic benefits.</p>
<p><b>7. Additional or multiple use benefits.</b></p>	<p>Wind projects can provide benefits to the local community like additional income for farmers, local owner cooperatives and municipalities, upgrading transmission lines to improve reliability of service or increased tourism.</p>
<p><b>8. Poverty reduction through flow on benefits to local communities via employment, skills development, investment opportunities and technology transfer.</b></p>	<p>Many energy development projects provide new income through local ownership and generate jobs for the local population. These include direct and indirect employment opportunities, both during construction and for the life of the project, as well as expansion of the local skills base, capacity building, investment opportunities and the benefits of technology transfer.</p>
<p><b>9. Maximise opportunities and benefits for, and not posing significant unsolvable threats to, vulnerable social groups.</b></p>	<p>In general terms, wind projects do not pose significant threats to vulnerable social groups. However, any threats and opportunities need to be identified. Opportunities for local involvement need to be maximised, and projects that present significant threats to vulnerable social groups should be avoided if the threats cannot be mitigated.</p>



<b>10. Community support and/or lack of community opposition.</b>	<p>Wind projects with full or partly local ownership will more easily obtain local acceptance; projects that have local community support should be favoured over those that have widespread opposition.</p>
<b>11. Safety issues and hazards.</b>	<p>Safety issues and hazards should be identified and the risks (likelihood and consequences) evaluated. Management measures should be planned to reduce or eliminate risks.</p>
<b>12. Environmental impact assessment.</b>	<p>An environmental impact assessment needs to be undertaken for the project and it should:</p> <ul style="list-style-type: none"> <li>• thoroughly identify relevant issues</li> <li>• include appropriate levels of stakeholder consultation, and</li> <li>• recommend effective and community and regulator-supported mitigation strategies and/or compensation measures.</li> </ul>
<b>13. Carbon intensity and greenhouse gas emissions.</b>	<p>In general terms wind power schemes and other renewable energy projects have low carbon intensity and low levels of greenhouse gas emissions. This compares, for example, with coal-fired systems that emit approximately 1000 tonnes of CO<sub>2</sub> per GWh produced.</p>
<b>14. Waste products (emissions or discharges to air, water and land).</b>	<p>Waste products are a major sustainability issue for fossil fuel and nuclear projects. Air emissions can extend the environmental footprint of some fossil fuel projects across national borders via acid rain. Negative health effects can also result from particulate and other emissions to air. Disposal of waste to tailings dams and radio-active waste repositories represents an inter-generational transfer of cost and environmental liability.</p>
<b>15. Extent of land or marine area affected (environmental footprint) and associated aquatic and terrestrial ecological impact.</b>	<p>The relatively dilute nature of renewable resources often means that these types of projects can have a large environmental footprint per unit of energy produced. Projects that are spread over large areas often have limited or easily mitigated environmental effects. Wind farms, for example, have limited impact on other land and marine use activities.</p> <p>Some fossil fuel-based projects can have a very large footprint, for example, the area affected by air emissions.</p> <p>The impact of the environmental footprint needs to be assessed in relation to the associated aquatic and terrestrial ecological impacts and the degree to which they can be mitigated and/or compensated.</p>

<p><b>16. Avoidance of exceptional natural and human heritage sites.</b></p>	<p>Developers should make every effort to avoid, or reduce to a minimum, alterations to ecological, cultural or heritage sites of exceptional national and international value.</p>
<p><b>17. Level of impacts on rare, vulnerable or threatened species, maximising habitat restoration and protecting high quality habitats.</b></p>	<p>Potential impacts on rare, vulnerable or threatened species should be carefully assessed as part of the decision-making process. Consideration of the creation of alternative habitats or the protection of adjacent areas should be considered as part of any mitigation program. Habitats are of varying quality and priority should be given to protecting or restoring higher quality habitats.</p> <p>Significant damage to areas of high conservation value (including critical habitat for endangered species) should be avoided when adequate mitigation or compensation is not feasible.</p>
<p><b>18. Environmental management plans.</b></p>	<p>For new projects, evidence should be available of effective planning for management of environmental issues during construction and operation.</p>
<p><b>19. Environmental management system.</b></p>	<p>New projects should have plans in place for the implementation of a comprehensive and effective environmental management system. The plans should preferably include an intention to certify the system to an international standard, (e.g. ISO 14001).</p>
<p><b>20. Regulatory compliance.</b></p>	<p>All relevant regulatory compliance issues should have been identified. Plans should be in place, as part of overall or specific management systems, to measure and report on compliance with these regulatory requirements.</p>

## 4.2 Due diligence assessment of on-shore and off-shore wind energy systems

A due diligence review is an instrument to measure risk. It is usually performed as part of a decision on an investment in projects and can cover a broad range of risks. It is recommended that due diligence assessments be carried out on sustainability aspects of new and operating power systems prior to investment decisions.

A due diligence review involves risk assessment. Tables 2, 3, and 4 below give risk ratings in terms of likelihood and consequence. Where risk ratings are medium or high, measures are required to ensure reduction or effective management of risk.

**Table 2 – Likelihood**

Level	Descriptor	Description
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Moderate	Might occur at some time
D	Unlikely	Could occur at some time
E	Very rare	May occur only in very exceptional circumstances

**Table 3 – Consequence or Impact**

Level	Descriptor	Examples
1	Insignificant	Very minor environmental impact, e.g., occasional bird strike of abundant and non-threatened species
2	Minor	Minor environmental impact, e.g., on-site release of materials, contained with moderate clean-up costs
3	Moderate	Medium level environmental impact requiring ongoing management or expensive modification of equipment
4	Major	Major environmental incident, high financial loss, high probability of prosecution
5	Catastrophic	Major environmental incident of national or even global significance, very high and long-term remediation costs

**Table 4 – Level of Risk**

Likelihood		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Level		1	2	3	4	5
A	Almost certain	Low	High	High	High	High
B	Likely	Low	Medium	High	High	High
C	Moderate	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	High	High
E	Very rare	Low	Low	Low	High	High



Table 5 details the main risk scenarios for a wind power project. In any due diligence exercise, these scenarios and associated management strategies should be risk assessed in accordance with the process outlined in Tables 2, 3, and 4.

**Table 5 – Sustainability due diligence checklist**

<b>Relevant Issues</b>	<b>Risk Scenarios</b>	<b>Management Strategies</b>
<b>1. Regulatory environment</b>	Absence of clear Strategic Assessments	Proponent carries out some level of baseline research.
	Seriously deficient or overly complex environmental legislation	Early agreement with regulators on rules that apply to the project.
	Lack of understanding of regulatory requirements	Process to identify all relevant regulatory compliance issues. Planning for measurement and reporting on compliance with these regulatory requirements.
<b>2. Economic viability of the project</b>	Inadequate or poor business case	Ensure thorough cost-benefit analysis and plans in place for ongoing monitoring of economic performance.
<b>3. Economic impact on other existing or proposed land or marine uses near the site of the project</b>	Unacceptable detrimental impact on other permitted uses	Identification and understanding of economic impacts on other uses. Negotiation and payment of compensation where applicable.
<b>4. Community and stakeholder support for the project</b>	Community opposition or loss of support for the project	Comprehensive stakeholder consultation and participation process.
<b>5. Safety issues and hazards</b>	Unacceptable levels of worker or community safety	Thorough analysis of safety and hazard issues. Appropriate management and mitigation strategies planned or in place.
	Noncompliance with air traffic safety regulations	Compliance with statutory, administrative, or contractual obligations concerning air traffic safety issues.
<b>6. Environmental impact assessment</b>	Inadequate environmental impact assessment	Assessment should <ul style="list-style-type: none"> <li>• thoroughly identify relevant issues</li> <li>• include appropriate levels of stakeholder consultation, and</li> <li>• recommend effective and community and regulator-supported mitigation strategies and/or compensation measures</li> </ul>

Relevant	Risk Scenarios	Management Strategies
<b>7 Degree of environmental and social impacts</b>	Unacceptable impacts to exceptional natural and/or human heritage sites	Avoidance, or reduction to a minimum, of alterations to ecological, cultural or heritage sites of exceptional national and international value.
	Limited opportunities and/or unacceptable threats to vulnerable social groups	Where project proposes threats to vulnerable social groups, plans are in place for appropriate social and cultural enhancement programs that will result in improved conditions for those groups.
	Broad environmental footprint with significant aquatic and/or terrestrial ecological impacts	<p>Adequate assessment of potential impacts and appropriate use of avoidance, mitigation, or compensation strategies.</p> <p>Windfarms can be spread over large areas, but usually have limited impact on other land and marine use.</p>
	<p>Project threatens rare, endangered, or migratory species, eg, bird species</p> <p>Other rare, threatened or endangered species issues also need to be assessed, for example, rare plants, marine mammals, fish or seagrass beds</p>	<p>Location away from critical habitat areas, and/or adequate risk modelling to identify level of potential threat to rare or endangered bird species.</p> <p>Targeted management plans need to be developed for species of conservation significance.</p> <p>Translocations or habitat rehabilitation may be options, along with identification of suitable habitat for ‘reserve’ management</p> <p>Monitoring should be conducted at regular intervals and form part of permit/licence conditions.</p>



Relevant Issues	Risk Scenarios	Management Strategies
	<p>Community complaints or regulatory opposition to project because of noise from power project infrastructure or construction activities.</p> <p>These complaints may relate to noise characteristics, (eg, volume and intensity), as well as duration, time, and place</p>	<p>An issue that needs to be thoroughly addressed, particularly when windfarm projects are sited near populated areas.</p> <p>Ensure the project complies with relevant regulatory standards</p> <p>Other mitigation strategies could include review of siting options and choice of turbines.</p> <p>Prior to construction a noise impact assessment can be conducted to model noise output from the wind farm based on a nominal turbine layout and information about prevailing background sound. This data can be used to generate an acceptable attenuation distance from noise generating infrastructure and dwellings. A noise buffer zone can protect affected property and can be designed to conform with relevant national and international standards. Mechanical tonal noise from modern wind turbines has been reduced to low levels.</p>
	<p>Unacceptable visual impacts in sensitive landscapes/seascapes</p>	<p>A more significant issue when project is close to populated areas or sited in areas with high scenic or recreational value. Mitigation measures are limited, but can include wind farm layout, and colour and structure of turbines.</p> <p>Good community consultation and participation, with appropriate representations of the future appearance of the windfarm, is often effective. Avoidance of areas with high scenic or recreational value is generally required.</p> <p>Construction of visitor interpretation facilities may add to public acceptance in locations where there are opportunities to build on the visitor experience through local tourism.</p>

Relevant Issues	Risk Scenarios	Management Strategies
	<p>Communications interference from wind farms may be a concern for defence, aircraft, telecommunications and radar installations, and can take several forms. Interference may also extend to impacts on television services.</p>	<p>Communications interference is more likely to be a problem if metallic wind turbine blades are used.</p> <p>The appropriate management strategies are stakeholder consultation and compliance with relevant guidelines.</p>
<p><b>8 Associated infrastructure</b></p>	<p>Inadequate assessment of, or unacceptable social and/or environmental impacts resulting from associated infrastructure, such as powerlines or roads.</p>	<p>Adequate environmental and social impact assessment for associated infrastructure.</p> <p>Effective avoidance, mitigation, or compensation.</p>
<p><b>9 Environmental management plans</b></p>	<p>Inadequate environmental management plans.</p>	<p>Planning for, or implementation of, effective environmental management plans during the construction and operational phases of the project.</p> <p>Management plans should include procedures for dealing with hazardous materials and waste.</p> <p>Storage handling, use and disposal of all materials should conform to relevant industry standards.</p> <p>Any chemicals or oils should be registered for offshore use, for example under the UK's Offshore Chemicals Notification Scheme.</p> <p>An emergency response plan should be developed, and staff training undertaken.</p> <p>Management plans need to deal with marine construction issues. These plans should address sediment dispersion and noise/vibration, which can impact on fish and mammal species. Bubble walls and other strategies may need to be implemented to minimise dispersion of acoustic vibrations through the water column.</p>
<p><b>10 Environmental management system</b></p>	<p>Inadequate environmental management system.</p>	<p>Planning for, or implementation of, an effective environmental management system. Ideally, the system should be certified to a relevant international standard, eg, ISO 14001.</p>



#### 4.2.1 Legal & institutional arrangements

A fundamental aspect of managing risk associated with wind power scheme is to have processes in place that ensure compliance with all relevant laws, policies, permits, agreements and codes of practice.

These may include, but are not limited to:

- Electricity supply industry legislation;
- Environment protection legislation and associated regulatory standards and permits;
- Conservation and threatened species legislation;
- Cultural heritage and indigenous rights legislation;
- Coastal protection legislation;
- Occupational health and safety legislation;
- National, regional and local government policies;
- Corporate law requiring financial and environmental reporting;
- Relevant international laws, conventions and protocols; and
- Voluntary commitments and signed agreements.

Wind power operators should undertake an analysis of legal risks with the aim of developing appropriate response strategies, identifying activities that need to be managed, and determining priorities.

Investors in major long-term projects such as wind power developments need a reasonable degree of certainty regarding the on-going viability of their investments. Adjustments to operations may be required as new information becomes available and the results of monitoring programs are assessed. If governments introduce new environmental or resource usage objectives they should consider the impacts on the economic viability of wind power schemes, as well as other economic and social implications, and compensate accordingly.

## 5 managing environmental outcomes

### 5.1 Optimising environmental outcomes for wind power schemes

Windfarms can have a number of environmental impacts that need to be identified early and avoided, mitigated, or compensated. Effective environmental management over the life of the windfarm should ensure sustainable operation of the facility. Crucial in this process is the effectiveness of the initial environmental impact assessment.

#### 5.1.1 Environmental assessment (EA) principles

Environmental assessments (also known as environmental impact assessments or environmental impact statements – EIAs and EISs) are conducted to inform decision makers of positive and negative effects of a project and associated mitigation measures.

WWEA's policy position is that Environmental Assessments (EAs) should be applied at the project level.

EAs should take account of higher-level national and/or regional policies and strategic assessments, including assessments already completed for potential wind farm sites. Initial screening should be conducted to determine if a project is likely to have significant effects on the environment by virtue of its nature, size or location.

EAs should be conducted for all on or offshore wind power projects that have the potential for significant impacts on the environment. EAs should be based on good science and factual information. They should be relevant to the scale and nature of the project in question and factor in existing information.



WWEA members should apply appropriate procedures or codes of practice regarding stakeholder participation and environmental protection.

Stakeholders should be given opportunities to participate in decision-making processes. Their roles, and rights to access information, should be documented in language relevant to their needs.

WWEA supports transparency of process and co-ordination between the different sectors involved - government, developer and community interests. It recommends developers consult with local and national resource agencies, defence, telecommunications and coastal management authorities at the earliest opportunity to assist in the determination of the environmental issues to be addressed, the studies required, and to clarify the timelines that apply.

Regulatory authorities should have specified and reasonable timelines for their assessment and approval processes.

WWEA acknowledges that an EA for a large infrastructure project, such as a wind power scheme, takes place in a broad political, social and economic context. It is one step in a wider decision making process, and is generally written to provide authorities with the following information.

- A full description of the project;
- A statement of objectives, including clear targets and proposed indicators of success;
- A description of the existing environment in the area where the project is to be developed;
- Project justification, including evaluation of project alternatives;
- Economic, social and environmental considerations, including the consequences of not undertaking the project;
- Any mitigation measures that will be implemented to minimise environmental harm and / or enhance the environment; and

- A description of the stakeholder communication / consultation process.

WWEA supports post-construction auditing to measure performance against objectives, targets and proposed indicators of success detailed in the project EA.

A key element for public acceptance can be the negotiation of an agreement between the proponent and the local community on the nature and scope of the collaboration required to conduct the EA.

### **5.1.2 Environmental management systems**

WWEA believes that wind power operators, as well as manufacturers of associated equipment, should adopt internationally recognised environmental management systems (such as ISO 14001).

The components of an environmental management system can be summarised as follows:

- Management Commitment;
- Environmental Policy;
- Environmental Aspects and Impacts;
- Objectives and Targets;
- Roles and Responsibilities;
- Planning and Programs;
- Regulatory Compliance;
- Document Control;
- Operational and Emergency Procedures;
- Training;
- Monitoring and Measuring; and
- Review (including environmental audits) and Improvement.

Wind power operators should also consider incorporating their EMS as part of a broader sustainability management and public reporting program. Open and continuous stakeholder consultation enhances longer-term relationships with the local community, regulators, and shareholders.



## 6 managing social outcomes

Wind energy projects contribute to employment generation and economic development, often in regional communities. Additionally, such projects promote infrastructure development and tourism, and have a flow-on benefit for local industry.

On a broader scale, access to electricity promotes new economic activity, empowers women by reducing domestic and repetitive chores such as firewood collection, improves health and education services, and provides a cleaner and healthier home environment.

### 6.1 The role for stakeholder and community consultation

The WWEA believes that the goal of social sustainability regarding wind energy projects will be achieved if adequate consultation is undertaken with stakeholders and those communities directly affected by projects. The following considerations should be taken into account when determining social aspects of sustainability;

- impacts on the community, stakeholders and the environment;
- stakeholders are informed about the project and the implications for them;
- the proposed project is the best alternative, following the consideration of relevant stakeholders concerns;
- a negotiated and agreed outcome is achieved wherever possible; and
- the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project.

### 6.2 Gaining community acceptance – managing social impacts

There are various issues that require management to ensure that change affecting communities and individuals is effectively managed during the planning, construction and operation of wind power facilities. Possible social impacts that require consideration are identified below.

- Changes to resource use and biodiversity in the area of the proposed project and the impacts this may have on the local community.
- Distribution of benefits among affected parties.
- Effectiveness and on-going performance of compensatory and benefits programmes.

### 6.3 Gaining community acceptance – outcomes for new developments

When developing wind power projects, governments and proponents should aim to achieve the following outcomes.

- Providing affected communities with identifiable benefits, such as local cooperative ownership, pay-for-itself solutions and other types of investment opportunities.
- Ensuring that the local knowledge of communities and stakeholders is utilised and actively involved in project planning to minimise adverse impacts and maximise benefit outcomes.
- Supporting additional community infrastructure associated with the project, for example electricity connection, where positive benefits to the community will result.

## 6.4 Gaining community acceptance – strategies to achieve proposed outcomes

To enable the above outcomes to be achieved the following strategies are proposed.

The project proponent should ensure that:

- adequate consultation is undertaken, with relevant local, regional and national agencies consulted, and any legislation, regulations, codes of practice or guidelines of government agencies complied with;
- impacts on the community, stakeholders and the environment are identified and that stakeholders are informed about the project and the implications for them, as well as being regularly consulted throughout the planning and implementation phases;
- stakeholders who may be affected by the project are provided with the opportunity to be represented during the different phases of project development;
- those communities or individuals affected by the project are compensated for any loss caused by the project;
- a negotiated and agreed outcome is achieved wherever possible; and
- the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project.

Broad community acceptance of a project, particularly in its early phases, will greatly assist in the successful implementation of that project. To achieve community acceptance, the following should be undertaken by the proponent and / or regulatory authorities.

- Ensure that benefits and costs of the project, including environmental, social and economic, are clearly identified, documented and disseminated to stakeholders.

- Identify stakeholders and impacted communities and provide them with the opportunity to have informed input into the decision making process. The community must view the process as being open, fair and inclusive.
- Affected stakeholders should participate in the development and implementation of mitigation measures.
- A process for addressing future concerns or risks from the project needs to be outlined to stakeholders at the start of the project.
- Specifically identify any minority and / or vulnerable groups and ensure that they are adequately represented in any consultation process and are not adversely impacted by the project.
- Communities and / or groups that are impacted by a project should be the first to benefit. These groups should also participate in the identification, planning and distribution of benefits, e.g. by offering them cooperative ownership or similar investment opportunities.
- Communities that will be affected should be compensated for their loss. This will include those persons or groups displaced by associated infrastructure developments, such as roads, those communities who experience loss of livelihood, and those who depend on common resources such as fisheries and agricultural land that might be altered by the project.
- Local and regional resources (particularly labour) should be utilised in the development and operation of the project. Local communities will then more readily see the benefits of the scheme to their community.
- Social compensation projects (such as new roads) should undergo appropriate environmental assessment.

## 7 managing economic outcomes

There can be no sustainable development without the demonstration of sound and equitable distribution of economic benefits. For this reason economic considerations are a central plank in the decision-making processes associated with wind power projects. The efficient use of economic resources requires that the best options are selected, that alternatives have been carefully evaluated, and that there are no hidden and unforeseen costs that could emerge in the future. This is the basis for sound economic practice.

All significant wind farm costs come at the construction stage. Once constructed, a wind project is virtually immune from further inflationary pressures for its planned economic life. Older wind power turbines can be replaced or decommissioned relatively cheaply. Wind power projects also have favourable energy payback periods (the amount of energy derived from the generating station compared with that put into its construction and operation).

With new developments, capital and operating costs should be taken into account over the lifetime of a project with a life-cycle assessment of project alternatives forming an integral component of assessment processes. Direct and indirect costs and benefits should be identified, and where possible quantified in monetary terms. The key principles are as follows and require a clear understanding of government and developer responsibilities.

### 7.1 Institutional framework

Governments need to establish a suitable investment climate and communicate this widely, in the process making known their project priorities. In particular, governments should ensure that:

- The legislative framework for decision making is one in which an investor can have confidence in terms of clarity, the impartiality of the legal process, and the ability to resolve disputes without undue costs or delay.
- An efficient institutional framework is in place to ensure that all parties concerned with the development of any project are fully aware of the factors of interest to themselves and that, as far as possible, unnecessary delay and conflict of interest are avoided.
- In determining project priorities, the long-term interests of the state should be taken into account, in terms of the selection of the preferred project and the finalisation of its ultimate configuration.
- Economic and financial analysis should take account of the effects of assumed interest rates, and some allowance taken of the needs for price escalation.

### 7.2 Identifying costs and benefits

Economic sustainability decisions should be based on a comprehensive evaluation of resources affected and project costs and benefits, some of which will be difficult to quantify in precise terms. As far as possible the following elements should be taken into account:

#### Costs

- Construction, operations and maintenance costs should be fully detailed, recognising the split between foreign and local currency, financing options and the anticipated exposure that these might give in terms of exchange rate variation.
- The full capital and recurrent costs of environmental and social mitigation plans should be included.

## Benefits

- Allowance should be made of the accrued benefits at a national or regional level, including any additional taxes, industrial development and improved infrastructure or multiple use benefits that could be attributed to the project.
- Recognition of savings on greenhouse gas emissions, and improved local air quality, to the extent that this can be quantified.
- Where feasible, allowance should be made for benefits that accrue to local communities including integrated local renewable energy supply systems and ownership, job creation, local industry, investment opportunities, and tourism.

### 7.3 Allocation of benefits

The principal stakeholders in any project are future owners, the developer, the electricity user/supplier (if different), governments, financing agencies, communities, investors and individuals directly affected by the scheme. These stakeholders should be identified early in the planning and development approval process and their legitimate interests acknowledged and taken into account in the financial and economic evaluation processes.

The above objectives imply the need for the following:

- Balanced commercial agreements in the case of privately funded projects
- Reasonable returns on equity, consistent with the risk profile and international norms
- Transparency in procurement processes
- Directly negotiated contracts to be subject to independent audit
- Ongoing auditing/monitoring of economic performance against projected benefits.

## 8 wwea member commitment to sustainability

Wind power, provided that it is developed and operated in a sustainable manner, will play an important role in helping to address some of the major global challenges of the twenty first century.

One of these challenges is to alleviate poverty and increase living standards through the provision of affordable access to electricity and basic services. This is a necessary step towards achieving more equity between different socio-economic groups within nations, and between developed and developing nations.

Another major challenge is global warming. This is the world's most pressing environmental issue and requires the increasing development of less carbon intensive methods of energy production.

A third challenge is the security of energy supply in all parts of the world, having in mind that fossil as well as nuclear resources are facing significant constraints and even depletion.

On all of the three counts wind power, especially in combination with other renewable energy forms and appropriate storage facilities, is making, and will continue to make, a significant contribution.

WWEA members are owners, operators and developers of wind power projects. They are committed, through their membership of WWEA, to the underlying principles of sustainability outlined in this document.



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