EPHC

# Report on Impediments to Environmentally and Socially Responsible Wind Farm Development

November 2008

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Environment Protection and Heritage Council

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# Contents

## EXECUTIVE SUMMARY

This report seeks to identify impediments to environmentally and socially responsible wind farm development and how these impediments might be addressed. This report has been prepared in response to the Environment Protection and Heritage Council's decision of 17 April 2008 requesting its Standing Committee to report to the Council on ways to address impediments to wind farm development. The report focuses in particular on consistency and certainty about the planning and assessment process, including ongoing environmental monitoring of wind farms.

Increasing scientific certainty and growing community awareness is placing increasing pressure on governments to undertake actions to address climate change. Initiatives such as the Carbon Pollution Reduction Scheme and the expanded National Renewable Energy Target will increase the competitiveness of renewable energy technologies, driving a significant expansion in investment in this sector. Wind generation, in particular, is expected to be commercially competitive and make a significant contribution to early efforts. Facilitating this development will need to take account of community concerns over the impact on their local environments as well as providing project developers and local authorities with the appropriate level of investment certainty.

Wind is an intermittent resource. As such it poses particular issues for the management of electricity networks. These issues are being addressed through other fora such as the Ministerial Council on Energy, jurisdictional energy policy working groups and the managers of electricity systems and as such are not covered here, though the critical nature of the issues is acknowledged. While this issue is outside of the Report scope, the Working Group noted that connection of new wind farms to the existing network, the cost of providing the infrastructure, and in particular the potential impacts of increasing intermittent generation levels have on electricity systems and energy security, present some of the most significant challenges to successful renewable energy implementation.

### TERMS OF REFERENCE

The aim of the Working Group is to identify the impediments associated with wind farm development in Australia and to establish whether it is possible to enhance confidence from the community and industry in the wind farm planning and assessment processes.

Its role is to:

- Settle membership of the Stakeholder Reference Group, based on a review of the membership of the existing Commonwealth working group established in 2007 to develop a National Wind Farm Code
- Consult with the Stakeholder Reference Group during the development of the working group report
- identify key impediments to the environmentally and socially responsible development of the wind energy projects
- Develop a report on how identified impediments to wind power might be addressed, focussing in particular on consistency and certainty about the planning and assessment process, including ongoing environmental monitoring of wind farms. Consideration will be given as to how any suggestions sit in relation to relevant planning and environmental legislation
- Examine whether there would be advantages in drawing the documents listed below together (in particular their key principles) under a national wind farm code
- In developing the report, the Working Group should consider the following documents:
  - Various Commonwealth, State and Territory requirements under legislation and government policy in relation to planning and assessment for wind farm development
  - Existing industry tools such as Best Practice Guidelines; the Interim Standards for Assessing the Risks to Birds from Wind Farms; the National Framework for Assessing Landscape Values for Wind Farms; and the Wind Industry Accreditation Scheme.

The full Terms of Reference are in Attachment 1.

Twenty four recommendations are made to strengthen best practice in wind farm development so as to enhance community and industry confidence in wind farm planning and assessment processes. The primary recommendation is that a set of National Wind Farm Development Guidelines be developed under the auspices of and adopted by the Environment Protection and Heritage Council and for the consideration of the Local Government and Planning Ministers' Council.

## PROCESS TO DEVELOP REPORT

A Working Group of Officials representing the Commonwealth Government (chair), the governments of New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania and a representative of the Local Government and Planning Ministers' Council developed the Report. Membership is in Attachment 2.

A Secretariat was provided by the NEPC Service Corporation. Consultants from Hydro Tasmania Consulting assisted with drafting and technical advice.

New Zealand's regulations, policies and guidelines regarding wind farm development have been included for information. However, these documents have not been considered in the broader discussion of each issue.

The Working Group on Wind Farm Development consulted a Stakeholder Reference Group (SRG) consisting of representatives of the wind energy industry, local government, farming interests, community groups in support of and against wind farms, Indigenous interests, and professional organisations such as Birds Australia, the Planning Institute of Australia, the Australian Council of National Trusts and the National Trust of Western Australia. Membership of the SRG is in Attachment 3.

This is a report of the Working Group of Officials. While the SRG has been consulted during the report's development, the report reflects the advice of officials and does not necessarily represent the views of the SRG. Where issues raised by SRG members during the consultation process have not been agreed as substantive issues in the report, they have been captured in Attachment 4, together with a response from the Working Group.

## CONTEXT OF THE REPORT

Through the Council of Australian Governments, all governments have agreed that support for zero and low emissions technologies, such as wind energy, is essential to addressing climate change effectively. Wind power, at a level that is economically, socially and environmentally sustainable, and in locations that are best suited to this renewable energy technology, is an essential and growing component of Australia's energy supply.

### Australian Government's Renewable Energy Target

There has been a rapid rise in the development of wind farms in Australia, stimulated in large part by the Australian Government's Mandatory Renewable Energy Target (MRET), but also by the Victorian Renewable Energy Target (VRET) and proposals for similar schemes in other jurisdictions. This development will be further stimulated by the Commonwealth's commitment to implementing an expanded National Renewable Energy Target (RET) scheme that will:

- Ensure the equivalent of at least 20% of Australia's electricity supply (approximately 60,000 gigawatt hours) is generated from renewable energy sources by 2020.
- Increase the Renewable Energy Target to 45,000 gigawatt hours to ensure that, together with the approximately 15,000 gigawatt hours of existing renewable capacity, Australia reaches this target by 2020.
- Absorb state and territory renewable energy targets into a single national scheme.

This 20% Renewable Energy Target will drive significant investment in wind farms.

### Drivers for investigating better wind farm-related processes

Wind energy has the potential to deliver a significant proportion of Australia's future electricity needs and greenhouse gas abatement. Building community acceptance of this technology is vital to the continued development of the wind industry in Australia. There is some community concern about wind farm development which can be divided into two categories. The first relates to questions regarding the benefits of the technology, such as the level of greenhouse gas abatement delivered by wind farms and government support for wind farm development in this context. The second category relates to concerns about the potential for wind farms to impact negatively on landscape values, heritage and threatened species, and the physical impacts of wind farm operations on people, such as from turbine noise.

The wind energy industry has called for greater national consistency and transparency in wind farm planning and assessment processes and expressed a willingness to work with governments to develop nationally consistent approaches.

Wind farm development will benefit from governments acting collectively to deliver a higher degree of consistency and certainty about processes for the planning, assessment and environmental performance monitoring of wind farms, including community consultation and engagement. The recommendations in this report are intended to stimulate public and industry confidence in wind farm planning and approval processes.

**Roles and responsibilities of governments and of the wind industry**

States and territories have the major responsibility for legislative frameworks for the approval of wind farms. Most jurisdictions have guidelines and other policy instruments relating to the development and siting of wind farms. Local government frequently has an active role in implementing this legislation.

The Commonwealth's jurisdiction in respect of wind farm developments is limited to matters of national environmental significance as listed under the *Environment Protection and Biodiversity Conservation Act 1999.*

However, the Australian Government has played an active role in facilitating the sensitive development of Australia's wind power potential and has already laid some of the groundwork for a better nationwide approach to wind energy industry development. Support has been given to assist the Australian wind industry to embark on the development of best practice guidelines for the development of wind farms in Australia, other related materials and associated activities such as national and international conferences.

The peak industry group (Auswind, now part of the Clean Energy Council) established, with Australian Government funding support, best practice guidelines. In collaboration with the Australian Council of National Trusts, it was then funded to develop a national framework for assessing the impact of wind farms on landscape values with the aim of improving industry standards in understanding and managing impacts of wind farms on landscape and the community.

Major steps have been taken in improving wind farm planning and development processes across jurisdictions. However, some stakeholder groups believe that wind energy industry development would benefit from governments acting collectively to deliver a higher degree of consistency and certainty about the planning, approval and operation of wind farms, including in relation to community consultation.

Against this background, in April 2008 at the 16th meeting of the Environment Protection and Heritage Council, all Commonwealth and State environment ministers agreed to consider options to encourage the responsible development of wind farms and improve the efficiency and effectiveness of decision making. They asked their Standing Committee to appoint a Working Group to examine how impediments to the uptake of wind energy might be addressed, including whether there would be advantages in establishing a national code for wind farms. They were also asked to establish and consult with a Stakeholder Reference Group, drawing on the membership of an existing Commonwealth working group.

Technical impediments such as how to better integrate wind power into the grid have been dealt with in other fora and such matters are not the focus here. For example, variability in electricity supply from intermittent non-scheduled wind generators can potentially have implications on the functioning of the National Electricity Market (NEM). Under the recent changes made to the National Electricity Rule, all new intermittent generators (such as wind) that are larger than 30MW will be required to register with NEMMCO as "semi-scheduled" generators. The implementation of the new Rules is expected to improve the overall reliability and security of supply.

## KEY IMPEDIMENTS

The Working Group on Wind Energy Development has identified a number of issues that can be broadly described as impediments to the environmentally and socially sustainable development of wind farms. Care needs to be taken in using the term "impediment". Many of the issues identified by the Working Group have their genesis in concerns raised by the community (and sometimes also by the wind energy industry). Such issues are viewed as impediments in the sense that failure to deal effectively with them will result in continuing concern in the community about wind farm development. However, there are also limitations to the extent to which all community expectations can be satisfied and ultimately it is a matter for elected governments to determine where the balance of public interest lies.

It should be noted that many wind development issues are shared by other types of development and as such, the Working Group recommends against developing dedicated approaches that place additional requirements on wind farm developers relative to the proponents of other development activities. The Working Group has also endeavoured to distinguish between substantive impediments that require attention and issues of perception that may require further explanation to the community. To this latter end, there is a need for improved public education about wind farm development and its contribution to meeting national and state renewable energy generation objectives and targets.

The impediments identified by the Working Group are broadly categorised in the following way:

1. Local Amenity/Environmental Nuisance:
    a. Turbine noise
    b. Shadow flicker – occurs when the rotating blades cast a flickering shadow across the ground or nearby structure
    c. Blade glint – occurs when sunlight on the rotating blades reflects flickering beams of light
    d. Shadow from towers
2. Ecological and Heritage impacts:
    a. Impacts on landscapes
    b. Impacts on birds, bats and other fauna
    c. Impacts on flora
    d. Impacts on heritage (Indigenous and non-Indigenous)
3. Community engagement:
    a. Education and learning
    b. Community consultation process – non-statutory
    c. Community consultation process – statutory
4. Other issues:
    a. Variability of degree of assessment based on scale of wind farms
    b. Aircraft safety and lighting
    c. Electromagnetic interference
    d. Risk of fire
    e. Risk of lightning strike
    f. Impact on property value
    g. Community benefit

The Working Group found that some of these issues are well addressed in current jurisdictional practices, some less so. In particular, areas needing further attention are:

- **Noise,** where a renewed effort is needed to finalise a national standard on measuring noise from turbines. In addition, there are some types of noise currently not covered by the draft Australian Standard and consideration should be given to monitoring and prediction of these noise sources.
- **Shadow flicker**, where there is no national modelling methodology on which to specify targets.
- **Blade glint**, where there is no national requirement that blades should be finished with a surface treatment of low reflectivity.
- **Impacts on Landscape,** where there is limited guidance on nationally consistent approaches in assessing impact of wind farm development on landscape values.
- **Impacts on Birds, Bats and Other Fauna,** where there is no nationally consistent methodology for assessing potential impacts on birds and bats.
- **Heritage issues** are not specific to wind farms but are relevant nonetheless. It is suggested that best practice assessment in relation to Indigenous heritage values should integrate consultation and landscape assessment with the examination of physical remains of past Indigenous activity.
- **Education and learning,** which has been historically undertaken by the wind industry, but where there is an increasing role for governments, in partnership with industry, in educating the community about renewable energy.
- **Non-statutory community engagement** used by developers, where it is suggested that earlier engagement is preferable, in order to build public confidence in the process, starting with site selection.
- **Variability of degree of assessment** according to impacts rather than just based on scale of wind farms, to emphasise that risk and impact vary according to the circumstances of individual proposals and the locale. Variability in the degree of assessment is desirable to ensure that the rigour of the assessment is appropriate to the environmental risk of the project.
- **Aircraft safety and lighting,** regarding the responsibilities of the Civil Aviation Safety Authority (CASA), Air Services Australia and the Department of Defence and the insufficiency of CASA's Advisory Circular 139-18. CASA will now undertake an appropriate safety study into aviation and wind farms and will develop a new set of guidelines in consultation with industry and other stakeholders.

- **Electromagnetic Interference (EMI)** is a complex issue and which requires further clarification on how wind farm developers should address impacts on parties affected by EMI.
- **Risk of fire,** which is typically addressed by local regulatory frameworks, and is best handled through improved consultation with local and regional fire authorities.

## OTHER ISSUES

### Cumulative Impact

The Working Group agreed that, while cumulative impact is not a consideration unique to wind farm development, potential impacts on environmental matters such as landscape values and threatened species merit consideration. These impacts ideally should be understood in a cumulative context that cannot readily be considered in isolation of the potential impacts from other developments. The Working Group noted that very little guidance appears to exist in relation to the assessment of cumulative impacts. During the development of the recommended National Wind Farm Development Guidelines, further consideration should be given as to appropriate methodologies for identifying and assessing cumulative impact.

### Decommissioning of Wind Farms

The Working Group agreed that, when a wind farm is to be decommissioned, best practice would require a 'closure' plan be developed identifying how decommissioning will be implemented and where materials would be taken for disposal and recycling. The rehabilitation of the site would be a significant component of such an Environment Management Plan.

## CONCLUSIONS

### Government-developed National Wind Farm Development Guidelines

In developing the Report, the Working Group considered a plethora of legislative requirements, government policy and regulation in relation to wind farm assessments and, to the extent that they exist, best practice guidelines in all jurisdictions. In addition, it examined industry resources such as industry Best Practice Guidelines and frameworks for the assessment of landscape values and of birds.

The Working Group agreed that the assessment and approval systems in jurisdictions are generally robust and working well, and that many issues identified in this report are being adequately dealt with through existing processes.

Each of the jurisdictions has a well-developed process for the approval of new developments, including the assessment of potential environmental impacts. These processes are generally supported by a range of documentation, including policies, regulations, guidelines, zoning schemes, planning overlays and the like. Planning regulations also define the responsible authority, the statutory consultation process (including nature and length of public exhibition periods), the review process and rights of appeal. While the generic nature of the processes and documentation is similar between jurisdictions, there are local differences due to the historic development of these in each jurisdiction. These processes apply to all developments and not just to wind energy developments. This report does not propose changes to statutory arrangements.

However, the Working Group concluded that there is merit in developing government-endorsed National Wind Farm Development Guidelines to deliver a higher degree of consistency and transparency in the planning, assessment, approval and environmental monitoring of wind farms. These Guidelines would assist in building community acceptance and support for wind energy developments. The existing guidance documents described above and outlined in more detail in the body of this report should be used as the starting point for the development of the proposed National Wind Farm Development Guidelines.

The Working Group considers that at this time, the development of National Wind Farm Development Guidelines is preferable to a national wind code. The National Wind Farm Development Guidelines could be endorsed and adopted as a matter of policy by jurisdictions to support their existing planning and environmental approval systems.

The "best practice" model is preferred because it can provide greater national consistency in how the matters it covers are addressed and can be readily incorporated into jurisdictions' existing regulatory practice without the need for amendments to statutory schemes. Similarly, the National Wind Farm Development Guidelines could be adopted as a key reference document by local government authorities.

Some stakeholders would prefer to see an approach which went beyond the adoption of the proposed National Wind Farm Development Guidelines. As a first step, they would prefer to see the incorporation of the Guidelines into the statutory planning processes, with the objective of the Guidelines becoming a `mandatory relevant consideration' in the statutory process.

The Working Group considers that the appropriate scope of the National Wind Farm Development Guidelines would cover each phase of a wind farm project's evolution – site selection, assessment, planning application, construction, monitoring, decommissioning and site rehabilitation, and would focus on providing technical guidance to the assessment of wind farm development proposals through identification of principles and assessment methodologies. A major element of the National Wind Farm Development Guidelines would be clear and transparent guidance for wind farm developers on the nature of community consultation, which should commence at the earliest stage of the project.

Additional tools such as standards, methodologies and nationally consistent frameworks, should be developed in conjunction with the guidelines and referenced by them. Specific recommendations are made in this regard. Their timely implementation will be essential to achieving greater national consistency in the wind farm development process.

The SRG expressed a view that on several issues, turbine noise being the key example, the objective of achieving greater national consistency should extend to setting methodologies and targets against which the development and operation of wind farms could be assessed and monitored. The Working Group has concluded that while there could be value in setting national targets for some of the issues raised in the report in the longer term, the immediate priority is to focus on developing the tools and methodologies needed to more effectively measure performance. The Working Group also notes that jurisdictions already have thresholds/targets in relation to issues such as turbine noise and that some of these are embedded in legislation. These are quite often specifically tied to the assessment methodology prescribed. The Working Group is concerned that without first developing agreed national methodologies for measuring impacts, any process for setting targets risked being driven towards a lower common denominator. Consideration of targets would logically follow this work.

To assist with transparency, the National Wind Farm Development Guidelines should provide clear direction on principles applicable to each area of wind farm development, supported by agreed methods for assessing each technical issue addressed in the Guidelines.

A code is the less preferred approach because it would be viewed as having its own legal basis and the Working Group does not believe there is a compelling rationale for a mandatory approach, ie, the existing regulatory arrangements are effective. While mandatory codes are about identifying minimum threshold practices, best practice is about raising standards in order to enhance and sustain confidence. The best practice model is the preferred approach because it focuses on identifying and articulating "good" or "best" practice and setting out norms to which developers should aspire. Best practice models also provide specific benchmarks against which practice can be monitored and good practice implemented.

The National Wind Farm Development Guidelines would not cover engineering or commercial considerations such as infrastructure, electrical connections, structural safety and economic viability analyses.

**RECOMMENDATIONS**

The Working Group recommends that:

1. National Wind Farm Development Guidelines be developed and adopted as a matter of policy by state and territory jurisdictions to support their existing planning and environmental assessment and approval processes.
2. The National Wind Farm Development Guidelines cover the following key elements: site selection, planning, application development, assessment, construction, monitoring, decommissioning and site rehabilitation. Particular attention in the Guidelines should be given to community consultation throughout the wind farm development process. Consideration should be given to the appropriate approach to addressing cumulative impacts.
3. The Working Group conduct the development of the National Wind Farm Development Guidelines, including assessment of relevant issues, drawing on technical expertise as required. This work would cover technical assessment of key documents, consultations with the Stakeholder Reference Group and, if appropriate, a broader public consultation process.

4. The National Wind Farm Development Guidelines draw on all key documents and resources available in jurisdictions, as well as the resources developed by the industry.
5. Specific matters to be covered in the National Wind Farm Development Guidelines should include:
    5.1. Prediction and post-construction monitoring of noise generated by wind turbines.
    5.2. Blade glint – include a requirement that blades should be finished with a surface treatment of low reflectivity.
    5.3. Non-statutory community engagement process by the developers - promote the principle of an earlier engagement with communities.
    5.4. Variability of degree of assessment according to impacts rather than based on scale of wind farms - promote a best practice approach which allows flexibility in assessments based on risk.
    5.5. Risk of fire – encourage better consultation with local and regional fire authorities.
    5.6. Aircraft safety and lighting – CASA has recently advised it will withdraw Advisory Circular 139-18 and will undertake an appropriate safety study into aviation and wind farms as a precursor to developing a new set of guidelines.
    5.7. Electromagnetic Interference (EMI) – should include advice on how wind farm developers should address impacts on parties affected by EMI.
    5.8. Relevant case studies that demonstrate best practice.
    5.9. If necessary, practice notes to help users of the guidelines in their interpretation and application.
    5.10. Heritage – promote best practice assessment in relation to Indigenous heritage values which should integrate consultation and landscape assessments with the examination of physical remains of past Indigenous activity.
6. Work be commissioned to develop tools such as standards, methodologies and frameworks for later incorporation into the National Wind Farm Development Guidelines, including:
    6.1. Noise – provide a consistent methodology for evaluation of noise, preferably through finalisation of the draft Australian Standard.
    6.2. Shadow flicker – develop a standard modelling methodology as a basis for targets which individual jurisdictions may specify.
    6.3. Impacts on Landscapes – develop a nationally consistent best practice approach in assessing impacts of wind farm development on landscapes values using the National Assessment Framework, WA Visual Landscape Planning Manual and other key guidelines.
    6.4. Impacts on Birds, Bats and Other Fauna - develop nationally consistent methodology for assessing potential impacts on birds and bats with the approach to be peer reviewed by experts.
7. The nomenclature of "impediments" should be dropped from the next phase of this project.
8. Further consideration should be given as to appropriate methodologies for assessing cumulative impact.
9. Continued investment should be made in education campaigns about renewable energy and the benefits of wind farms.
10. In light of the significant expansion of wind farms expected in the coming decade, the EPHC accords a high priority to the body of work recommended in this report, with challenging but realistic timeframes being set for its completion, including that the guidelines be completed within 12 months.
11. The EPHC agrees that there would be value in undertaking a post-implementation review of the guidelines and outcomes from the associated activities identified in Recommendation 6 to assess the effectiveness of the systems developed.
12. The EPHC agrees to the publication of this report and its dissemination to key target groups including local government, interested community groups and professional associations.

## ISSUES

The following issues have been identified as potential environmental and social impediments to the development of wind energy:

# 1 LOCAL AMENITY / ENVIRONMENTAL NUISANCE

## 1.1 TURBINE NOISE

Noise is produced by wind turbines as their blades pass through the air. The effect of noise diminishes with distance from the source; however, noise levels can be affected by the number of turbines, the background noise conditions and the wind speed and direction. Issues which may arise regarding noise relate to the volume, timing and/or character of the noise produced.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Environmental Noise Guidelines: Wind Farms (SA EPA, 2003)*<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The SA Environment Protection Authority (EPA) standard has been adopted as NSW's turbine noise assessment policy.<br>A "dwelling" where noise criteria are to be met under the standard consists of existing dwellings and sites where a Development Application for a dwelling is before Council. Previous planning decisions (eg Woodland Wind Farm) have extended this definition to include any vacant lot legally existing at the date of the Consent and upon which a residential dwelling would be permissible at the same date. The potential for future subdivisions has been explicitly denied. |
| **Queensland Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Environmental Protection (Noise) Policy 1997*<br>• *Environmental Protection Regulation 1998 Section 2A*<br>• *Noise Measurement manual – third edition* | There are no specific regulations for turbine noise from wind farms; however, the identified regulations, policy and manual contain provisions relating generally to nuisance noise.<br>The current EPP (Noise) is presently being re-drafted and an associated state planning policy addressing noise is in preparation. Neither will include specific provisions relating to wind farm noise, but they will provide a policy base for minimising and mitigating impacts of noise arising from development.<br>Previous planning decisions (eg Crows Nest Wind Farm) have identified the New Zealand[1] (NZ) standard as the applicable standard. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Wind farms environmental noise guidelines (interim)(December 2007)*<br>• *Environment Protection (Noise) Policy 2007 under the Environment Protection Act 1993*<br>• *Relevant Development Plan policies* | It is a mandatory requirement for the relevant authority to refer wind farm applications to the EPA for advice. The relevant authority must have regard to EPA advice, but is not bound by it.<br>EPA guidelines require an applicant to undertake a noise study which is assessed by the EPA against the Policy.<br>The Guidelines provide technical advice on noise study requirements.<br>Development Plan policies seek to ensure development does not create noise nuisance. |

[1] *The New Zealand Standard ( NZS 6808:1998)* Acoustics - The assessment and measurement of sound from wind turbine generators is currently being reviewed. It is scheduled to be released in October 2009.

| Description | Comment |
|---|---|
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)*<br>• *New Zealand Standard NZ 6808:1998 Acoustics – the Assessment and Measurement of Sound from Wind Turbine Generators*<br>• *Draft Environmental Protection Policy (Noise) and Impact Statement (December 2006)* | The Guidelines require compliance with the draft EPP and the New Zealand standard.<br>Previous planning decisions (eg Musselroe Wind Farm) have modified the New Zealand standard to replace the $L_{95,10min}$ acceptability limit with the $L_{90,10min}$ acceptability limit to be consistent with the draft EPP. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)*<br>• *New Zealand Standard NZ 6808:1998 Acoustics – the Assessment and Measurement of Sound from Wind Turbine Generators*<br>• *State Environmental Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* | The Guidelines state that a wind energy facility should comply with the noise levels recommended for dwellings in the New Zealand standard.<br>Victorian Planning Panels (eg Bald Hills EES) have previously specified a version of the New Zealand standard with the following modifications:<br>• separate consideration of day and night periods, with night specified in accordance with SEPP N-1<br>• averaging within New Zealand standard was considered appropriate for the day/evening period<br>• for the night period, maxima should also be considered and that maxima should not exceed the NZS6808 limits for more than 10% of the night period |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Environmental Protection Act (Western Australia) 1986*<br>• *Environmental Protection (Noise) Regulations WA 1997*<br>• *Environmental Noise Guidelines: Wind Farms (SA EPA, 2003)*<br>• *Guidance for Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) Environmental Noise Draft No.8 EPA 2007* | The WA Guidelines state that, to avoid adverse noise impact on the surrounding community and/or residential areas, wind farm developments should include sufficient setbacks to these areas and recommend approximately 1km distance between the turbine and the noise-sensitive building. They also suggest that acoustic studies can be carried out if necessary by the proponent. The relevant planning authority would then determine the acceptability of the development. The Guidelines also state that no formal policy has been adopted in WA at this stage.<br>Noise issues are addressed in the Act and also governed by the Regulations. The Department of Environment and Conservation (DEC) endorses the criteria and approach of wind farm assessment based on background noise levels, as described in the SA Guidelines. The WA Guidelines state *"These guidelines (SA) provide that wind farm developments should be constructed and designed to ensure that noise generated will not exceed 5dB(A) above the background sound level or 35dB(A) whichever is greater".*<br>In the Shire approval of the Emu Downs Wind Farm, the South Australian standard was modified to require noise compliance at all existing premises on adjoining properties and at future premises constructed on adjoining properties. No limitations were included on the latter condition to prevent it applying to residences built on future subdivisions of adjoining properties. |

| Description | Comment |
|---|---|
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines note that noise is to be accounted for in wind farm layout, with consideration given to existing and future dwelling locations. They also identify this issue as potentially requiring detailed assessment.<br>Appendix 7 of the Guidelines refers to the New Zealand Standard NZS 6808:1998 *Assessment and Measurement of Sound from Wind Turbine Generators* and the South Australian EPA *Environmental Noise Guidelines: Wind Farms*. It also refers to the Australian Standard DR 04173 *Measurement, Prediction and Assessment of Noise and Wind Turbine Generators* which was released for public comment in March 2004.<br>The Guidelines note that discussion will be required with the local council and relevant EPA to determine the methodologies that should be employed and limits that should be applied. They also identify the need for background monitoring to verify and improve noise modelling, particularly at noise-sensitive residences. They also recognise the need for the wind farm owner to address and rectify demonstrated post-construction non-compliances with noise standards. |
| **Other regulations and guidelines** | |
| The relevant documents are:<br>• *Australian Standard Draft. DR 07153 CP: Acoustics – Measurement, prediction and assessment of noise from wind turbine generators.* | The draft Australian Standard is currently being finalised. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *New Zealand Standard NZS6808 Acoustics - The Assessment and Measurement of Sound from Wind Turbine Generators.*<br>• *Energy Efficiency and Conservation Authority (EECA) – Guidelines for Local Authorities: Wind Power August 2004.*<br>• *Energy Efficiency and Conservation Authority (EECA) Report – Low frequency noise and infrasound from wind turbine generators: a literature review.*<br>• *New Zealand Wind Energy Association Fact Sheet 6 – Sound.* | The New Zealand Standard has no statutory effect under the Resource Management Act 1991 which has led to its inconsistent application across jurisdictions. The New Zealand standard is currently under review. Depending on the outcome of the review one option might be to incorporate the revised standard into a National Environmental Standard which would give the document statutory standing under the RMA. Applicants would then be required to comply with the standard and Local Government would be obliged to amend their plans to conform to the standard and would also have to justify any rules or consent conditions that were more stringent than the standard.<br>The EECA guidelines refer to the NZS6808 when discussing construction and operation noise effects at a general level. The Ministry for the Environment is currently drafting a more comprehensive guidance note that will be made available on the Quality Planning website (http://www.qualityplanning.org.nz/). |

### 1.1.1 Discussion

There are two noise standards currently in use across the jurisdictions — the New Zealand standard and the South Australian standard. The New Zealand standard includes a separation of day/night periods with a higher threshold[2], and the SA standard averages over the entire day but uses a lower threshold depending on location[3]. The standards also use different models for calculation of noise levels, with the New Zealand standard generally being conservative, and thus offsetting the difference in thresholds between the two standards. The practical result is that both generally yield equivalent results.

Even when a jurisdiction identifies a relevant standard for application, these standards are often modified for local interpretation of the standard (refer to the comments box). The lack of consistency between jurisdictions and the lack of guidance regarding application of the standards creates a significant impediment to developers.

An Australian Standard is currently under development. The standard specifies a method of noise assessment specific to wind farms, with individual jurisdictions responsible for setting thresholds against

[2] The community may be more comfortable with separate consideration of the night period, particularly in rural communities where background noise levels at night can be very low.

[3] The NZ standard uses a threshold of 40dB(A) whereas the SA standard uses 35dB(A) in general or 40dB(A) in primary rural production zones.

this methodology. It has been under development for many years and has been on public display twice – first in 2004 and again in 2007. The draft is currently being finalised by Standards Australia.

It should be noted that the 2007 draft Standard, does not address such noise sources as infrasound, low frequency noise (noise outside the normal auditory range of the human ear), impulsivity, and low frequency modulation of broad band or tonal noise. It also does not include noise from service equipment, switchyards and substations. Cross-references to relevant Australian and international standards are provided for these other noise sources.

The focus of the existing standards is the noise from wind farm operations. There is also a lack of clarity regarding the period of post-construction monitoring which may range from 1 year up to 3 years.

Some stakeholders have raised concerns about the consistency and validity of either of the two current standards, particularly as to whether the modelling accurately reflects post-installation noise levels.

### 1.1.2 Suggested action

The draft Australian Standard needs to be finalised and issued for implementation across all jurisdictions. This should include an independent assessment of the predictive capability of the proposed modelling method against actual post-installation noise measurements.

The new proposed National Wind Farm Development Guidelines should include the requirement for prediction and post-construction monitoring of noise generated by wind turbines.

In conjunction with the proposed National Wind Farm Development Guidelines, a consistent methodology for evaluation of noise should be provided, preferably through finalisation of the Australian Standard.

## 1.2 SHADOW FLICKER

Shadow flicker is produced by blades breaking the plane between the sun and a receiver. This modulates the intensity of light received and can produce a "strobing" effect that could pose a nuisance or distraction hazard to drivers, for instance. The degree of shadow flicker can be affected by the proximity of the turbines relative to high traffic areas and residences.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* (SEAV, 2003) | Assessment requirements established on a project-by-project basis. They typically specify consideration of shadow flicker.<br>Assessments typically adopt guidance provided in *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* (SEAV, 2003). This specifies no more than 30 hours per year. |
| **Queensland Government regulations and guidelines** | |
| See http://www.epa.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/ | No specific Queensland statutory land use planning or development assessment instruments. However, policy covering landscape and amenity under the State and regional Coastal Management Plans would be applied in the assessment of a wind farm application in the coastal zone. Additionally, local government planning instruments may include provisions. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)* | Development Plan policies seek to avoid or minimise nuisance or hazard by way of shadow, flickering, reflection and blade glint impacts. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)* | Sections 4.7 *Visual effects* and 4.13 *Health and safety issues* of the Guidelines require the assessment of the effects of shadow flicker and blade glint on nearby residences and road users. |

| Description | Comment |
|---|---|
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines state that the shadow flicker experienced at any dwelling in the surrounding area must not exceed 30 hours per year as a result of the operation of the wind energy facility. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Visual Landscape Planning in WA: a manual for evaluation, assessment, siting and design (WAPC, 2007)* | The Guidelines state that shadow flicker, overshadow (from towers) and blade glint below can affect the local amenity of an area, and modelling can determine the affected areas. They also note that the use of low reflectivity materials and careful siting and design can minimise these issues.<br>This is reflected in the Manual. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)*<br>• *Wind Farms and Landscape Values : National Assessment Framework (AWEA and ACNT, 2007)* | The Guidelines note that shadow flicker is to be accounted for in wind farm layout, with consideration given to existing and future dwelling locations. They also identify this issue as potentially requiring detailed assessment.<br>No specific targets are set in the Guidelines or the Framework. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Resource Management Act 1991*<br>• *Efficiency and Conservation Authority (EECA) – Guidelines for Local Authorities: Wind Power August 2004* | These Guidelines address shadow flicker at a high level and note that it is unlikely to be an issue in New Zealand because the separation distances required for noise mitigation are usually sufficient to prevent this effect.<br>Further guidance on shadow flicker will be included in a forthcoming guidance note being prepared by the Ministry for the Environment. |

### 1.2.1 Discussion

Only two jurisdictions, New South Wales and Victoria, specify a target for shadow flicker. Both specify the same target of 30 hours per year[4].

There is a lack of clarity as to the appropriate modelling methodology. Factors affecting the modelling that need to be specified include: method of adjustment for cloud cover, distance from a turbine over which shadow flicker can be considered noticeable, method of accounting for vegetation and surface topology, method of accounting for changes in wind direction, influence of general atmospheric visibility, how the sun is modelled (disk or point) and period over which the assessment is carried out. The assumptions used in an analysis are important to the outcome and should be specified.

### 1.2.2 Suggested action

In conjunction with the proposed National Wind Farm Development Guidelines, develop a standard methodology for modelling shadow flicker and metrics for quantifying its impact against which jurisdictions may specify targets.

[4] The limit of 30 hours/year is derived originally from a German court ruling in which the judge deemed this an acceptable limit. While not universally accepted, it is widely used internationally. Subsequent studies have shown that it can also be important to take into account the time of day and year at which shadow flicker occurs. Shadow flicker on summer evenings was shown to cause the greatest annoyance due to use of outdoor areas; however, setting of limits that vary with the time of day and year are likely to be arbitrary, will potentially open any limits to question and reduce the certainty and transparency of the assessment framework.

### 1.3 BLADE GLINT

It is possible for sun reflecting off untreated blades to produce a flash observable to a human receiver. This flash could just be a nuisance or it may pose a distraction hazard to drivers, for instance. The degree of blade glint can be affected by the position of the turbines relative to high traffic areas and the nature of the blade materials.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Assessment requirements established on a project-by-project basis. They typically specify consideration of blade glint. |
| **Queensland Government regulations and guidelines** | |
| See http://www.epa.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/ | No specific Queensland statutory land use planning or development assessment instruments. However, policy covering landscape and amenity under the State and regional Coastal Management Plans would be applied in the assessment of a wind farm application in the coastal zone. Additionally, local government planning instruments may include provisions. |
| **South Australian Government regulations and guidelines** | |
| The relevant documents are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)* | Development Plan policies seek to avoid or minimise nuisance or hazard by way of shadow, flickering, reflection and blade glint impacts. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)* | Sections 4.7 *Visual effects* and 4.13 *Health and safety issues* of the Guidelines require the assessment of the effects of shadow flicker and blade glint on nearby residences and road users. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines state that blades should be finished with a surface treatment of low reflectivity to ensure that glint is minimised. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Visual Landscape Planning in WA: a manual for evaluation, assessment, siting and design (WAPC, 2007)* | The Guidelines state that shadow flicker, overshadow (from towers) and blade glint below can affect the local amenity of an area, and modelling can determine the affected areas. They also note that the use of low reflectivity materials and careful siting and design can minimise these issues.<br>This is reflected in the Manual. |
| **Wind Industry guidelines** | |
| | The issue is not specifically mentioned in the Auswind Best Practice Guidelines or in the *Wind Farms and Landscape Values: National Assessment Framework*. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Resource Management Act 1991*<br>• *Energy Efficiency and Conservation Authority (EECA) – Guidelines for Local Authorities: Wind Power August 2004* | These guidelines address blade glint at a high level and note that its effects can generally be mitigated by sensitive turbine layout and the use of matt paints.<br>Further guidance on blade glint will be included in a forthcoming guidance note being prepared by the Ministry for the Environment. |

### 1.3.1 Discussion

Only one jurisdiction, Victoria, requires remedial action in the form of a surface treatment of low reflectivity.

Application of a low reflectivity surface treatment is now standard practice for wind turbine generator manufacturers. This is undertaken to satisfy requirements in a many countries and is a simple method which resolves the issue of blade glint.

### 1.3.2 Suggested action

Within the new proposed National Wind Farm Development Guidelines, include a requirement that blades should be finished with a surface treatment of low reflectivity.

## 1.4 SHADOW (FROM TOWERS)

Like any exposed object, wind turbines create a shadow. Given the slender nature of the turbines and diffraction effects, the shadow from a turbine dissipates close to the source. Also given the movement of the sun, the slender nature and separation between turbines, these shadows seldom remain over a particular patch of ground for any significant period.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Not typically considered or addressed given that other impacts (particularly noise) tend to ensure separation distances at which shadowing is not a key issue. |
| **Queensland Government regulations and guidelines** | |
| See http://www.epa.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/ | No specific Queensland statutory land use planning or development assessment instruments. However, policy covering landscape and amenity under the State and regional Coastal Management Plans would be applied in the assessment of a wind farm application in the coastal zone. Additionally, local government planning instruments may include provisions. |
| **South Australian Government regulations and guidelines** | |
| The relevant documents are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)* | Development Plan policies seek to avoid or minimise nuisance or hazard by way of shadow, flickering, reflection and blade glint impacts. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)* | Shadow from towers is not specifically mentioned under "visual effects" in the Guidelines but it seems most unlikely that any residences will be located sufficiently close to a wind farm for this to be a concern. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | Not directly addressed in the Guidelines; however, an application requirement of all Victorian planning schemes (Clause 52.32) requires proponents to show the location of all dwellings within a 500m radius of the site. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Visual Landscape Planning in WA: a manual for evaluation, assessment, siting and design (WAPC, 2007)* | The Guidelines state that shadow flicker, overshadow (from towers) and blade glint below can affect the local amenity of an area, and modelling can determine the affected areas. They also note that the use of low reflectivity materials and careful siting and design can minimise these issues.<br>This is reflected in the Manual. |

| Description | Comment |
|---|---|
| **Wind Industry guidelines** | |
| | This issue is not specifically mentioned in the Auswind Best Practice Guidelines or in the *Wind Farms and Landscape Values: National Assessment Framework*. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Resource Management Act 1991* | Shadow (from towers) is not specifically mentioned in the Energy Efficiency and Conservation Authority (EECA) guidelines for local authorities on wind power. Shadow from towers will be addressed under a broader consideration of visual effects in a forthcoming Ministry for the Environment guidance note. |

### 1.4.1 Discussion

The buffer required to meet noise levels at adjacent properties will ensure neighbours do not experience overshadowing.

There is no significant shadow effect from tall, slender structures due to diffusion. In addition, the shadows created are also not a fixed feature, but move throughout the day.

### 1.4.2 Suggested action

In those jurisdictions that require overshadowing to be considered, future reviews of planning guidelines should consider the removal of overshadowing as an effect to be considered in wind farm planning. Should the base regulations be applicable to a range of infrastructure types, an alternative may be to include an explanatory guideline specifying that this effect does not need to be considered for wind farms.

## 2 ECOLOGICAL AND HERITAGE IMPACTS

### 2.1 IMPACTS ON LANDSCAPE

The construction of a wind farm may impact on landscape values. A landscape is the appearance or expression of an area of land, referring to the combination of elements such as landform, vegetation, waterform and all types of human land use. Landscape values are the perception of these elements held by people and communities. Landscapes change over time, both naturally and through human intervention. Landscapes are made up of different layers and meaning. There are differing opinions regarding what is valued and what is not. Some of the elements through which we value landscapes include visual, cultural, spiritual, environmental, based on memories, perceptions or different aesthetics. Many highly valued landscapes enjoy statutory protections, for example through national parks, nature reserves, marine parks and zoning controls, to ensure they remain essentially natural in character. However, there are many significant landscapes that do not have specific protection and special care needs to be taken to identify and protect the values of those landscapes.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Wind Farms and Landscape Values : National Assessment Framework (AWEA and ACNT, 2007)* | Assessment requirements are established on a project-by-project basis. They typically refer to the Framework as the relevant standard. |

| Queensland Government regulations and guidelines | |
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| See *http://www.epa.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/*<br><br>See *http://wwwhost.env.qld.gov.au/steps/references/op_pk_vis_landscape_classification_system.pdf*<br><br>See *http://www.epa.qld.gov.au/cultural_heritage/owning_a_heritage_place/general_exemptions/g1_maintenance_and_minor_repair/landscape_maintenance_guidelines/landscape_maintenance_outline/* | There is no state planning policy pertaining to landscape matters. Even so, regional plans and local planning schemes often include provisions relating to landscape amenity. It is not known whether there are any specific provisions for wind farms.<br><br>Some local authorities are likely to have guidelines associated with their planning schemes and some agencies may have internal guidelines dealing with their own activities (eg Main Roads).<br><br>QEPA (Queensland Parks) utilises a landscape classification system for visitor management that could be utilised to assess wind farm proposals in proximity to the protected area estate.<br><br>The EPA has guidelines in relation to its built heritage portfolio. These would only have minor relevance to wind farm development. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)*<br>• *Guide for Applicants – Wind Farms (July 2002)* | Development Plan policies seek to avoid, or minimise impacts, on landscape and scenic values<br><br>The relevant authority may require an applicant to provide a detailed description of visual impacts, including graphic representations of turbines in the landscape.<br><br>The Guide suggests applicants should provide a detailed visual description with their application. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)*<br>• *Wind Energy Projects in Tasmania, Key Issues and Requirements (DPIWE, 2004)* | The Guidelines require that the Development Proposal and Environmental Management Plan (DPEMP) should outline the existing visual setting within which the project will be located and assess the ability of the landscape to absorb any visual changes to the landscape as a result of the project. They contain a number of detailed prescriptions relating to the evaluation of the appearance of the project. The decision-maker in relation to visual impacts is the local Council not the EPA.<br><br>The Key Issues and Requirements require the identification of impacts on any high-quality wilderness areas identified in the Tasmanian Regional Forest Agreement. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)*<br>• *Wind Farms and Landscape Values : National Assessment Framework (AWEA and ACNT, 2007)* | The Guidelines note:<br>• The landscape value of a site or location is highly subjective. National Parks protect some of Victoria's most significant landscapes.<br>• Other landscapes may also be valued by the community for their scenic and recreational value. Strategic landscape studies have been completed across a number of regions across Victoria. These are required to be considered by decision-makers.<br>• Relevant strategic studies prepared at the local level may also be referenced in the planning scheme, and significant landscapes may be recognised in planning scheme overlays, such as Environmental Significance Overlay, Vegetation Protection Overlay or Significant Landscape Overlay.<br>• In locating wind energy facilities, consideration should be given to the significance of the landscape as described in relevant planning scheme objectives for the landscape, including relevant referenced strategic studies and overlays to help guide appropriate site selection, design and layout of individual wind turbines.<br><br>The Guidelines state:<br>• A written report is required with an application outlining an assessment of the visual impact of the proposal on the landscape and how the proposal responds to any significant landscape features for the area identified in the planning scheme.<br>• Consideration of the visual impact of a proposal should be weighted having regard to the Government's policy in support of renewable energy development. |

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| | Impact reduction considerations include:<br>• Siting and designing to minimise impacts on views from areas used for recreation based on landscape values and from dwellings.<br>• Locating arrays of turbines to reflect dominant topographical and/or cultural features, such as the coastline, watercourses, windbreaks or transmission lines.<br>• Using techniques such as colour, painting, etc to reduce visual impacts from key vantage points.<br>• Selecting turbines that are consistent in height, look alike and rotate the same way.<br>• Spacing turbines to respond to landscape characteristics.<br>• Under-grounding electricity lines wherever practicable.<br>• Minimising removal of vegetation.<br>• Minimising additional clutter on turbines such as unrelated advertising and telecommunications apparatus.<br>State environmental assessment<br>• Should a referral be developed for the need for an Environmental Effects Statement under the Environmental Effects Act (1978), a preliminary landscape assessment is required to accompany the referral. Should an EES be required, then it must include an independently peer-reviewed visual impact assessment by a suitably qualified and experienced person.<br>Victoria was engaged in the development of the National Assessment Framework (NAF). The NAF complements the Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria.<br>Previous planning decisions (eg Bald Hills Wind Farm) have drawn a clear distinction between landscape (public, community value) and visual amenity (individual, personal value). They also noted that rural zoning at sites does not confer a right to protection of visual amenity, although private dwellings "should retain outlooks that are not dominated by wind farm plant". Even so, this distinction is not defined in the Victorian guidelines. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Environment and Natural Resource State Planning Policy No2 (WAPC 2003)*<br>• *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design (WAPC 2007)*<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Wind Farms and Landscape Values : National Assessment Framework (AWEA and ACNT, 2007)*<br>• *WA Planning and Development Act 2005* | The National Assessment Framework (NAF) allows for community consultation and complements work already published for WA. Western Australia was engaged in both stages of development for the National Assessment Framework.<br>The policy provides the context under which the Visual Landscape Manual operates.<br>Different approaches/methodologies for landscape assessment may use different terminologies that have the same meaning. This is quite common within the field of visual landscape planning as a result of different methods being developed for varying purposes.<br>The WA manual proposes two methodologies within the planning context of WA to assess and evaluate visual landscape character, as well as assess visual impacts as a result of a development proposal.<br>Visual landscape assessment/evaluation is the process of evaluating the character of areas of land, usually by reference to an agreed set of criteria based primarily on community preferences. This assessment process would ideally be undertaken early in the planning process.<br>Visual impact assessment is the analysis of changes in the appearance of the landscape as a result of development. Impacts may be either negative or positive.<br>Part 3 of the Manual (*Guidelines for Particular Land Uses - Utility Towers - Wind Farms*) addresses the visual impact of wind farms at regional, local and site level on natural, rural and built landscapes. The Guideline lists visual elements of wind farms that require consideration for assessment; issues and pressures that surround visual impact, planning and wind farm development; issues at each scale of application - regional, local, site and, most importantly, principles and Guidelines on how to reduce the visual impact of these issues at each level. The Guideline breaks down all the components that need to be considered in the assessment of visual landscape and wind farm development. Site selection is stated as very important in terms of maximising the wind resource as well as reducing |

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| | the impact of the wind farm on the surrounding landscape.<br><br>The Guidelines provide guidance in relation to landscape impacts consistent with the Manual, although not in as much detail. |
| **Commonwealth regulations and guidelines** | |
| The relevant documents are:<br><br>• *Environment Protections and Biodiversity Conservation Act 1999*<br>• *Matters of National Environmental Significance Significant Impact Guidelines 1.1 Department of the Environment and Heritage, May 2006* | The *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)* establishes the National Heritage List which includes natural, Indigenous and historic places that are of outstanding heritage value to the nation. The Act also establishes the Commonwealth Heritage List which comprises natural, Indigenous and historic places and heritage landscapes on Commonwealth lands and waters or under Australian Government control, and identified by the Minister for the Environment, Heritage and the Arts (the Minister) as having Commonwealth Heritage values.<br><br>The Indigenous Advisory Committee advises the Minister on the operation of the EPBC Act taking into account their knowledge of the land, conservation and use of biodiversity.<br><br>Under the EPBC Act, there are penalties for anyone who takes an action that has or will have a significant impact on the national heritage values of a place. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br><br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)*<br>• *Wind Farms and Landscape Values : National Assessment Framework (AWEA and ACNT, 2007)* | The Guidelines note that a "best practice wind farm" requires sound and consistent methodologies be applied to assess and identify the most appropriate siting of the wind farm to minimise landscape and visual amenity impacts. They also identify this issue as potentially requiring detailed assessment.<br><br>The Guidelines require proponents to assess the visibility of the proposed development from important public viewpoints (including roads, lookouts and towns), and note the need to enter a dialogue with the community regarding landscape values.<br><br>The Framework was jointly developed by the Australian Wind Energy Association (AWEA or Auswind) and the Australian Council of National Trusts (ACNT). The Framework includes a staged methodology for undertaking an assessment of landscape values. For each stage, the methodology identifies when community consultation should occur, what the objectives of the consultation should be and what the required outputs are. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br><br>• *The Resource Management Act 1991*<br>• Landscape guidance note available on the quality planning website (http://www.qualityplanning.org.nz/) | The Landscape guidance note does not specifically address the landscape effects of wind turbine generators. However, it does provide guidance and a set of best practice examples of landscape assessments.<br><br>The Environment Court has developed a set of criteria for use when assessing landscape effects known as the 'Modified Pigeon Bay Criteria'. These criteria emerged from case law on the assessment of landscape effects relating to marine farms but are broadly applied in the absence of a nationally agreed set of assessment criteria or methodology.<br><br>The Ministry for the Environment has recently released a proposed National Policy Statement for Renewable Electricity Generation which requires decision makers to have particular regard to the constraints developers face when seeking to avoid, remedy or mitigate the adverse environmental effects of renewable electricity generation activities. In the context of wind farms, this means that decision-makers must have particular regard to the need for turbines to be located in windy areas – on ridgelines and the coastal environment. |

### 2.1.1 Discussion

There are a range of methodologies that could assist in the assessment of landscape values in response to wind farm developments.

Not all jurisdictions have a state methodology to refer to. However, most already apply various elements of best practice when dealing with the issue of visual landscape impacts as a result of wind farm developments. The methodologies presented in the WA manual could complement the National Assessment Framework (NAF).

There is a lack of consistency in approaches across jurisdictions. The NAF could provide consistency in approach (as it is only a framework rather than a detailed methodology) if it is recommended as a starting guide. Although the WA manual operates under the WA planning system, the actual methodologies can be used, varied and/or applied in other planning contexts.

### 2.1.2 Suggested action

Where appropriate, each jurisdiction should continue to use best practice techniques when dealing with impacts on landscape values in response to wind farm developments.

In conjunction with the proposed National Wind Farm Development Guidelines, develop a nationally consistent best practice approach to landscape assessment. This should have a framework containing both principles and methodologies. Existing resources such as the National Assessment Framework and other relevant state documents[5] should form inputs to this process.

## 2.2 IMPACTS ON BIRDS, BATS AND OTHER FAUNA

The construction of a wind farm may impact on fauna indirectly through the loss of habitat cleared at the turbine locations, along access tracks within the site or along roadsides leading to the site. Once operating, the wind farm may then impact birds and bats directly due to collision with turning blades (mortality), presence of the wind farm (physical obstruction) or noise from the wind farm (behavioural changes). The degree of impact will depend on the species likely to be affected. Apart from collision risk and behavioural responses to obstructions and noise, impacts to fauna are similar to other developments and are addressed through existing regulatory processes. Collision risk can be modelled. Behavioural changes, however, are not well understood due to a lack of statistically robust data from wind farms.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Draft Guidelines for Threatened Species Assessment (DECC & DPI, 2005)*<br>• *Cumulative Risk for Threatened and Migratory Species (DEH, 2005)*<br>• *Wind Farms and Birds : Interim Standards for Risk Assessment (AWEA, 2005)* | Assessment requirements are established on a project-by-project basis. They typically refer to the draft Guidelines and the Cumulative Risk for Threatened and Migratory Species. |
| **Queensland Government regulations and guidelines** | |
| | There are no specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)* | Development Plan policies seek to avoid or minimise nuisance or hazard to wildlife.<br>The relevant authority may require an applicant to provide a detailed study of risk of bird or bat strike.<br>The relevant authority may seek informal advice from the Department of Environment and Heritage. There is no requirement for mandatory referral. |

[5] The Auswind National Assessment Framework (NAF) provides a best practice tool and its focus has been on the development of a framework for the assessment of landscape values in response to wind farm developments. It provides a clear sequence of assessment steps to describe the existing landscape (preliminary report to full landscape report), model the proposal within the landscape, assess the impacts and then respond to impacts.

Generally, the NAF provides a useful document for proponents when preparing landscape assessments. However, it is a framework rather than a set of detailed prescribed methods, tools or techniques.

The WA manual provides more detailed, comprehensive methods, tools and techniques in the step-by-step guidance. This complements the broader framework of the NAF.

The Victorian Guidelines do not specify a methodology for undertaking a landscape assessment; however, Victoria has published a Coastal Spaces Landscape Assessment Study that may be another useful source document.

| Description | Comment |
|---|---|
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Threatened Species Protection Act 1995*<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)*<br>• *Brief for Flora and Fauna Consultants, Evaluation of Impact of Proposed Development Activities (Nature Conservation Branch, RMC Division, DPIW)*<br>• *Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites (National Wind Coordinating Committee, Washington, 1999)* | In addition to complying with the Act, the Guidelines recommend compliance with the NWCC Guidance Document. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)*<br>• *Fauna and Flora Act 1988*<br>• *Environmental Effects Act 1978*<br>• *National Parks Act 1975*<br>• *The State Planning Policy Framework* | The Guidelines state:<br>• Development of wind farms should not lead to unacceptable impacts on critical environmental or cultural values. Critical values are those protected under Commonwealth or Victorian legislation.<br>• National legislation applies and proponents and responsible authorities need to be aware of this.<br>• In Victoria, the *Fauna and Flora Act* (1988) provides protection for species and ecosystems which are of state wide importance.<br>• Protection to flora and fauna is also afforded protection by the exclusion of wind energy facilities from land protected under the *National Parks Act* (1975).<br>• The flora and fauna found at a site should be considered in relation to: Commonwealth legislation, the sensitivity of any protected species to disturbance and the potential loss of habitat of species protected under the EPBC Act or the FFG Act.<br>• Appropriate surveys will be required where species listed under the above legislation are considered reasonably likely to be present on the site.<br>• These surveys may indicate how the facility can be sited and designed to manage the risk of impact. Ongoing monitoring may be required as a condition of development. An environmental management plan may provide for the development of reasonable and cost effective steps to minimise any ongoing risks.<br>• International experience and Victorian research shows that the level of bird mortality associated with modern wind energy facilities is not significant. Nevertheless in assessing a proposed development, any risk to protected bird species needs to be carefully assessed and adaptive management applied where relevant.<br>Clause 15.09 of all planning schemes (*conservation of native flora and fauna*) provides for the relevant decision-making framework for responsible authorities.<br>State environmental assessment<br>• The *Environmental Effects Act 1978* also applies. If a proposal is likely to have a significant effect on the environment, it should be referred to the Minister for Planning on the need for an Environment Effect Statement.<br>• It is anticipated that most wind energy facilities can be adequately assessed through the planning permit process. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Wind Farms and Birds : Interim Standards for Risk Assessment (AWEA, 2005)*<br>• *Environment and Natural Resource State Planning* | The State Planning Policy (general measures) outlines that the implementation of planning decisions (eg wind farm approval) can have an impact on the environment and natural resources, including habitats and decision-making should take this into consideration.<br>The Guidelines state that cumulative effects of wind farms may have an |

| Description | Comment |
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| *Policy No.2 (WAPC, 2003)*<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Environmental Protection and Biodiversity Conservation Act 1999*<br>• *Environmental Protection Act (Western Australia)1986*<br>• *Wildlife Conservation Act 1950 WA*<br>• *Draft Bushland Policy for Perth Metropolitan Region State Planning Policy 2.8 (WAPC, 2004*) | impact on migratory routes of certain bird species, and a full avian study is recommended when a large wind farm is proposed, as well as solid towers to prevent birds from nesting. Siting, location and positioning of turbines away from migratory routes and using slower rotation turbines may reduce such impacts.<br><br>Under section 38 of the EP Act, wind farms will be assessed if the "proposal is likely if implemented to have significant impacts on the environment". Such a proposal would be referred to the Environmental Protection Authority (EPA) by the proponent, the Department for Planning and Infrastructure (DPI) or the decision-maker (either state and/or local government). Depending on the location of the wind farm site, the factors for assessment would be different in every case, so one would not necessarily expect that all such proposals will trigger an assessment by the EPA.<br><br>The WC Act protects native flora and fauna in WA and may therefore be relevant if there are fauna or flora under that Act that may be impacted.<br><br>The draft Bushland Policy recognises the protection and management of significant bushland areas which have been identified through an endorsed strategy as a fundamental consideration in the planning process. This policy would apply if a wind farm was proposed in any of the significant bushland areas identified, particularly on the coast. |
| **Commonwealth regulations and guidelines** | |
| The relevant documents are:<br>• *Environment Protection and Biodiversity Conservation Act 1999*<br>• *EPBC Act Policy Statement 2.3 Wind Farm Industry, Department of the Environment, Water, Heritage and the Arts 2008*<br>• *Matters of National Environmental Significance Significant Impact Guidelines 1.1 Department of the Environment and Heritage, May 2006*<br>• *Grey-headed Flying-Fox EPBC Policy Statement 3.2 Nationally Threatened Species and Ecological Communities Guidelines, Department of the Environment and Heritage, November 2003*<br>• *Spectacled Flying-fox EPBC Policy Statement 3.3 Nationally Threatened Species and Ecological Communities guidelines, Department of the Environment and Heritage, November 2003*<br>• *Tiger Quoll (south eastern mainland population) and the use of 1080 EPBC Policy Statement 3.4 Nationally Threatened Species and Ecological Communities Guidelines, Department of the Environment and Heritage, May 2004*<br>• *Tasmanian Devil EPBC Policy Statement 3.6 Nationally Threatened Species and Ecological Communities Guidelines, Department of the Environment and Heritage, July 2006* | The *Environment Protection and Biodiversity Conservation Act 1999* provides for the listing of nationally threatened native species and ecological communities, native migratory species and marine species.<br><br>Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act:<br>• Extinct<br>• Extinct in the wild *<br>• Critically endangered<br>• Endangered *<br>• Vulnerable * and<br>• Conservation dependent<br><br>All species on the list of migratory species are matters of national environmental significance under the EPBC Act. An action will require approval if the action has, will have, or is likely to have, a significant impact on a listed migratory species. The action must be referred to the Minister and undergo an environmental assessment and approval process. Note, that some migratory species are also listed as threatened species.<br><br>** Only species in those categories marked with an asterix are matters of national environmental significance (protected matters) under the EPBC Act.* |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)*<br>• *Wind Farms and Birds : Interim Standards for Risk Assessment (AWEA, 2005)*<br>• *Environment Protection and Biodiversity Conservation Act 1999* | The Guidelines note that a desktop survey and/or initial field survey should identify migratory bird routes and threatened species that have been recorded in the area or may potentially be impacted by a wind development at the site. They also note that assessment should be in accordance with the Interim Standards.<br><br>Appendix 8 of the Guidelines notes the need to conduct risk assessments of avian issues and monitor the effects of any development on bird species. The potential for collisions with turbines and alienation/barrier effects are specifically identified as risks.<br><br>The Interim Standards detail tiered investigations to be undertaken in the |

| Description | Comment |
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| | design and planning stages and as part of operational monitoring. The level of investigation required is based on the assessed risk to the different avifauna species at the site, with a low risk to common species requiring less investigation than a high risk to threatened species. These investigations are based on a Before-After-Control-Impact (BACI) design.<br><br>The Interim Standards identify bird, wildlife and field naturalist organisations as a source of local information, but do not necessarily require consultation with these groups as part of the initial risk assessment. They also include protocols for undertaking field surveys and, using a tiered assessment approach, identify which types of survey are applicable at each stage of assessment. The approaches have been developed specifically for survey of bird species.<br><br>Appendix 9 of the Guidelines notes the need to conduct risk assessments of bat issues and monitor the effects of any development on bird species. General principles for their assessment are identified. Even so, a set of Interim Standards similar to those developed for bird species have yet to be developed for bat species, with no discussion in the Guidelines of potential field survey protocols. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br><br>• *The Resource Management Act 1991*<br>• *Energy Efficiency and Conservation Authority (EECA) – Guidelines for Local Authorities: Wind Power August 2004*<br>• *New Zealand Wind Energy Association Fact Sheet 8 – Birds and Bats* | The EECA guidelines note that there is very little data on the potential effects of wind turbine generators on birds, particularly migratory birds and bats. The migratory paths for many native New Zealand bird species tend, however, to follow the coast in areas of abundant wind resources and applicants are advised to contact the Department of Conservation in the early stages of site selection.<br><br>The effects of wind turbine generators on birds and bats will be addressed more comprehensively in the Ministry for the Environment's forthcoming practice note. |

### 2.2.1 Discussion

Many aspects of the risk to birds, bats and other fauna are unique to wind farms, and thus a specific methodology for wind farm assessment is desirable. Rather than being prescriptive, a practical methodology should be flexible and specify actions proportional to risk at a given site. It is therefore important that the methodology selected for a given site should be independently reviewed prior to undertaking the study and that the progress of the study be subject to ongoing monitoring and review.

There is no clear direction as to acceptable methodologies for fauna impact assessment except in the Auswind interim bird standard, and this standard does not necessarily represent best practice nor does it currently reflect the views of most avifauna experts. Aspects of the methodology that lack direction include seasonality, length of survey and statistical robustness. It is also overly prescriptive and inflexible to adopting new remote sensing techniques.

The Auswind standard does not include an independent peer review of the field survey design, the survey outcomes or the subsequent analysis. While consultation with the relevant authorities is identified as a step in the process, there is no requirement to submit a survey plan for review by the relevant authorities.

The behavioural responses of birds and bats to wind farms are not well-understood, particularly with respect to Australian species. This is an area that requires additional research. There is also some concern that the methodology for undertaking collision risk modelling (including the underlying algorithms and assumptions) requires greater public and scientific scrutiny. The model may need modification once behavioural information becomes available.

The acceptability of impacts to specific species is not consistent across jurisdictions. Rather than consider the impacts to overall population viability, acceptability generally relates to the number of individuals resident/visiting the jurisdiction.

**Birds**

The Auswind interim standards on assessing risks from wind farms focus solely on the risk to birds.

Some studies are available on the risk to Australian species of birds from wind farms.

There are no studies on behavioural responses of Australian species of birds from wind farms.

**Bats and other fauna**

There is no defined standard methodology for assessing potential impacts to bats.

There is no defined standard methodology for assessing potential impacts to non-avian species; however, such impacts can be addressed through micro-siting.

There are no studies on the risk to Australian bat and other non-avian species from wind farms.

There are no studies on behavioural responses of Australian species of bats or non-avian fauna from wind farms.

Due to the localised nature of the interaction, the lack of uniform standards for non-avian fauna is not generally regarded as an impediment to development. In this respect, wind farms are similar to other types of development.

### 2.2.2 Suggested action

**Birds**

In conjunction with the proposed National Wind Farm Development Guidelines, develop an appropriate methodology for assessing potential impacts on birds. This methodology could be developed through an expert workshop process. The Auswind interim standard (*Wind Farms and Birds: Interim Standards for Risk Assessment*, Auswind 2005) could be an input to this process.

**Bats**

In conjunction with the proposed National Wind Farm Development Guidelines, develop a methodology for assessing potential impacts on bats.

**Other fauna**

None required.

## 2.3 IMPACTS ON FLORA

The construction of a wind farm may impact on flora through the loss of habitat cleared at the turbine locations, along access tracks within the site or along roadsides leading to the site. This may, in turn, lead to weed infestation due to ground disturbance. These impacts are similar to other developments and are addressed through existing regulatory processes. The degree of impact will depend on the species likely to be affected, with impacts to threatened species regarded as most significant and impacts to locally rare species next most significant.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Draft Guidelines for Threatened Species Assessment (DECC & DPI, 2005)*<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | Assessment requirements are established on a project-by-project basis. They typically refer to draft Guidelines. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms.<br>Clearing of remnant vegetation, particularly vegetation classified as `endangered regional ecosystems' or `of concern regional ecosystems' is regulated under the *Vegetation management Act 1999*. Since 2006 broad-scale clearing for development (outside areas allocated for urban purposes) is generally prohibited. Where possible, offset requirements apply.<br>Clearing of certain protected plants is also regulated under the *Nature Conservation Act 1992*. |

| Description | Comment |
|---|---|
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies*<br>• *Planning Bulletin – Wind Farms – Draft for Consultation (August 2002)*<br>• *Native Vegetation Act 1991* | Development Plan policies seek to avoid or minimise nuisance by way of modification to wildlife. Many Development Plans also contain additional policies that seek to preserve and/or rehabilitate areas of native vegetation.<br>Approval under the *Native Vegetation Act* from the Native Vegetation Council (part of the Department of Water, Land and Biodiversity Conservation) may be required if proposal includes clearance of, or damage to, native vegetation. Approval may involve formal agreement to protect or reinstate other native vegetation on the site or elsewhere.<br>The relevant authority may seek informal advice from the Native Vegetation Council. There is no requirement for mandatory referral. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Threatened Species Protection Act 1995*<br>• *Brief for Flora and Fauna Consultants, Evaluation of Impact of Proposed Development Activities (Nature Conservation Branch, RMC Division, DPIW)* | |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)*<br>• *Fauna and Flora Act 1988*<br>• *Environmental Effects Act 1978*<br>• *National Parks Act 1975*<br>• *The State Planning Policy Framework (Clause 15.09 – Conservation of native flora and fauna)*<br>• *Native Vegetation Management – A Framework for Action (DNRE, 2002)* | Most of the points covered under Impacts on birds, bats and other fauna are also relevant to flora.<br>The guidelines also state that, if native vegetation is proposed to be removed as part of a development proposal, responsible authorities must have regard to the Native Vegetation Framework. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *EPA Position Statement No.2 Environmental Protection of Native Vegetation in Western Australia*<br>• *Environmental Protection and Biodiversity Conservation Act 1999*<br>• *Environmental Protection Act (Western Australia)1986*<br>• *Wildlife Conservation Act 1950 WA*<br>• *Draft Bushland Policy for Perth Metropolitan Region State Planning Policy 2.8 (WAPC, 2004)* | The guidelines state that, where a proposed wind farm impacts upon remnant vegetation, the proposal should be assessed against the Position Statement. Endangered or threatened species within a wind farm study site should be mapped by field surveys so that highly sensitive areas of vegetation can be avoided. Roads, services and ancillary features can also be sited and designed appropriately. The guidelines states that during construction minimal vegetation removal and disturbance is recommended. Development issues also include stabilising topsoil and retaining existing vegetation, particularly in coastal areas where it may be difficult to re-establish.<br>The other Acts and the Policy would apply to impacts on flora as described under Impacts on birds, bats and other fauna. |

| Description | Comment |
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| **Commonwealth regulations and guidelines** | |
| The relevant documents are:<br>• *Environmental Protection and Biodiversity Conservation Act 1999*<br>• *EPBC Act Policy Statement 2.3 Wind Farm Industry, Department of the Environment, Water Heritage and the Arts 2008*<br>• *Matters of National Environmental Significance Significant Impact Guidelines 1.1 Department of the Environment and Heritage, May 2006*<br>• *Bluegrass Ecological Community EPBC Policy Statement 3.1 Nationally Threatened Species and Ecological Communities Guidelines, Department of the Environment and Heritage, August 2001*<br>• *White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands EPBC Policy Statement 3.5*<br>• *Peppermint Box (Eucalyptus odorata) Grassy Woodland of South Australia and Iron-grass Natural Temperate Grassland of South Australia EPBC Policy Statement 3.7 Nationally threatened species and ecological communities guidelines, Department of the Environment and Water Resources, June 2007* | The *Environment Protection and Biodiversity Conservation Act 1999* provides for the listing of nationally threatened native species and ecological communities, native migratory species and marine species.<br>Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act:<br>• Extinct;<br>• Extinct in the wild*<br>• Critically endangered<br>• Endangered*<br>• Vulnerable* and<br>• Conservation dependent.<br>All species on the list of migratory species are matters of national environmental significance under the EPBC Act. An action will require approval if the action has, will have, or is likely to have, a significant impact on a listed migratory species. The action must be referred to the Minister and undergo an environmental assessment and approval process. Note that some migratory species are also listed as threatened species.<br>** Only species in those categories marked with an asterix are matters of national environmental significance (protected matters) under the EPBC Act.* |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines note that minimisation of flora impacts (particularly for protected species) is to be accounted for in wind farm layout, with consideration given to ecological importance, rehabilitation options and approvals required for disturbance. They also identify this issue as potentially requiring detailed assessment.<br>Impacts on flora are referred to within Appendix 13 of the Guidelines as part of a discussion of general ecological assessment. Specific mention is made of the need to ensure ecological work is undertaken at the appropriate time of year or for a suitable duration. The need to meet with the relevant planning authority and stakeholders to discuss timing of construction and scope for changing site layouts is specifically identified.<br>Appendix 13 also notes that any ecological study would include power line routes and other areas of potential disturbance during construction.<br>No specific methodologies or targets are identified in the Guidelines. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Resource Management Act 1991*<br>• *Energy Efficiency and Conservation Authority (EECA) – Guidelines for Local Authorities: Wind Power August 2004*<br>• *The Department of Conservation's Protected Natural Area Programme reports.* | The EECA guidelines note that because wind farms frequently occupy agricultural land which is regularly disturbed by agricultural practices, and where ecology and habitats are already highly modified, it is unlikely that there will be any ecological concerns associated with development in such areas. The effects of wind turbine generators on flora will be addressed more comprehensively in the Ministry for the Environment's forthcoming guidance note.<br>The Department of Conservation began a protected natural areas program in 1981 as a means of identifying natural ecosystems worthy of protection in more modified parts of New Zealand's landscapes. The results of these surveys tend to be used by district and regional councils when zoning land and when identifying areas of significant natural heritage value. |

### 2.3.1 Discussion

Impacts on flora are generally addressed through micro-siting[6] and are therefore not considered a substantive impediment to wind farm development.

### 2.3.2 Suggested action

None required.

## 2.4 IMPACTS ON HERITAGE

Wind farm development may impact on heritage values. Heritage is managed by various levels of government and peak bodies that identify and list places for their heritage values. Significant heritage places are identified and grouped into lists that guide the protection and management of heritage values. The location, groundwork for the turbines foundation and construction of access tracks within a wind farm site may affect Indigenous and non-Indigenous heritage values. These impacts are similar to other developments and are addressed through existing regulatory processes.

**Indigenous Heritage**

State and territory governments have the major responsibility for the protection and management of Indigenous heritage. States and territories have legislation that provides presumptive or 'blanket' protection for aspects of Indigenous heritage, making it an offence to damage, destroy or interfere with Aboriginal sites or objects.

The Australian Government also has a role in the protection and management of Indigenous heritage places. The heritage values of places included in the National Heritage and World Heritage lists are matters of national environmental significance (NES matters) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act also protects the heritage values of places in the Commonwealth Heritage List (places owned or leased by the Commonwealth with significant heritage value). By law, no one can take any action that has, will have, or is likely to have, a significant impact on the heritage values of a place included in these lists without approval.

In addition, Indigenous people can apply for protection under the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*. This is an Act of last resort that provides for the preservation and protection from injury or desecration of areas and objects that are of particular significance to Aborigines in accordance with Aboriginal tradition where a state or territory does not provide effective protection.

**Non-Indigenous Heritage**

In common with many State Heritage Protection Acts, the EPBC Act defines heritage value of a place as including the place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians.

The states and territories have the more general protective mechanisms for protecting places of natural heritage significance. Places of historic heritage significance are generally only protected if specifically included in a Commonwealth, state or territory heritage list.

| Description | Comment |
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| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DECC, 2005)*<br>• *Wind Farms and Heritage* | Assessment requirements are established on a project-by-project basis. They typically refer to the draft Guidelines and Wind Farms and Heritage.<br>The draft Guidelines and associated policy require sub-surface sampling prior to lodgement of a development application. |
| **Queensland Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Integrated Planning Act 1997* | No specific provisions relating to wind farms under any of these Acts.<br>The *Queensland Heritage Act 1992 (QHA)* generally deals with built and |

[6] Micro-siting - Siting turbines within a wind project involves careful consideration of an array of factors relating to wind flow, terrain, equipment access, environmental and land-use issues, and visual impact.

| Description | Comment |
|---|---|
| • *Queensland Heritage Act 1992*<br>• *Aboriginal Cultural Heritage Act 2003*<br>• *Torres Strait Islander Cultural Heritage Act 2003* | post European settlement places. Development on a heritage listed place under the Heritage Act would require development approval under the IP Act. QEPA would have an assessment role as a concurrence agency with the QHA providing the head of power. The same would apply if proposals were to be adjacent to a heritage place; however, QEPA's assessment role would be advisory only in such instances. Landscape issues would be a significant aspect of assessment. However, there are no specific guidelines in relation to wind farms.<br><br>Queensland's Indigenous cultural heritage Acts establish the framework for the ownership, protection and management of all aspects of cultural heritage (artefacts, places, landscapes, stories).<br><br>In summary the Acts:<br><br>• provide blanket protection of areas and objects of traditional, customary and archaeological significance<br>• recognise the key role of traditional owners in cultural heritage matters<br>• establish processes for dealing with cultural heritage<br>• establish a Cultural Heritage Register and Cultural Heritage Database<br>• create a general/universal duty of care requiring that actions not harm cultural heritage<br>• establish cultural heritage management planning process, and other agreement-based mechanisms<br>• make preparation of a cultural heritage management plan mandatory where an approval requires an environmental impact statement<br>• establish penalties for harming Aboriginal and Torres Strait Islander cultural heritage or breaching the duty of care<br><br>While none of these provisions or processes specifically apply to wind farms, cultural artefacts, places and landscapes have to be addressed by development. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br><br>• *Relevant Development Plan policies*<br>• *Heritage Places Act 1993*<br>• *Aboriginal Heritage Act 1988* | Development Plan policies seek to protect the heritage values of State Heritage Places, Local Heritage Places and Historic (Conservation) Zones and Policy Areas.<br><br>Any development which, in the opinion of the relevant authority, materially affects the heritage values of a State Heritage place is a mandatory referral to the Minister administering the Heritage Places Act.<br><br>The relevant authority must have regard to advice of the Minister administering the Heritage Places Act, but is not bound by it. However, if a Council does not totally adopt a recommendation of the Minister, it must seek the concurrence of the Development Assessment Commission.<br><br>There is no requirement for applications to be referred to Indigenous groups or the Minister for Aboriginal Affairs and Reconciliation. However, if an Aboriginal object or site is discovered the Minister must be informed and the object or site protected until a determination under the Aboriginal Heritage Act is made.<br><br>The Aboriginal Heritage Act also provides for Indigenous Land Use Agreements (ILUA). A current ILUA for Yorke Peninsula (Narrunga) requires copies of Development Approvals to be provided in certain areas but this is after a decision is made. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br><br>• *Aboriginal Relics Act 1975*<br>• *Historic Cultural Heritage Act 1995*<br>• *Aboriginal and Historic Cultural Heritage Survey and Recording Standards Consultancy Brief* (Tasmanian Heritage Office)<br>• *Guidance for the Production of Cultural Heritage Survey Reports* (Tasmanian Heritage Office) | |

| Description | Comment |
|---|---|
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)*<br>• *Aboriginal Heritage Act 2006*<br>• *Aboriginal Heritage Regulations 2007*<br>• *Commonwealth Native Title Act 1993* | The Guidelines state that it is important that any impacts and the views of relevant Aboriginal groups are considered in the early planning stage of any project.<br><br>Aboriginal Cultural Heritage values may apply to a range of locations in Victoria and are protected under the Act and Regulations.<br><br>Where wind energy proposals are on Crown Land, the provisions of the Commonwealth's *Native Title Act 1993* will apply.<br><br>Sites of cultural heritage significance are to be identified on the site analysis plan.<br><br>A Cultural Heritage Management Plan is recommended prior to lodgement, particularly where there are Registered Aboriginal Parties listed in the region. As a result, the practical implementation of the Regulations requires sub-surface sampling prior to lodgement of a development application.<br><br>In accordance with the *Aboriginal Heritage Regulations 2007,* wind farms are defined as a high impact activity (building and works that result in significant ground disturbance) which triggers the requirement for a Cultural Heritage Management Plan. An assessment may include background research, consultation, field survey and excavation. Some or all of the above assessments may be required. These are specified in the regulations. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Heritage of Western Australia Act 1990*<br>• *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design (WAPC 2007)*<br>• *Aboriginal Heritage Act 1972*<br>• *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*<br>• *Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984*<br>• *Commonwealth Native Title Act 1993*<br>• *The State Coastal Planning Policy 2.6 (WAPC 2003)*<br>• *Renewable Energy Handbook for Western Australia (SEDO 2006)*<br>• *Historic Heritage Conservation State Planning Policy 3.5 (WAPC 2007)*<br>• *Historic Heritage Conservation Planning Bulletin 88 (WAPC 2007)* | The Handbook outlines the process for heritage approval in response to renewable energy projects that may impact on areas of importance and significance to Aboriginal people. State processes include the protection of such areas under the *Aboriginal Heritage Act 1972*. It is recommended assessments are conducted to ensure that the proposal is not in breach of Section 17 of the Act.<br><br>The Manual outlines specific guidance to reduce the impact of wind farm development on the visual landscape which can be considered as natural heritage. The Manual also addresses "valued landscapes under pressure" (Part 3) and gives guidance on how to protect such landscapes. The advice given in this section was based on anecdotal evidence of community concern and reflected in government policies such as WAPC State Planning Policies that focus on sensitive areas including the state's coastline and coastal areas. This guidance can be relevant as coastal areas can be under pressure for wind farm development, given the high wind resources in such areas. The State Coastal Planning Policy 2.6 (WAPC 2003) would need to be considered for any wind farm proposed in a coastal area. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines note that the heritage value (Indigenous and non-Indigenous) and native title status of a site should be considered during site planning. They also identify this issue as potentially requiring detailed assessment.<br><br>In particular, the Guidelines note that desktop assessments and/or site surface surveys should be undertaken during preliminary site planning and may require sub-surface sampling in subsequent stages. These works are to be conducted by qualified archaeologists, together with representation from Indigenous communities.<br><br>Appendix 2 of the Guidelines addresses native title and cultural heritage impacts. Its focus is Indigenous cultural heritage rather than non-Indigenous cultural heritage.<br><br>Appendix 2 provides an overview of the survey process and identifies triggers that would prompt sub-surface surveys. Details are also provided for site supervisors on monitoring during construction.<br><br>No specific survey methodologies are identified in the Guidelines. |

| Description | Comment |
|---|---|
| **Commonwealth regulations and guidelines** | |
| The relevant documents are:<br>• *Environment Protection and Biodiversity Conservation Act 1999*<br>• *Draft: EPBC Act Policy Statement 2.3 Wind Farm Industry, Department of the Environment, Water, Heritage and the Arts, 2008*<br>• *Matters of National Environmental Significance Significant Impact Guidelines 1.1 Department of the Environment and Heritage, May 2006*<br>• *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*<br>• *Ask First, a guide to respecting Indigenous heritage places and values, Australian Heritage Commission, 2002*<br>• *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999*<br>• *Australian Natural Heritage Charter for the conservation of places of natural heritage significance, 2002*<br>• *Australian Heritage Places database, including the World, National and Commonwealth Heritage Lists and the Register of the National Estate* | The *Environmental Protection and Biodiversity Conservation Act 1999* establishes the National Heritage List, which includes natural, Indigenous and historic places that are of outstanding heritage value to the nation. The Act also establishes the Commonwealth Heritage List which comprises natural, Indigenous and historic places on Commonwealth lands and waters or under Australian Government control and identified by the Minister for the Environment, Heritage and the Arts (the Minister) as having Commonwealth Heritage values.<br>The Indigenous Advisory Committee advises the Minister on the operation of the EPBC Act, taking into account their knowledge of the land, conservation and use of biodiversity.<br>Under the EPBC Act, there are penalties for anyone who takes an action that has or will have a significant impact on the national heritage values of a place.<br>*Ask First: A guide to respecting Indigenous heritage places and values* provides a practical guide for land developers, land users and managers, cultural heritage professionals and many others who may have an impact on Indigenous heritage.<br>The draft EPBC Act Policy Statement 2.3 Wind Farm Industry has been released for public consultation.<br>The Burra Charter and Natural Heritage Charter provide guidelines for the conservation of cultural and natural heritage places respectively.<br>The Australian Heritage Places database gives details on listed and nominated places and contains over 20,000 entries. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Resource Management Act 1991*<br>• *Historic Places Act 1993* | Both resource consent under The Resource Management Act 1991 (RMA) and an approval under the Historic Places Act 1993 (HPA) are required before an applicant is able to destroy, damage or modify a place or feature of cultural heritage.<br>The RMA requires local authorities to hold a schedule of contacts and relevant management documents for iwi (tribes) and hapu (sub-tribes). Iwi and hapu may maintain a database of waahi tapu (sacred places). This database may or may not be available to the applicant. There is no obligation to consult with iwi or hapu, but it is advisable and considered best practice. |

### 2.4.1 Discussion

**Indigenous Heritage**

It is noted that both developers and local Indigenous groups have sometimes been frustrated by the process for identifying and addressing Indigenous heritage issues at wind farms sites. Much of this can be resolved through non-statutory consultation, as per Section 3.2.

When considering Indigenous heritage issues, it is necessary to look not only at physical landscapes (tangible values) but also at cultural landscapes (intangible values). These cultural landscapes include stories and song lines, places where hunting and gathering occurs and effects on the bush and animals (totemic animals can be affected).

**Non-Indigenous Heritage**

For natural heritage places, it is important to recognise that it is not only government reserves that may contain heritage values. Heritage lists should be consulted and relevant government agencies at all levels of government contacted for advice.

Wind farms may impact on heritage landscapes. These impacts are addressed through extensive existing regulatory processes in all jurisdictions.

### 2.4.2 Suggested action

**Indigenous Heritage**

Indigenous heritage assessment needs to consider both tangible and intangible values. Best practice assessment in relation to Indigenous heritage values should integrate consultation and landscape assessment with the examination of physical remains of past Indigenous activity.

**Non-Indigenous Heritage**

For all heritage places it is important that existing heritage lists, including those maintained by all levels of government and such voluntary bodies as the National Trusts, continue to be consulted thoroughly and early in the process, and that governments and interested groups and local residents be consulted and involved from early in the selection process.

## 3 COMMUNITY ENGAGEMENT

Within the area of community engagement, there are clear roles for government, the wind industry and developers. To date, much of the work on educating the public and raising community awareness has been undertaken by the wind industry and individual developers, with some involvement from government agencies. There is now a requirement for more involvement from government in basic education and awareness-raising, but this must be balanced and free from the perception of conflict of interest. Industry should continue its focus on better managing consultation activities in relation to specific wind developments to ensure that consultation is a truly two-way dialogue.

### 3.1 EDUCATION AND LEARNING

There is high-level community support for reducing Australia's carbon footprint; however, the community is still developing an understanding of the scale and nature of the requirements to meet the targets specified under the Mandatory Renewable Energy Target (MRET), the various state schemes and the expanded Commonwealth scheme. The wind industry and individual developers have made an initial contribution towards educating the community as to the need for wind farms and their effects.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | No specific legislation, policy or guidelines. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| | No specific legislation, policy or guidelines. |
| **Tasmanian Government regulations and guidelines** | |
| | This is not currently considered a role for the State Government. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines summarise Victoria's broader renewable energy policy agenda to set the context for wind energy facilities. They also provide information about Victoria's wind resource. This information is being updated to reflect current government policy commitments and wind resource information. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Renewable Energy Handbook for Western Australia (SEDO, 2006)* | The Handbook gives the reader an understanding of the purpose of the handbook, the importance of renewable energy and developing a renewable energy project in WA. It outlines the approvals processes as well as community consultation. |
| **Wind Industry guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Auswind Best Practice Guidelines are specifically focussed on individual projects, rather than providing a generic understanding of wind farms. |

| Description | Comment |
|---|---|
| **New Zealand regulations and guidelines** | |
| | There is no specific legislation, policy or guidelines. Some local authorities have made a policy commitment to advocating for and increasing public awareness of renewable energy, including wind energy. |

### 3.1.1 Discussion

Education and awareness across jurisdictions has been ad hoc and historically has been undertaken by the wind industry and individual wind farm proponents. This is seen as a potential conflict of interest. There is an increasing role for governments in educating the community about renewable energy in line with government targets and commitments.

One issue that has been raised is the means of assessing the level of greenhouse gas abatement that can be attributed to wind farms. The output from a wind farm is fed directly into the electricity grid and results in less generation being required from fossil fuel sources. For those jurisdictions operating in the National Electricity Market (NEM), the greenhouse gas abatement from the operation of wind farms will depend on the generators (coal, gas etc) that it displaces in the NEM.

### 3.1.2 Suggested action

Governments, both Commonwealth and state, need to provide a clear policy statement supporting renewable energy.

Education campaigns should be developed by government that identify the likely growth in new developments to support such policy targets.

Consideration could be given to developing a guide to calculating greenhouse abatement from wind energy facilities to help not only the wind farm developers, but also the community to better understand the greenhouse benefits from wind farms.

## 3.2 COMMUNITY CONSULTATION PROCESS - NON-STATUTORY

Non-statutory engagement and consultation relates to those processes undertaken by the proponent/developer of the wind farm in addition to the statutory consultation process (Section 3.3). The purpose of such consultation is to inform the community of a potential development and to involve the community in shaping the development. This process includes elements that are largely unique to wind farm developments.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Draft EIA Guidelines: Wind Energy (Planning NSW, 2002)* | Assessment requirements are established on a project-by-project basis. They typically require consultation with identified key stakeholders during the preparation of environmental assessment documentation. Proponents are also typically referred to the draft Guidelines. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **Tasmanian Government regulations and guidelines** | |
| | Procedures for the assessment of a Level 2 activity encourage non-statutory consultation by the proponent. |

| Description | Comment |
|---|---|
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines state that pre-application discussions with the relevant State and Commonwealth Government departments, agencies and surrounding land owners are recommended. No further details are provided around preferred pre-application consultation with community and stakeholders. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Visual Landscape Planning in WA: a manual for evaluation, assessment, siting and design (WAPC, 2007)*<br>• *Renewable Energy Handbook for Western Australia (SEDO, 2006)*<br>• *Consulting Citizens: A Resource Guide (Department of the Premier and Cabinet, April 2002)* | The Guidelines highly recommend consultation with all relevant agencies, developers, consultants and the community.<br>This is also reflected in the Manual which also notes that consultation with all stakeholders is beneficial early in the decision-making process.<br>*Consulting Citizens: A Resource Guide* is guide to more effective involvement of citizens in the decision making process. The guide offers best practice guidelines divided into 3 sections: preparing for consultation; foundations for effective consultation; and outcomes. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The integral role of community and stakeholder consultation is recognised in the Guidelines, as is the principle that communities should have the opportunity to participate in decisions that may affect them.<br>Appendix 4 of the Guidelines specifically addresses the framework for community and stakeholder engagement. Specific attention is paid to the key principles to be applied to all consultation and the process of developing a Community and Stakeholder Communications and Consultation Plan. |
| **New Zealand regulations and guidelines** | |
| | No specific provisions relating to wind farms. Assessment requirements are established on a project-by-project basis. |

### 3.2.1 Discussion

All jurisdictions encourage proponents to undertake some form of non-statutory consultation; however, there are no guidelines as to what preferred process should be recommended to be followed (with the exception of some general statements in the Auswind Best Practice Guidelines).

### 3.2.2 Suggested action

In conjunction with the proposed National Wind Farm Development Guidelines, develop a set of guidelines for community consultation which can be applied to all wind farm proposals by the applicable proponent/developer.[7] This would draw on the Auswind Best Practice Guidelines and existing state guidelines and supporting documentation. The new guidelines should address the consultation process recommended to be followed during the project feasibility, project development, construction, operational and decommissioning stages, as well as guidance for local government in their role because of potential risks at the pre-application stage. The guidelines should also encourage consultation to commence as early as reasonably possible within development of a new project.

## 3.3 COMMUNITY CONSULTATION PROCESS – STATUTORY

Statutory consultation relates to those processes that are defined in legislation and which are to be undertaken as part of the planning approvals process. The purpose of such consultation is to ensure potentially affected parties are aware of the development and have the opportunity to participate in the approvals process. This process is similar to other developments and is generally addressed through existing regulatory processes.

[7] The purpose of the guidelines needs to be clearly defined, in the sense that it is non-statutory and thus not enforceable. The clear intent of the guidelines should be to provide assistance to developers in informing communities of their plans.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Environmental Planning and Assessment Act 1979* | Wind farms with capital investment in excess of $30 million are assessed and determined under Part 3A of the Act. This requires a minimum of 30 days public exhibition and public notifications. These projects are assessed and determined by the Minister for Planning.<br>Wind farms with capital investment less than $30 million, but with generating capacity in excess of 30MW, are designated developments under Part 4. This requires a minimum of 30 days public exhibition and public notification. These projects are assessed and determined by the local council.<br>All other wind farms (less than $30 million and less than 30MW) are typically publicly exhibited for at least 14 days with public notifications. These projects are assessed and determined by the local council.<br>Appeal rights for wind farm developments in NSW are:<br>• **Wind Farms with Capacity of Less than 30MW:** Procedural appeal rights (available to any person) only - to restrain a breach of the *Environmental Planning and Assessment Act 1979.*<br>• **Wind Farms with Capacity of More than 30MW but less than 250MW:** Procedural appeal rights (available to any person) - to restrain a breach of the *Environmental Planning and Assessment Act 1979.* Merit appeal rights (available to third-party objectors who made a submission during the public exhibition period). Merit appeal rights are extinguished if the proposal is subject to a Concept Plan or if an Independent Hearing and Assessment Panel is convened.<br>**Winds Farms with Capacity of at Least 250MW:** Wind farms with capacity to generate at least 250MW are currently declared 'critical infrastructure projects' (for applications lodged before 1 January 2013) and do not attract any appeal rights (neither procedural nor merit-based). |
| **Queensland Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Integrated Planning Act 1997*<br>• *State Development and Public Works Coordination Act 1971* | No specific provisions relating to wind farms; however, it is expected that such development would require an "impact assessment" level of consideration under the *Integrated Planning Act 1997 (IPA).* This requires public consultation as per the provisions of that Act.<br>If designated a "significant project" under the *State Development and Public Works Coordination Act* (see response to scale of wind farms), public consultation would also be undertaken through an EIS process.<br>Statutory requirements for public involvement in development assessment (including appeals) are contained in the IPA. In general IPA classifies development as:<br>• Exempt development – No approvals required<br>• Self assessable development – No approvals required provided requirements of a self assessable code are met<br>• Code assessable development – Development approval required but assessment is only against an assessment code that is usually part of a planning scheme. Code assessable development is not subject to public notice and no third party appeals are provided<br>• Impact assessable development – Public notice of applications is required. Assessment is against the whole planning scheme and public submissions are considered. Third part appeal rights are provided<br>• IPA and individual planning schemes establish the class of development for specific use<br>• State planning regulator provision can be made in specific circumstances (e.g. to implement a regional plan or to prevent serious environmental harm). Regulatory provisions have precedence over other state and local planning instruments<br>• Public authorities may also be involved in assessment as concurrence or advice agencies and assess proposals against their relevant laws and policies or associated state planning instruments. Concurrence agencies can direct local authorities to set conditions in an approval or direct refusal. Regardless of development type (code or impact) concurrence agencies are generally joined in any appeal by the applicant.<br>• State planning instruments may also be made under PA. These |

| Description | Comment |
|---|---|
| | generally apply to specific subject matters (e.g. provision of low cost housing). They may include policies and assessment codes. Local government must apply these in development assessment unless provisions have been incorporated into a planning scheme. State planning instruments include:<br>o State planning policies<br>o Regional plans<br>o State planning regulatory provision (SPRP)<br>• SPRPs take precedence cover all other planning instruments. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Public consultation processes as prescribed by Section 38 of the Development Act 1993 (generally Category 3 public notification)*<br>• *Alternatively, Major Development public consultation processes as prescribed by Sections 46-48 of the Development Act (e.g. Myponga Wind Farm)*<br>• *Crown development and public infrastructure public consultation processes as prescribed by Section 49 of the Development Act (e.g. Starfish Hill Wind Farm)*<br>Note: Applicants may undertake their own community consultation in addition to statutory requirements but there is no requirement to do so, and this does not negate statutory consultation requirements | *Category 3 Public Consultation*<br>• Direct notices to owners and/or occupiers of adjacent land and anyone else who, in the opinion of the relevant authority, would be directly affected to a significant degree, and additionally, notification to general public through newspaper notice<br>• Application on display for 10 business days at principal office of relevant authority– relevant authority has discretion on provision of copies of documents<br>• Written representations must be submitted during 10 day notification period<br>• Persons who make valid representation are entitled to be heard by relevant authority<br>• Applicant and persons who made valid representation can appeal to Environment, Resources & Development Court (except non-complying where applicant has no appeal rights).<br>*Major Development Public Consultation*<br>Consultation process dependent on level of assessment:<br>• Notification of Environmental Impact Statement (EIS), Public Environmental Report (PER) or Development Report (DR) to general public through newspaper notice only, no direct notices<br>• EIS or PER on display for 30 business days, DR 15 business days, at places determined by Minister – copies available for purchase.<br>• Written representations must be submitted within display period<br>• Public meeting must be held for EIS or PER within display period, no public meeting for DR<br>• Governor decision - no applicant or third party appeal rights<br>*Crown Development*<br>Public consultation only if development cost is over $4 million, no consultation for less than $4 million cost.<br>• Notification to general public through newspaper notice only, no direct notices<br>• Application on display for 15 business days<br>• Written representations must be submitted within 15 day display period<br>• Persons who make valid representation are entitled to be heard by Development Assessment Commission who report to the Minister<br>Minister decision – no applicant or third party appeal rights. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Tasmanian Resource Management and Planning System*<br>• *Land Use Planning and Approval Act 1993*<br>• *Environmental Management and Pollution Control Act 1994* | The System provides for three levels of assessment as defined in "Variability of assessment based on scale of wind farms".<br>For Levels 1 & 2, the following apply:<br>• Level 1 activities are advertised for public comment for a minimum of 14 days prior to Council's decision on the development application. Any member of the public who makes a representation during this period has the right to appeal the final decision.<br>• Level 2 activities are subject to the similar advertising and appeal rights to Level 1. The duration of the public comment period is generally longer and the DPEMP is included in the information |

| Description | Comment |
|---|---|
| | available for public scrutiny.<br>• Level 2 activities which attract a high level of public interest or are subject to assessment under the Commonwealth EPBC Act are classified as 2C assessments. This generally involves the additional step of advertising the DPEMP guidelines for public comment prior to issue to the proponent. This ensures that interested stakeholders are alerted to the proposal at an early stage of its development and have an opportunity to influence the scope of the DPEMP.<br><br>Wind farms in Tasmania are subject to public consultation twice during the assessment process (on the guidelines for the DPEMP and the DPEMP itself). Members of the public who made a representation in relation to the DPEMP also have the right to appeal the final permit conditions. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Planning and Environment Act 1987* | The planning permit procedure is provided in the Act. Where required, public notice of wind energy facility applications must be given for at least 14 days. Notice is generally given to adjoining land owners, the council, to any person to whom the planning scheme requires and to any other person if the responsible authority considers that the grant of the permit may cause material detriment to them.<br><br>Victoria's planning processes provide extensive opportunities for local communities to be notified and have their views carefully considered. These include notification and possible exhibition processes, Panel hearings or review by the Victorian Civil and Administrative Tribunal. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Renewable Energy Handbook for Western Australia (SEDO 2006)*<br>• *WA Planning and Development Act 2005* | The Guidelines outline the relevant considerations that the responsible planning authority should take into account (such as relevant local and region scheme provisions). In rural, non-urban and similar land use zones, local government should consider wind farm proposals under the provisions of Clause 4.4.2 (b) Model Scheme Text; that is, the use is considered discretionary for which the approval of local government is required and the public advertising procedures of Clause 9.4 apply.<br><br>For development approvals and land use approvals Western Australia does not allow third party appeals but only developer appeals, called reviews, which are heard by the State Administrative Tribunal. There is no right of appeal for Scheme Changes.<br><br>As regards Environmental Protection Authority recommendations there are appeal rights for all and these are heard by the Appeals Convenor and the decision is made by the Minister for the Environment. |
| **Wind Industry guidelines** | |
| | Refer to comments on *non-statutory consultation*. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidance note on assessing applications available on the quality planning website (http://www.qualityplanning.org.nz/).*<br>• *Ministry for the Environment - Guide to preparing a basic assessment of environmental effects (http://www.mfe.govt.nz/publications/rma/aee-guide-aug06/aee-guide-aug06.pdf.)*<br>• *Resource Management Act 1991* | The Resource Management Act makes it explicit that there is no duty to consult about resource consent applications.<br><br>Although neither the guidance note nor Ministry for the Environment guide referred to here are specifically designed to guide the consultation process, they provide insight into best practice community consultation and give links to relevant case law on the matter. |

### 3.3.1 Discussion

Statutory consultation requirements and processes are a matter for individual states and territories legislative and regulatory frameworks. As a result, consultation requirements, processes and periods vary between jurisdictions. Developers need to satisfy the planning requirements specific to each state.

It is understood that jurisdictions already adopt the Development Assessment Forum (DAF)[8] Leading Practice Model.[9] The DAF model provides an example of how national harmonisation can be achieved without interfering with jurisdictional independence or existing legislative processes and requirements.

### 3.3.2 Suggested action

None required.

## 4 OTHER ISSUES

### 4.1 VARIABILITY OF DEGREE OF ASSESSMENT BASED ON SCALE OF WIND FARMS

Wind developments may come in a range of sizes, from small community wind farms (10's MW) to large commercial developments (multiple 100's MW). Presently, trigger points based on size of development are used to determine the type of assessment in some jurisdictions.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Draft EIA Guidelines: Wind Energy (PlanningNSW, 2002)* | Assessment requirements for Part 3A projects are established on a project-by-project basis by the Department of Planning, with input from other regulatory agencies.<br>Assessment requirements for Part 4 designated developments are set in legislation and supplemented by requirements established on a project-by-project basis by the Department of Planning.<br>Assessment requirements for other Part 4 proposals are set in legislation and supplemented by the requirements of the particular consent authority (ie local council).<br>Refer to comments on appeal rights under *Community Consultation Process – Statutory.* |
| **Queensland Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Integrated Planning Act*<br>• *State Development and Public Works Organisation Act* | No specific provisions relating to wind farms.<br>It is expected that a wind farm would trigger generic "material change of use" development assessment under the IP Act. The assessment would be against local and regional plans and state policies as applicable. The Local Government Area would most likely be the assessment manager but, depending on location, an application may be referred to State agencies for assessment (either in a concurrence or advice role).<br>Major projects are likely to be designated as "significant projects" under the SDPWO Act. This provides a process whereby a whole-of-government assessment is undertaken (generally with an Environmental Impact Statement). This process includes public consultation. |
| **South Australian Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |

[8] The Development Assessment Forum (DAF) was formed to recommend ways to streamline development assessment and achieve consistency, while retaining quality decision-making. The Forum's membership includes the three spheres of government (Commonwealth, state/territory and local government), the development industry and related professional associations. Through its linkages with the Planning Officials Group, DAF provides advice and recommendations to Local Government and Planning Ministers.

[9] The Leading Practice Model provides a guide to the various jurisdictions in developing efficient, effective and nationally harmonised development assessment systems. The DAF model provides a toolkit that can be adapted and adopted by jurisdictions to suit their specific needs. Application of the model in each jurisdiction will result, over time, in the increased harmonisation of systems across Australia.

The DAF model does not seek to prescribe a specific approach for third party involvement, but rather sets out ten assessment tracks based on project complexity and impact. Jurisdictions can apply these assessment tracks through their planning ordinance or regulatory instrument to classes of use or development. The DAF leading practice model recognises that the development of effective planning policies should involve effective consultation with the community (amongst others) and consequently that community notice and consent processes are targeted to those applications where decisions that require balancing of policy objective will be informed by community views. Third party involvement (public notification/opportunity for comment and opportunity for review/appeal) is limited to the 'merit assess' and 'impact assess' tracks (to different degrees).

| Description | Comment |
|---|---|
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *The Tasmanian Resource Management and Planning System*<br>• *Land Use Planning and Approval Act 1993*<br>• *Environmental Management and Pollution Control Act 1994* | The Tasmanian Resource Management and Planning System provides for three levels of assessment for all proposed developments:<br>• Smaller development proposals are assessed under the LUPA Act by the local Council (Level 1)<br>• The environmental aspects of most industrial development proposals are assessed under EMPC Act by the Board of the Environment Protection Authority (Level 2)<br>• A proposal may be declared to be a Project of State Significance (Level 3). These are subject to an integrated assessment by the Resource Planning and Development Commission.<br>Schedule 2 of the EMPC Act defines facilities for generating energy through wind with a maximum generating capacity of 30MW or more to be Level 2 activities. It is possible for a smaller wind farm to be "called in" for assessment as a Level 2 activity and it is hypothetically possible for a very large wind farm to be declared a Project of State Significance.<br>The three major wind farms (greater than 30MW) assessed to date in Tasmania have all been assessed as Level 2 activities and all of the wind energy projects smaller than 30MW have been assessed as Level 1 activities. To date no wind farm proposals have been declared to be Level 3 projects. |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | There is no variability outlined in the assessment process in the Guidelines. However, the responsible authority has discretion regarding the level and extent of information required to be provided with applications and the appropriate notice requirements.<br>Depending on the proposed installed capacity of the wind farm, the relevant responsible authority changes — local council (≤30MW), State Government (>30MW). |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Visual Landscape Planning in WA: a manual for evaluation, assessment, siting and design (WAPC, 2007)* | The Manual addresses issues and principles for wind farm developments at three scales of application — regional, local and site-specific. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The principles contained in the Guidelines apply to all wind developments, although the work required for a specific development may vary in nature and scale depending on its size. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidance note on assessing applications available on the quality planning website (http://www.qualityplanning.org.nz/).*<br>• *Ministry for the Environment - Guide to preparing a basic assessment of environmental effects (http://www.mfe.govt.nz/publications/rma/aee-guide-aug06/aee-guide-aug06.pdf.)*<br>• *Resource Management Act 1991* | Schedule 4 to the *Resource Management Act* requires that the degree of information supplied by the applicant in the Assessment of Environmental Effects is commensurate with the scale and nature of the actual and potential effects of the proposal. In practice this requires applicants to make judgements as to the scope and degree of information they supply. Consent Authorities are empowered by the RMA to request further information and this has the potential to significantly slow processing times. This potential serves an incentive to applicants to engage with councils and the community in order to identify information requirements and to ensure that all the necessary information is supplied up front.<br>Amendments to the Act in 2005 appear to have limited uncertainty due to misuse of section 92 - but abuse still occurs and the uncertainty created by non-specific information requirements is the subject of ongoing concern among generators. |

### 4.1.1 Discussion

Across the different jurisdictions different legislative requirements and guidelines apply to the level of assessment required for wind farm developments. Some jurisdictions apply different assessment processes or requirements based on the scale of a development while the scope of assessment in other jurisdictions is determined on a case by case basis.

The scale of wind farm developments - either the number of turbines, the size of turbines or the generation capacity - may bear some relationship to the potential risks and impacts (such as impacts on visual landscape and local amenity). However, risk and impact will vary according to the circumstances of individual proposals and the locale. For example, a small scale wind farm set in a particularly sensitive area (such as the habitat of a threatened bird species) will be far more problematic than a large wind farm in a location with no particular sensitivities.

Where a differentiation regarding the scale of the development is made, the limit is generally set at an installed capacity of 30MW. This limit also fits with changes to the National Electricity Rules, which will see renewable developments larger than 30MW listed as semi-dispatch. Currently wind farms can export to the grid unconstrained. However, under the new rules, semi-dispatch generators may be asked to reduce or cease exports under grid constraint conditions.

Variability in the degree of assessment is desirable to ensure that the rigour of the assessment is appropriate to the environmental risk of the project. However, variability in the degree of assessment could become an impediment to the development of wind farms if an arbitrary threshold between major and minor assessment requirements imposes an extremely rigorous assessment on a project with minimal risk.

### 4.1.2 Suggested action

Recommend, as a best practice approach, providing flexibility in assessment requirements to ensure that the rigour of the assessment is proportional to the level of risk associated with the proposal.

## 4.2 AIRCRAFT SAFETY AND LIGHTING (LEADING TO FURTHER IMPACT VISUALLY AND FOR BIRDS)

The presence of wind turbines at a location, like any tall structure (eg building, telecommunications tower), may pose a risk to aircraft transiting the area. The Civil Aviation Safety Authority (CASA) is the primary agency dealing with this issue; however, other authorities also hold an interest (eg Air Service Australia and Defence). The general response is to require the installation of lighting on top of some towers, but this has secondary impacts on visual amenity and birds. These secondary impacts should also be considered when proposing mitigation measures to avoid aircraft collision.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *AC139-18(0) – Obstacle Marking and Lighting of Wind Farms (CASA, 2007)* | Assessment requirements are established on a project-by-project basis. They typically refer to AC139-18(0). |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies* | Development Plan policies seek to ensure a development does not impact on the safety of air transport operations and facilities.<br>Plans include mandatory referral to Commonwealth authorities where buildings impinge on building height limits shown in "Airport Building Heights" maps in Development Plans.<br>The relevant authority must follow the direction of the Commonwealth authorities.<br>The relevant authority may seek informal advice from CASA or other air safety authority where there is no mandatory referral. |
| **Tasmanian Government regulations and guidelines** | |
| | A matter for CASA, not a State Government responsibility. |

| Description | Comment |
|---|---|
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines note that the height of wind energy turbines can be substantial, resulting in potential impact upon nearby airfields. Consultation with CASA is necessary to determine any airfields within a 30km radius and associated requirements.<br>The responsible authority must ensure that turbines should not protrude into any obstacle limitation surface for any airfield. CASA should be consulted. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)*<br>• *Civil Aviation Safety Authority (Manual of Standards 139)* | The Guidelines recommend that the development should be highlighted on all navigational maps and be equipped with appropriate safety tower lighting. The CASA Manual, CASA, Air Services Australia and the RAAF should be consulted, as appropriate, for wind farms that are in the vicinity of flight paths etc. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines note that potential impacts on aircraft should be accounted for during site planning. Proponents are specifically advised to contact CASA, Air Services Australia, the authorities responsible for the operation of such facilities in the vicinity of the proposed site, and local agricultural aviators. There is no reference to the Department of Defence. The only reference to the Royal Australian Air Force (RAAF) is in relation to advising the RAAF of the location of any monitoring masts.<br>Appendix 5 of the Guidelines provides additional detail in respect of aircraft safety, including CASA requirements for lighting. |
| **Commonwealth regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *AC139-18(0) – Obstacle Marking and Lighting of Wind Farms (CASA, 2007)*<br>• *Defence (Areas Control) Regulations 1989 Volume 13 Statutory Rules 1989 No. 337 as amended made under the Defence Act 1903*<br>• *Manual of Standards (MOS) Part 139 - Aerodromes* | Defence are developing a set of guidelines for siting wind farms with respect to Defence aviation activities.<br>Civil Aviation Safety Authority has recently advised that Advisory Circular 139-18(0) will be withdrawn for revision. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Civil Aviation Act 1990 – Part 77 Objects and Activities Affecting Navigable Airspace June 2007* | Approval is required from the Civil Aviation Authority before erecting structures in the vicinity of airports or in identified flight paths. |

### 4.2.1 Discussion

This is a Commonwealth planning issue covered by several Commonwealth agencies.

The current CASA requirements are based on the height to the blade tips and do not account for local topography. This may lead to a situation where a 95m turbine on a hill needs no lighting, but a 110m turbine in the adjacent valley needs lighting — even though the shorter tower on the hill poses a greater risk to aviation.

CASA's statutory power to require obstacle marking and lighting on obstacles under Civil Aviation Safety Regulation Part 139-18(0) only applies within the vicinity (approximately 30km) of an aerodrome. CASA cannot mandate the lighting or marking of structures outside the vicinity of aerodromes. It is CASA's view that this is a decision for, and the responsibility of, the developer. Any associated requirements placed on developers by planning authorities, insurers or financiers are beyond CASA's scope.

In 2007 CASA published Advisory Circular 139-18(0) to provide guidance to wind farm developers on their hazardous potential for aviation and to provide advice on means of marking or lighting them to mitigate such hazards. The advice contained within that circular gave the impression that CASA could require the lighting of obstacles not in or near the vicinity of an aerodrome. CASA's Industry Complaints Commissioner (ICC) has since considered industry complaints regarding AC 139-189(0) which identified a

number of issues with the circular. After considering the report of the ICC, the CEO has directed that CASA withdraw Advisory Circular 139-18(0). The CEO has also directed that CASA now undertake an appropriate safety study into the risk to aviation posed by wind farms and develop a new set of guidelines. This process will include appropriate consultation with industry and stakeholders on wind farms and a risk management approach with respect to aviation.

The Department of Infrastructure, Transport, Regional Development and Local Government is currently developing its National Aviation Policy Statement.

Defence concurs with the CASA Advisory Circular AC 139-18(0) Obstacle Marking and Lighting of Wind Farms. Defence would like to asses all wind farm proposals to assess the impact on Defence activities including the safety of aircraft operations and the operation of radars, communications and navigation aids (navaids).

Airservices Australia would also like to review wind farm proposals as they may impact on the safety of airport operations.

Defence are developing a set of guidelines for siting wind farms with respect to Defence aviation activities.

Defence (Areas Control) Regulations (DACR) have been extended for the major Defence airfields. The DACR contains the Obstruction Clearance Surface (OCS) and imposes height constraints over the land within approximately 15km radius of an airfield. The DACR are regulations made under the Defence Act 1903 and require any proposal for a structure higher than the DACR constraints to be referred to Defence for approval. A wind farm situated within 15km of an airfield has the potential to infringe the OCS and would not be supported by Defence as the wind turbines would be a hazard to aircraft.

Defence further advises that wind farms situated within 30km of an airfield would have the potential to impact on aircraft flying by instruments.

Areas marked as Prohibited, Restricted or Danger Area on aeronautical charts may be used for low level flying or low level jet routes. Defence very strongly discourages wind farms in designated low flying areas.

Wind monitoring masts are also of concern due to their small visual profile and the guy wires which support them. Defence requests that developers consult Defence to assess the impact of their wind monitoring masts prior to construction.

### 4.2.2 Suggested action

Note that CASA is currently revising Advisory Circular 139-18. CASA will undertake an appropriate safety study into the risk to aviation posed by wind farms and develop a new set of guidelines. This process will include appropriate consultation with industry and stakeholders on wind farms and a risk management approach with respect to aviation.

Note also that Defence is developing a set of guidelines for siting wind farms with respect to Defence aviation activities.

## 4.3 ELECTROMAGNETIC INTERFERENCE (INCLUDING BOM EQUIPMENT)

There are three main mechanisms by which wind turbines can produce electromagnetic interference that may affect radio, television, mobile phones and possibly radar. The first mechanism is a near field effect resulting from electromagnetic fields produced by the generator and switching mechanisms in the turbine nacelle. This is addressed by the electromagnetic emission standard AS/NZS 4251.2: 1999. The second mechanism is diffraction resulting from turbines providing obstructions to advancing electromagnetic wavefronts which are partly reflected and partly absorbed by the turbines. The third mechanism is reflection/scattering caused by rotating blades receiving the primary signal and producing a scattered signal, so that the receiver picks up two signals of which one (the scattered signal) is time delayed or distorted compared to the primary.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Assessment requirements are established on a project-by-project basis. They typically include consideration of interference in electric and magnetic fields. |

| Description | Comment |
|---|---|
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies* | Development Plan policies seek to minimise nuisance or hazard arising from interference to television or radio signals.<br>The relevant authority may seek informal advice from technical regulators or BOM. There is no requirement for mandatory referral. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)* | The Guidelines require that the DPEMP should identify the potential for the project to disrupt communications signals and also identify the public health issues potentially associated with electric and magnetic fields from the project (particularly transmission lines). |
| **Victorian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (SEAV, 2003)* | The Guidelines state that the siting of wind turbines in the "line of sight" between transmitters and receivers should be avoided. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Guidelines for Wind Farm Development Planning Bulletin 67 (WAPC, 2004)* | The Guidelines state "that electromagnetic interference is likely to be limited. However, effects can be minimised through the appropriate turbine siting, avoiding the line of sight of telecommunications transmitters and receivers or through technical modifications to turbines, repeater stations or receivers." |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines identify the potential for wind turbines to interfere with microwave, television, radar or radio transmissions. They also identify this issue as potentially requiring detailed assessment.<br>Appendix 11 of the Guidelines provides additional detail in respect of likely effects and possible remedial actions.<br>While mention is made of the possibility of interfering with aircraft radar, the Guidelines primarily focus on telecommunications (radio and television). |
| **Other Guidelines/Standards** | |
| The relevant documents are:<br>• *Australian Standard: Limits of electromagnetic interference from overhead a.c. powerlines and high voltage equipment installations in the frequency range 0.15 to 1000 MHz (AS/NZS 2344:1997)*<br>• *Electromagnetic compatibility (EMC) - Generic emission standard - Industrial environments (AS/NZS 4251.2: 1999)* | Auswind Best Practice Guidelines deal with these issues in more detail. |
| **New Zealand regulations and guidelines** | |
| | No specific provisions relating to wind farms. |

### 4.3.1 Discussion

Electromagnetic interference can cause annoyance for local residents by interfering with radio, television, GPS and mobile phone operation. This is most effectively addressed by using rules-of-thumb when siting turbines, such as avoiding line of site between receivers (dwellings) and transmitters to minimise the likelihood of interference. Post construction monitoring will then identify any remaining issues which can be addressed at a local level via installation of signal boosters, improved aerials or several other remedies.

International experience indicates that electromagnetic interference from wind farms can also impact on radar operation. Impacts on radar are sometimes alluded to in current regulations but are not specifically addressed.

A wind farm situated within the radar line-of-sight, within the line-of-sight of a microwave link or within proximity to a navigation aid or trig station, can also impact on the operation of these facilities.

Commercial and government operators of such facilities (such as Defence and Airservices Australia) often have their own requirements and standards for assessing EMI and like to assess wind farm proposals to ensure the wind farm does not degrade the operation of these systems. Similarly, commercial or community-based operators of other services for local residents (particularly mobile phone services and potentially fire or emergency services) may seek to undertake their own assessment of potential EMI. As such, specification of a standard method for modelling EMI for wind farms may not be appropriate.

### 4.3.2 Suggested action

The proposed National Wind Farm Development Guidelines should provide advice on how wind farm proponents should address impacts on parties affected by EMI. Reference to the Auswind Best Practice Guidelines could be included.

## 4.4 RISK OF FIRE

Wind turbines produce energy by transferring mechanical energy (rotation of the blades) into electrical energy through a generator. In this operation, there is the risk that sparks may be created by the generator and the concern is that these may result in a fire inside of the turbine that could spread to adjacent areas of bush and grassland.

It should be noted that wind farms are generally situated on ridgelines in areas of open pasture where the wind resource is not affected by surrounding trees. This, in turn, reduces the risk of bushfire from these facilities.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Typically not addressed. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies*<br>• *Building Rules Assessment under the Development Act* | Development Plan policies seek to minimise bushfire risk.<br>The relevant authority may seek informal advice from Metro or Country Fire Services. There is no requirement for mandatory referral.<br>Building Rules Assessment deals with fire safety issues within buildings. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *General Guidelines for the Preparation of a Development Proposal and Environmental Management Plan for Wind Energy Projects (DPIWE, 2004)* | The Guidelines require that the DPEMP should identify the potential fire risk associated with the project. This should include consideration of fire within the site, fire escaping from the site and the effect of wildfire originating outside the development. |
| **Victorian Government regulations and guidelines** | |
| | Not addressed. |
| **Western Australian Government regulations and guidelines** | |
| The relevant documents are:<br>• *Planning for Bushfire Protection (WAPC and FESA 2001)*<br>Fire and Emergency Services Authority of Western Australia (FESA) | Some general guidance provided within the planning document. |

| Description | Comment |
|---|---|
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines identify fire hazard management as an issue that potentially requires detailed assessment. They recommend consultation with rural fire services early in the development process.<br>While noting the low risk of fire from a wind development, Appendix 10 of the Guidelines provides guidelines for fire management. Specific actions identified for fire management include consulting with local and regional rural fire offices, agreeing on appropriate fire management actions and developing an Emergency Response Plan. Appendix 10 also provides specifications for roads/tracks within the development to ensure ready access by fire vehicles. It also recommends identifying local water reserves, maintaining basic fire-fighting equipment on-site and providing mobile telephone and UHF radio communications on construction sites. |
| **New Zealand regulations and guidelines** | |
| | Not addressed. |

### 4.4.1 Discussion

No specific guidelines are identified apart from those in the Auswind Best Practice Guidelines.

The Australian Standard AS1851-2005 *Maintenance of fire protection systems and equipment* and the International Electrotechnical Commission standard IEC 61400-1 *Wind Turbine Safety and Design* may also be relevant.

Fire risk associated with wind farms is fundamentally no different from the fire risk associated with any other industrial or farming equipment that may operate in similar condition, and thus, should be addressed under existing schemes.

There are dissenting views as to the real fire risk associated with wind turbine generators. Independent research could provide a basis for determining whether there is a need for any specific requirements to address fire risk and will also provide a valuable resource for public education.

Developers are very exposed to risk from fires as they stand to lose a multi-million dollar investment in the form of the wind turbine generator (or the whole farm if the fire spreads). The same applies to their insurers.[10] Both parties therefore have considerable incentive to minimise the risk of fire.

### 4.4.2 Suggested action

Fire risk is typically already addressed by local regulatory frameworks. Within the proposed National Wind Farm Development Guidelines, encourage better consultation with local and regional fire authorities.

## 4.5 RISK OF LIGHTNING STRIKE

The metallic structure of a wind turbine may serve as a conductor for lightning produced by storms in the vicinity of the turbine. The concern is that this may increase the risk of lightning producing bush and grass fires. This issue is similar to that resulting from any tall structure (eg building, telecommunications tower) and is generally regarded as a design issue.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Typically not addressed. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |

[10] An assessment of insurance claims by the Danish Insurance Association over a 15 year period up to 1998 indicated fire was a contributing cause in only 7% of claims. The report also noted that improvements had been made to turbine design to reduce fire risk (eg installation of oil coolers, use of fire-retardant materials for noise insulation, addition of shielding on disc brakes, installation of remote monitoring systems).

| Description | Comment |
|---|---|
| **South Australian Government regulations and guidelines** | |
| | Not assessed. This is a technical issue and is not relevant to planning or environmental assessment. |
| **Tasmanian Government regulations and guidelines** | |
| | This is a basic engineering consideration for the proponent. It is not considered to be relevant to environmental or social impact assessment except as it relates to fire risk (covered separately). |
| **Victorian Government regulations and guidelines** | |
| | Not addressed. |
| **Western Australian Government regulations and guidelines** | |
| | Not addressed. |
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | Appendix 12 of the Guidelines identifies a range of standards to be met in the design and planning of wind developments. These include AS/NZS 1768(Int)-2003 Lightning protection and IEC/TR 61400-24:2002 Wind turbine generator systems - Part 24: Lightning protection. |
| **New Zealand regulations and guidelines** | |
| | Not addressed. |

### 4.5.1 Discussion

This is covered by national and international design standards.

### 4.5.2 Suggested action

None required.

## 4.6 IMPACT ON PROPERTY VALUE

The presence of a wind farm may result in changes to land values in the area surrounding the development. This is similar to any proposed development in an area. At present there are no requirements for other developments that comply with local zoning regulations and that have planning approval to pay compensation to landowners in proximity to the development.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Assessment requirements are established on a project-by-project basis. They typically include consideration of impacts on property values, land use conflicts and land/ resource sterilisation. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| | Not assessed. Not relevant in any planning or environmental assessment. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Land Use Planning and Approval Act 1993* | The LUPA Act objectives provide for explicit consideration of social and economic effects when decisions are made about the use and development of land. |
| **Victorian Government regulations and guidelines** | |
| | Not addressed. |

| Description | Comment |
|---|---|
| **Western Australian Government regulations and guidelines** | |
| | Not addressed. |
| **Wind Industry guidelines** | |
| | The issue is not specifically mentioned in the Auswind Best Practice Guidelines. |
| **New Zealand regulations and guidelines** | |
| | No specific provisions relating to wind farms. |

### 4.6.1 Discussion

There is no requirement for any other development to undertake an assessment of impacts on property values (presumably with a view to compensating aggrieved individuals). It would be a dangerous precedent to introduce such a requirement for wind developments.

The issue of appropriate siting of such facilities should be addressed where it is best placed and currently sits — in the zoning schemes.

### 4.6.2 Suggested action

None required.

## 4.7 COMMUNITY BENEFIT

A wind farm may produce benefits to the community through reducing the nation's carbon footprint, creating local and regional employment during both construction and operation stages, and through payment of rates (or the like) to local councils.

| Description | Comment |
|---|---|
| **New South Wales Government regulations and guidelines** | |
| | Typically not addressed. |
| **Queensland Government regulations and guidelines** | |
| | No specific provisions relating to wind farms. |
| **South Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Relevant Development Plan policies* | Development Plan policies seek to minimise adverse impacts and maximise positive impacts on the community. |
| **Tasmanian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Land Use Planning and Approval Act 1993* | The LUPA Act objectives provide for explicit consideration of social and economic effects when decisions are made about the use and development of land. |
| **Victorian Government regulations and guidelines** | |
| | Generators including wind farms have the option to elect not to pay council rates under the Local Government Act and make payment in lieu of rates according to a formula prescribed by the Electricity Industry Act. Payment in lieu of rates is based on $40,000 plus $900 per MW of rated capacity, with discounts for generators operating at low capacity. |
| **Western Australian Government regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Renewable Energy Handbook for Western Australia (SEDO, 2006)* | The Handbook provides reader-friendly background information on the importance of renewable energy for future sustainable generations. |

| Description | Comment |
|---|---|
| **Wind Industry guidelines** | |
| The relevant documents are:<br>• *The Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (AWEA, 2006)* | The Guidelines note that a "best practice wind farm" will make a positive economic contribution to the community in which it is located.<br>The Guidelines note the need to develop an impact statement that identifies, among other things, the economic effects of the project. The impact statement should include details of the number of temporary and permanent jobs created and the value of contracts available locally. The assessment of socio-economic impacts is identified as an area potentially requiring detailed assessment. |
| **New Zealand regulations and guidelines** | |
| The relevant regulations, policy and guidelines are:<br>• *Wind Energy Association Fact Sheet 4 – Tourism.* | Aside from the Wind Energy Association's fact sheet, there are no specific provisions relating to wind farms. |

### 4.7.1 Discussion

There is no uniformity regarding municipal rates across jurisdictions. Some councils are aware of the revenue stream that can be generated by wind farm developments, while others are not aware of the revenues they are entitled to.

### 4.7.2 Suggested action

Note that it is up to municipal authorities to decide how rates are set.

## ATTACHMENT 1 –
## WIND FARM DEVELOPMENT WORKING GROUP OF OFFICIALS

The Australian Government has committed to deliver 20% of Australia's electricity supply from renewable energy by 2020. This will drive significant investment in wind farm development.

The wind energy industry has expressed a need for greater consistency and transparency in the wind farm planning and assessment processes Australia-wide. It has called for a national approach and expressed a willingness to work with governments to develop a code of practice to facilitate informed decision-making. Some communities have raised concerns about wind farm developments, mostly on the basis of visual impact on landscapes, turbine noise and potential impact on threatened species of birds and bats. Building community acceptance of a technology that has the potential to deliver a significant proportion of Australia's future electricity needs and greenhouse gas abatement is vital to the continued development of the wind industry in Australia.

Wind farm development would benefit from governments acting collectively to deliver a higher degree of consistency and certainty about the planning, assessment processes and environmental performance monitoring of wind farms, including in relation to community consultation.

The Working Group of Officials will report to the EPHC Standing Committee on how impediments to the uptake of wind energy might be addressed, including the possibility of establishing a national code for wind farms.

### MEMBERSHIP

| | |
|---|---|
| Chair: | Commonwealth |
| Members: | New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania and a representative of Local Government and Planning Ministers' Council |
| Secretariat: | NEPC Service Corporation |

### TERMS OF REFERENCE

The aim of the Working Group is to identify the impediments associated with wind farm development in Australia and to establish whether it is possible to enhance confidence from the community and industry in the wind farm planning and assessment processes through the development of a national wind farm code or by other means.

Its role is to:

- Settle membership of the Stakeholder Reference Group, based on a review of the membership of the existing Commonwealth working group established in 2007 to develop a National Wind Farm Code.
- Consult with the Stakeholder Reference Group during the development of the working group report
- Identify key impediments to the environmentally and socially responsible development of the wind energy projects.
- Develop a report on how identified impediments to wind power might be addressed, focussing in particular on consistency and certainty about the planning and assessment process, including ongoing environmental monitoring of wind farms. Consideration will be given as to how any suggestions sit in relation to relevant planning and environmental legislation.
- Examine whether there would be advantages in drawing the documents listed below together (in particular their key principles) under a national wind farm code.

In developing the report, the Working Group should consider the following documents:

- Various Commonwealth, state and territory requirements under legislation and government policy in relation to planning and assessment for wind farm development.
- Existing industry tools such as Best Practice Guidelines; the Interim Standards for Assessing the Risks to Birds from Wind Farms; the National Framework for Assessing Landscape Values for Wind Farms; and the Wind Industry Accreditation Scheme.

**ATTACHMENT 2 –**
**WORKING GROUP MEMBERSHIP**

| | |
|---|---|
| **Stephen Oxley (Chair)**<br>Assistant Secretary | Renewable Energy Branch<br>Department of the Environment, Water, Heritage and the Arts |
| **Jadranka McAlpine**<br>Acting Director<br>Renewable Energy Deployment Team | Renewable Energy Branch<br>Department of the Environment, Water, Heritage and the Arts |
| **Rebecca Collins**<br>Project Officer<br>Renewable Energy Deployment Team | Renewable Energy Branch<br>Department of the Environment, Water, Heritage and the Arts |
| **Simon Howes**<br>Principal Planner, Legislation | Planning SA |
| **John Lane**<br>Director, Integrated Planning | Strategy and Policy Division<br>Environmental Protection Agency (QLD) |
| **Leigh Simpkin**<br>Principal Policy Officer | Office of Climate Change<br>Department of Environment and Conservation (WA) |
| **Tara Cherrie**<br>Senior Environmental Planner | Environment and Sustainability<br>Department for Planning and Infrastructure (WA) |
| **Tristy Fairfield**<br>Policy Officer | Office of Climate Change<br>Department of Environment and Conservation (WA) |
| **Scott Jeffries**<br>Director Major Infrastructure Assessments | Department of Planning (NSW) |
| **Nicholas Sawyer**<br>Senior Environmental Officer | Assessments Section, Environment Division<br>Department of Environment, Parks, Heritage and the Arts (TAS) |
| **Darryl Cook**<br>Director, Assessments Section | Assessments Section, Environment Division<br>Department of Environment, Parks, Heritage and the Arts (TAS) |
| **Cameron Frazer**<br>Manager, Sustainable Energy and Transport | Sustainability and Innovation<br>Environment Policy and Climate Change<br>Department of Sustainability and Environment (VIC) |
| **Sarah McDonald**<br>Manager, Statutory Initiatives | Department of Planning and Community Development (VIC)<br>Representative of Local Government and Planning Ministers' Council Joint Committee |
| **Diwaker Basnet**<br>Senior Policy Officer<br>Sustainable Energy and Transport | Environmental Policy and Climate Change Division<br>Department of Sustainability and Environment (VIC) |
| **Monina Gilbey** and **Susan Whitehead**<br>Project Officers<br>Secretariat Support | National Environment Protection Council Service Corporation |

**New Zealand Contributor**

| | |
|---|---|
| **Tim Bennetts**<br>Manager, Resource Management Act Policy and Functions Local Government Group | Ministry for the Environment |

**ATTACHMENT 3 –**
**STAKEHOLDER REFERENCE GROUP MEMBERSHIP**

| Name | Affiliation | Representation |
|---|---|---|
| **Liz Johnstone** | Municipal Association of Victoria<br>Senior Planning Advisor | Local Government Interests |
| **Andrew Richards** | Pacific Hydro<br>Executive Manager<br><br>Clean Energy Council<br>Board Member | Wind Energy Industry |
| **Brett Thomas** | Acciona Energy<br>Managing Director | Wind Energy Industry |
| **Tim Le Roy**<br>(Randall Bell representing) | Tarwin Valley Coastal Guardians<br>Spokesperson | Community Group |
| **Yvonne Wenham** | Friends of Future Generations Spokesperson | Community Group |
| **Colin Griffiths** | Australian Council of National Trusts<br>Executive Officer | Professional Organisation |
| **Di Jay** | Planning Institute of Australia<br>Chief Executive Officer | Professional Organisation |
| **David Clarke** | VIC Central Highlands Area Consultative Committee Inc<br>Chair | Farming |
| **Tom Perrigo** | National Trust of Australia (WA)<br>Chief Executive Officer | Professional Organisation |
| **Damein Bell** | Indigenous Advisory Committee (IAC) | Indigenous Interests |
| **Chris Tzaros** | Birds Australia<br>Conservation Officer | Birds of Australia |

## ATTACHMENT 4 –
## RESPONSE TO COMMENTS FROM STAKEHOLDER REFERENCE GROUP

A range of concerns was raised individually by members of the Stakeholder Reference Group. Not all concerns were shared by all members of the Stakeholder Reference Group: however, the working group felt that such concerns should be noted and addressed. These concerns have been summarised below together with responses to said concerns.

| Stakeholder Concern | Response |
|---|---|
| **Community trust** | |
| There was a range of issues raised where the underlying theme seemed to be a lack of trust by the community of the wind industry and government | Governments need to develop education and awareness campaigns to help inform communities about government policies in relation to increased renewable energy, the targets proposed and the likely development effects in rural communities. These materials need to be balanced and address both the benefits ($CO_2$ reduction, dangers in a failure to act, etc) and dangers (development impacts, increased rural industrialisation, etc). These materials should address renewable energy in general and not just wind farms.<br><br>State governments should also develop education and awareness campaigns that inform people of the different planning zones and allowable activities in each zone. This particularly applies to "tree changers" who may be entering rural communities with romantic expectations of the rural zone.<br><br>The National Wind Farm Development Guidelines should provide clear direction on principles applicable to each area of wind farm development and back these with agreed methods for assessing each technical issue addressed in the Guidelines. This would provide transparency that is needed by communities and developers alike. An abridged version of the issues and principles could also be issued for public consumption.<br><br>Community consultation will be addressed as a key issue in the National Wind Farm Development Guidelines. While there are elements of consultation in all technical areas and these should be addressed in the individual technical methodologies, there is also a need to ensure a centralised consultation process that promotes dialogue and not just issues management. |
| There was a perception that developers and their opponents may make claims about a development (eg job creation, economic benefits, hazards) that are not rigorously evaluated by decision-makers. There is also no evaluation of such claims to ensure their validity and, where such claims are proven to be untrue, sanctions and compensation should be considered. | This situation also applies to other developments and may need to be addressed through the state planning process.<br><br>The payment of compensation and implementation of sanctions would set a significant precedent for all developments. It is unclear what party would have to establish the burden of proof as to a false or genuine claim. |
| There is a concern that groups within the community may disseminate misinformation about wind farms. | Effective and balanced education is the appropriate mechanism to deal with misinformation. Commonwealth and state governments have a role to play in this regard, and such measures have been identified in this report's recommendations. |
| **Permit conditions** | |
| It was noted that variations to permit conditions can be sought by developers and that there is a perception that these may result in greater impacts but are not subject to the planning process (including third-party rights of appeal). | State governments should develop education and awareness campaigns that inform people of the planning process and clearly identify the conditions under which permit variations are granted. |
| The community cannot understand the differences in permit conditions between developments, particularly when the basis for them is not apparent. Standard conditions ought to be possible covering a range of matters and issues. | There will always be differences in permit conditions between developments in order to address site-specific conditions at each development. However, the National Wind Farm Development Guidelines should consider whether, for specific issues, some degree of standardisation of permit conditions could be achieved. These conditions could be developed in a tiered approach to enable flexible implementation based on the risks present at specific sites.<br>This would also assist in reducing discrepancies between state and Commonwealth permit conditions, which has been a concern for developers in the past. |

| Stakeholder Concern | Response |
|---|---|
| Monitoring and performance data should be published publicly. | The National Wind Farm Development Guidelines should consider mechanisms to provide information to the community about wind farm operations. |
| **Cumulative impacts** | |
| The measurement of cumulative impacts needs to be considered as more wind farms are developed. | The assessment of cumulative impacts, while referred to in planning policy and regulations, is not well defined. Further work is required to develop a methodology for the assessment of cumulative impacts. In the development of the National Wind Farm Development Guidelines, the Working Group should seek advice as to whether this is being addressed elsewhere in government or whether the Guidelines should seek to outline a methodology specifically for wind farms. |
| **Birds** | |
| New remote monitoring techniques need to be deployed in assessing the potential impacts to bird life. | While the general risk-tiered approach is of the Auswind bird standard is commendable, one of the criticisms is that it is too prescriptive. The National Wind Farm Development Guidelines should assess the Auswind bird standard to ensure it is flexible to new technologies that can provide improved data availability, particularly with respect to behavioural responses to wind farms. |
| There is a lack of basic information on migration patterns of Australian and international migratory bird species. Research needs to be undertaken to fill this gap and compile the information into a national database. This database can then be consulted by developers so that their developments can be situated away from areas of high migratory traffic. | While perfect knowledge would be ideal, the cost of undertaking this research (and the same for every plant and animal species that could be impacted by any development) would be prohibitive. The approach taken in all jurisdictions is for the developer to undertake sufficient monitoring before submitting their planning application in order for the effects of the development on migratory species to be properly identified. The primary limitation in securing this information with regard to migratory bird species is the reliance on human observers for undertaking this work. The National Wind Farm Development Guidelines need to ensure that remote monitoring techniques can be readily incorporated into the Guidelines as they become available.<br><br>Funding agencies and industry should be encouraged to make funds available for the development and commercialisation of new remote monitoring techniques and for research into bird migration and behavioural responses to infrastructure (including wind farms).<br><br>The need for a national database to consolidate bird migratory and behavioural data should be investigated in developing the National Wind Farm Development Guidelines. |
| State wildlife managers should be funded by the energy industry and the Commonwealth Government to undertake monitoring of birds at existing and future wind farm sites. | State wildlife managers do not have the resources or the time to undertake such monitoring activities. The approach taken in all jurisdictions is for the developer to fund and undertake any monitoring required before, during and after construction of any development.<br><br>If the issue is the potential conflict of interest the developer has in funding such monitoring, this should be lessened by ensuring the National Wind Farm Development Guidelines have a transparent, risk-tiered methodology for undertaking such monitoring. This could also be enhanced by including a requirement for progressive independent review at key decision-making milestones within the methodology. This would have the advantages of removing the community perception of bias and providing early advice to the developer as to their progress in assessing impacts to birds. |
| **Bats** | |
| The same concerns raised in relation to birds equally apply to bat species, although the base information on bat species is poorer and our current ability to monitor such species is more limited. | Refer to the responses provided to these concerns under the *Birds* category. |
| **Landscape assessment** | |
| A national landscape assessment should be undertaken to identify areas suitable and unsuitable for wind farm development. | The cost of such an assessment would be prohibitive and would result in the assessment of many areas that are unsuited to development due to poor wind resource. The approach of developing renewable energy atlases and working with local government to undertake local landscape assessments, where there is a likelihood of development, should continue. Such assessments can then be integrated with local zoning schemes and |

| Stakeholder Concern | Response |
|---|---|
| | planning overlays, using a combination of approaches as suggested throughout the report. |
| Photomontages should be a truthful representation of a potential development. | Address landscape and visual assessment in the National Wind Farm Development Guidelines. This should include direction as to the appropriate representation of a view and the selection of viewpoints for representation. |
| **Noise** | |
| A standardised procedure applicable across all jurisdictions is required for the assessment of noise from potential wind developments. | As stated earlier in this report, the Working Group will seek clarification as to when the new Australian Standard addressing noise from wind farms will be released.<br>Noise should be addressed as a key issue in the National Wind Farm Development Guidelines. |
| Background noise testing needs to be undertaken at all potentially affected residences. | The draft Australian noise standard[11] provides direction on the selection of 'receivers' for measurement of background noise levels. |
| Provision of wind speed data, direction and atmospheric measurements should be compulsory for independent evaluation by affected residents. | This information is commercial in confidence to a developer and would not be publicly available. However, sufficient summary detail should be provided to enable independent review. This should be considered in the development of the National Wind Farm Development Guidelines. |
| A national ombudsman should be established for managing complaints, although these may not necessarily be restricted to noise. | State agencies are already empowered to hear complaints regarding wind farm developments.<br>State governments should develop education and awareness campaigns to inform communities of the complaints process and the agencies with responsibility for investigating complaints. Citizens already have access to the Ombudsman. |
| Assessment on the stability of the atmosphere at the site should be compulsory. | The draft Australian noise standard provides direction on undertaking measurements that ensure that atmospheric stability is taken into account. |
| Definition of "special audible characteristics" should be clarified, and assessment made at all potential sites of the ability to adhere to a 5dB penalty. | The draft Australian noise standard provides clarification of "special audible characteristics" and suggests a penalty be added to the predicted noise level. However, the setting of thresholds is the responsibility of State Governments. |
| **Heritage** | |
| The assessment of heritage needs to address the full range of heritage values — social, aesthetic, historic, scientific and spiritual. This, in turn, requires a consistent community and stakeholder consultative process. | Address heritage assessment in the National Wind Farm Development Guidelines.<br>As noted above, a community consultation process that is coordinated across all technical areas should also be addressed in the National Wind Farm Development Guidelines. |
| **Economics** | |
| The development of wind farms in rural areas will serve as a disincentive to migration from urban to rural areas ("tree changers") and second home owners. Such capital-rich migrants are a potential source of capital into poorer rural areas. | The contribution of "tree changers" and absentee landlords in economically enhancing rural areas is open to question. Many communities have reported that councils often have to divert funds from other services into areas where such urban migrants have high expectations. Such migrants also potentially have unrealistic expectations of rural life which can conflict not only with wind developments but also with other more traditional sources of rural income. |
| The economic benefit of wind farm developments to rural regions is negligible and often overstated in economic assessments. | The National Wind Farm Development Guidelines should consider providing direction on how to undertake both economic and financial assessments of wind farms. |
| Wind energy facilities are inefficient and would not exist without subsidy. | As noted above, governments need to develop education and awareness campaigns to help inform communities about their policies regarding increased renewable energy targets. These campaigns should also address the subsidy paid financially to renewable energy developers (financial |

[11] Draft Australian Standard 4959—200X *Acoustics — Measurement, prediction and assessment of noise from wind turbine generators*. Issued for public comment on 9 March 2007.

| Stakeholder Concern | Response |
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| | subsidy) and to non-renewable energy developers (historic pollution of the "commons"). |
| **Fire risk** | |
| Should a turbine catch fire, it is very difficult to fight a fire in the nacelle and prevent sparks spreading from the turbine. | There have been very few documented turbine fires. However, this does not mean that fire safety should not be considered when developing and operating a wind farm.<br><br>Developers should consult with the relevant fire authorities as part of the planning process. The Auswind Best Practice Guidelines also provide direction on developing site layouts to aid access for fire trucks.<br><br>Fire risk should be addressed in the National Wind Farm Development Guidelines through consultation with local fire authorities. |
| Wind farms should be prohibited from being developed in high fire risk areas. | The risk of fire from wind farms should be addressed on a case-by-case basis through existing local regulatory frameworks.<br><br>Fire risk should be addressed in the National Wind Farm Development Guidelines through consultation with local fire authorities. |
| **Hydrology** | |
| The comment was made that hydrological surveys are not typically undertaken for wind farm approvals, with specific reference to groundwater. | Surface water hydrology is considered as part of the normal planning process, particularly with regard to potential erosion and water quality impacts on rivers and streams. The Auswind Best Practice Guidelines identify stormwater management as one of the key issues to be addressed in Environmental Management Plans.<br><br>Groundwater hydrology is generally not considered as part of the normal planning process for wind farms. This is due to turbines primarily being located on ridgelines where they are away from regional aquifers. Thus, potential groundwater effects are likely to be extremely localised. The effect then is to potentially exacerbate existing landslips. However, developers will normally avoid such areas due to engineering design considerations and risks without the need for specific attention within the planning process. This is addressed by developers as part of geotechnical studies undertaken during the preliminary and detailed engineering design stages. |
| **Geology** | |
| The comment was made that geological surveys are not typically undertaken for wind farm approvals, with the specific concern being the potential for foundations to cause fault/ground movement and possible secondary groundwater impacts. | Geotechnical studies are undertaken for all wind farms to ensure foundations are properly designed, avoid rocky areas (particularly fractured rock) and do not result in landslip or subsidence.<br><br>However, potential regional effects (such as fault movement) are generally not considered as the turbine foundations do not significantly increase the mass at the site. This is because the foundations require the excavation and disposal of soil, and thus the weight of the foundations is roughly balanced by material removed from the site. |
| **Grid connection** | |
| There was a perception that developers get paid for their energy "at the farm gate" and therefore do not care whether the energy export from their site compromises the efficiency and effectiveness of the local electricity network and affects local users. | This is incorrect. The two main revenue streams for a wind farm are dependent on Marginal Loss Factors (at the transmission network level) and avoided Transmission Use of Service payments (at the distribution network level). Both these revenue streams are heavily dependent on efficient and effective network connections and balancing site selection with local/regional load growth.<br><br>The developer also needs to ensure their development does not adversely affect the electricity network as, under the "deep" network market model, the developer is liable to pay for all electricity network costs associated with their development (including any regional network reinforcement and other works required to embed the new generation efficiently into the network). Without this, the development will not be allowed to connect to the distribution or transmission networks. |

| Stakeholder Concern | Response |
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| The comment was made that the current centralised electricity grid is a disincentive for renewable energy development while the developer is expected to pay the full costs of grid connection. This may prevent exploitation of good wind resources and drive development into populated areas with available grid connections. Funds should be provided from the Infrastructure Fund to upgrade and extend the existing network to allow distributed energy to be connected into the grid without significant financial impost on new developments. | It is outside the terms of the working group to address this concern; however, the working group has noted this issue in the Executive Summary of this report.<br><br>However, resolution of this issue may not be as simple as providing funding for new infrastructure. It may be necessary to undertake a range of measures including, but not limited to, funding new transmission line infrastructure, adopting a 'shallow' rather than 'deep' network cost model, and rolling out of smart meters for demand control. |
| **Lease contracts** | |
| Standard lease contracts should be developed similar to those found with residential tenancy agreements, real estate purchases, car hire and goods purchases. | The wind industry should be encouraged to develop standard lease contracts that are available to the public. Like tenancy agreements, these can be modified on a case-by-case basis, but their availability would allow lessors to be better informed when entering contracts.<br><br>Conditions for decommissioning (including extension of the development life) could also be included in the standard lease contract. |
| **Community wind farms** | |
| There is a view that timeframes for assessment of funding applications for community wind farm projects are a disincentive to such projects. | This is outside the scope of this report. |
| **Decommissioning of infrastructure** | |
| There is no requirement for the wind farm to be decommissioned after its design life has been reached. | This situation applies to other developments and cannot be addressed without setting undesirable precedents.<br><br>Decommissioning will be addressed in the National Wind Farm Development Guidelines. |
| It is not clear whether jurisdictions are required to rehabilitate land at the end of the wind farm's life. | Site rehabilitation will be addressed in the National Wind Farm Development Guidelines. |