

Dollar / Foster North wind energy facility

Re : Dollar Wind Farm Pty Ltd -Meridian Energy – Southern Hydro

(...)

I would like to make a submission relating to the proposed development listed above. I will also be making presentations today for residents that cannot attend the hearing.

At the outset I would like to state that I strongly applaud any significant, effective and practical method by which greenhouse gas emissions and surrounding effects can be reduced. I believe this can be most effectively achieved by the reduction in energy use across the State (mainly through education, planning and good design standards) and, secondly, by energy production systems that might realistically offer an alternative to coal-fired power stations.

I am opposed to the development in its present form mainly because:

- a) The proposed windfarm is extremely unlikely to have any meaningful impact or contribution towards the lowering of greenhouse emissions on either a local or State level and to suggest so is deliberately misleading
- b) The benefactors of this project are likely to be the New Zealand government and a small number of landholders at the arguably significant long-term cost and risk to a considerably larger number of others- being local, regional and Victorian.
- c) No development of this magnitude can claim to be green and still involve clearing of native vegetation and habitat

As is argued elsewhere in this submission, the present proposal not only fails on these three important counts, but the inadequacies of basic research by the proponent along with its consultants and no EES, would appear to promote very little confidence in the understanding of, or commitment to the environment or the local human community.

I also wish to state my concern about and opposition to the proposed development for the following reasons:

1. Inadequate floral and faunal information.

It appears that the approach and standard for these reports are well below the fastidious levels that are required for such an important report.

Given the amount of time spent in the study area for flora studies was so small, (4 days) from the 4th to 7th of February 2004 and knowing that late summer is not an optimal time for flora studies/surveys as many flora species are spring flowering and cannot be identified at this time, makes it very difficult for me or the panel to have any faith in the report at all.

As with plants some animal species are inadequately researched as well. For example the Swift Parrot is a nationally endangered species that is known to fly from Tasmania to Victoria and from Victoria to Tasmania to breed. It appears ridiculous to search for this species when you know that it is heading back to Tasmania instead of from Tasmania to Victoria, not to mention only spending a total of three days searching for it.

No genuine effort seems to have been made to identify the relative frequency and occurrence of each of the listed fauna and appears only to be of a standard that is of the requirement of AusWea. Again an EES report would have been far more transparent than what has taken place.

Raptors are felt to be more likely than many other bird species to be killed by wind turbines. With eight types of raptors recorded in the proposed site it is very likely the Wedge-tailed Eagles sighted, given the very large territories occupied by breeding pairs in the district, that these are dispersing young. As such they may be more vulnerable to turbine-related death. As stated by the expert witness (Meredith) his numbers of bird deaths was incorrect and would be in fact higher than reported.

The lack of data about any small mammals and the very low diversity of reptiles and amphibians reported is probably due to the lack of time and effort expended on the biotic surveys as well as what all too frequently happens in grazed country subject to development applications: heavy stocking prior to survey causing the elimination of much floral evidence. To have been adequate the faunal and floral surveys should have been carried out over several seasons and at least during the spring/early summer period (September to December) and for periods longer than four days . Instead surveys were carried out at times when few deciduous forbs, migratory birds, reptiles and amphibians are likely to be found. This may well explain the presence of so many taxa unable to be identified at the species level. The more sceptical might suggest that this biotic down-time was deliberately targeted to reduce chance discoveries of inconvenient wildlife.

Failure to incorporate standard trapping techniques such as hair tubes or pit-traps and only

relying on Elliott traps in this contentious area, suggests that a less than earnest attempt to gain any accurate insight into the floral or faunal significance of the proposed area to be developed. If such techniques had been used it would have radically increased the number of species observed — Even laying down sheets of corrugated iron, a practice often utilised by herpetological researchers, could have been attempted, not to mention the fact that vegetated areas had not been fenced to keep livestock out. The playback sessions might also have included the calls of non-threatened species, such as Striated Fieldwren, Grey Goshawk and Southern Boobook Owl, as these are usually found in the area but were not detected by the survey.

With a little extra effort (given the proposed fiscal returns) a more meaningful picture of the flora and fauna of the area could have been obtained.

This study is inadequate to enable predictions beyond obtaining a snapshot of a heavily disturbed, exhausted group of sites. This data cannot fairly be used to make accurate predictions or interpretations of the study area. I would add that the snapshots obtained under such conditions could hardly have produced lower biotic values and that more work is required to obtain a more meaningful and reliable prediction of the impacts of the proposal on flora and fauna.

The panel members who were able to go on the site visit of the proposed land being used to host the turbines, would not have been able to miss the abundance of vegetation that is located all throughout the site. The idea that the site is, cleared rolling hills put forward by the proponent and their expert witnesses are absurd.

It should also be noted that Biosis Research only carried out limited field studies and that only quadrant 1 and 4 locations for point counts were actually in the proposed site. It should also be noted that Biosis have only done bird death modelling on birds that they sighted in the site and as mentioned by Biosis they did their observations from the ridgelines and not from the vegetation that exists throughout the proposed site, stating that they were sure that the bird species that inhabit such vegetation would stay in that vegetation and not be affected by the turbines. Once again this is an absurd statement and to suggest such a thing is irresponsible.

2. Negative impacts on the forested corridor between Corner Inlet and the Strzelecki Ranges.

While the proposed windfarm is sited on land used primarily for primary production, there exist within these lands significant areas of natural vegetation. Some of these are to be cleared as part of the proposal.

I feel strongly that no stands of native vegetation should be cleared for any development, especially one aspiring or claiming to be clean and green. The extent of clearing required for this development transgresses the spirit of native vegetation regulations.

The forested area proposed for clearing forms an integral part of the vegetated corridor that

Landcare has been working towards for the past 5 years with their Hills to Ocean recovery project. The Strzelecki Ranges form an important part of this corridor all the way to Wilsons Promontory National Park. (a very significant corridor for wildlife). The vegetation map in the report by Biosis shows much of this area to be cleared of vegetation”, which is of course nonsense and is a phrase that should not have been used in this context. It is not even cleared of trees. If this map intends to demonstrate the extent of pre-European vegetated landscape compared with regrowth, it is still very inaccurate. It serves to highlight the dangers of relying on overhead photography without adequate ground truthing.

This corridor presently helps assure continuity of movement for seasonally migratory birds such as Yellow-faced Honeyeaters, robins (including Scarlet Robins) and many other small passerines, as well as other migratory and dispersive native species. If substantially broken it has the potential to severely impact on the long term viability of many populations and perhaps species of native wildlife. With the project being located so close to a Ramsar site it is of vital importance that no migratory bird is threatened. Under agreements with foreign countries, which include Japan it is inherent that these treaties remain in place and do not threaten our other trade agreements that are in place. The affect that this could have on the whole Australian economy needs to also be taken into account.

3. Negative impacts on threatened natural communities.

No targeted surveys for threatened species seem to have been carried out in actually finding information; rather the team relied largely on AVW (Atlas of Victorian Wildlife) and other reports/databases for information. This is not good enough. Of necessity these databases for the area contain relatively scanty or incomplete information, through no fault of the AVW and its data contributors. Any consultant working in such a large-scale project should have taken more time and effort in surveying. Even attempting to rationalise the significance of the study area for threatened species through habitat potential is unreliable, and as the consultants should know that due to seasonal conditions and prior disturbances throughout much of the locality, original community units are difficult to clearly define.

In other words it would be fair to say the consultants were well aware that the timing and disturbance to the area would produce little if any value in accurately assessing the project’s potential significance to flora, fauna and threatened species and communities.

Threatened species would be very difficult to detect by surveys carried out at the wrong time of year. Victoria is still finding threatened species in reasonably large populations, some in areas of disturbed native grassland. This again serves to highlight the inadequacy of relying on databases and computer-generated information without backing this up with targeted, on-ground data collection.

Apart from overly generalised plant identification, some species are by themselves unusual and noteworthy in terms of their regional conservation status.

Eucalyptus kitsoniana is a rare and endangered species and needs to be protected at all

costs, as the Strzelecki Ranges are only 20% of what they use to be. Its potential habitat is under threat and needs to be protected at all costs.

Southern blue gum and Strzelecki gum are also under threat and in serious decline in the Strzelecki Ranges and are listed as endangered species. These and other another native species are at risk and under attack from projects such as this in our region.

Though Southern blue gum and Strzelecki gum have not been identified in this site due to poor data collection skills, 16 species recorded during the “detailed” flora and fauna survey were of regional significance. A total of 62 indigenous flowering plants were found on-site. One cannot tell without a thorough EES whether these species occur together or disparately in the study area. It is therefore quite impossible to tell from the information supplied whether threatened taxa or communities occur onsite. Nevertheless the area contains conserved native plant communities, and everything possible should be done to protect and regenerate the site. Landcare has formed a vital partnership with residents and farmers in the area, to revegetate and provide growth corridors and shelter belts this should be allowed to continue without the interference that will be placed on it, should this proposal be approved.

Native plants such as Mother shield fern and Sweet Pittosporum which have been listed as an introduced species are in fact indigenous ones and have been observed by locals to occur in several stands onsite. It has been reported to me that the area contains some extensive patches of well-structured and biodiverse grasslands. Yet, despite this, the fact that some of these will be cleared for the project, and the complete lack of research that went into assessing the presence and extent of understory species is an insult. The fact that no EES report was undertaken, the acceptance that the presence of such species is unlikely, nor the fact that they will be significantly impacted by the proposed development.

Despite the lengthy discussion in Supplement A, I feel the evidence presented under the conditions described are insufficient to accept as reputable. A four day study on flora in February 2004, over an area that spans over 2300 hectares is far from being an adequate study period. Certainly the data presented to show the presence of native vegetation in areas affected by the proposed development, is of little value, when one site of the two recording sites is outside the proposed boundary of the site. This then leaves only one quadrant in the proposed site that was studied. To say that “the proposed development is unlikely to lead to a significant impact on flora species” is absolutely ludicrous when the proposed site has not even been studied in detail.

I demand that a spring survey be undertaken on the proposed site before any decision is made about the suitability of the site. This spring survey should be carried out, preferably following normal rains, and in particular should be looking for the following species that have not been listed by the so called experts over the grand total of 4 days they were there: *Caladenia fragrantissima subsp. Orientalis*, *Prasophyllum frenchii*, *Pterostylis cucullate*, *Sowerbaea juncea*, *Caladenia vulgaris*, *Agrostis avenacea var. perennis* and *monotoca glauca*.

In any case the descriptions given and comparisons made within the report about the study

area being devoid of remnant vegetation, gives a damning picture of unsustainable and damaging land practices in use on these properties from past land management practices. The idea that these may continue beneath the “clean, green” wind towers minus even more of the remaining bushland should be abhorrent to any sensible-minded landuse planner.

Several species of birds in decline throughout much of their former range are listed as being present, as are some species which are often held to indicate habitat in reasonable condition. These include the Power Owl and Wedged tailed Eagles. The wideness of diversity of birds in this direct area is of interest and again seems to denote a lack of time and effort spent in identification by the researchers.

It is of great surprise to me that the researchers recorded or reported such little bird activity in the site area, that is until we read just how this recording was undertaken. It is once again a far cry from being a thorough study, as reported in Supplement A only 16 days 8 in February 2004 and 8 in March 2004 as well as 4 days in Summer 2002, 2003 and 4 days in Autumn and Spring 2003. Only four to six point sites had been selected to be studied for 30 minutes twice a day by 2 field personnel. All observation points were supposed to have been visited twice a day by the observers, which would give a total of 224 separate observations, instead of only 194. This equates to 15 hours that no recordings were taken out of a possible 112 hours. I feel that 97 hours spread across 3 years is insufficient and is not adequate even if the industries own governing body suggests it is. The sites that had been selected are all in areas of low conservation significance, as stated in the report, with one in particular being WP3 having no turbines proposed near it.

For these reasons I understand just how easy it was for the observers to not record the correct number of birds that are known to frequently visit the proposed site. We can also understand that by the way in which the study was conducted that it was and would have been impossible to record accurate information on the number and types of birds in the proposed site. It should have been compulsory for at least two observers to be together at all times, so one could have been observing and the other recording the information. This should have been done and also over a much longer time frame, when the Brack's government decided that an EES was not required.

White-throated Needletails have been observed in the area. While the area forms “part of the Strzelecki Ranges and is the species migration route” the assurance that this link is large and robust enough to permit continued migration of this species is not supported. The bushland link is relatively thin (remembering the Strzelecki Ranges are only 20% of what they use to be) and unprotected by reserves at this point and the further disturbance of this link should not take place.

Fauna habitat of high quality was reported to have been scarce during the survey, perhaps if the surveys had been carried out in areas where large areas of native vegetation existed a different result would have been found. Not to mention this situation could easily be reversed where native vegetation were allowed to regrow under reduced grazing pressure. This along with other Landcare projects to maintain and encourage the revegetation of the area is likely to do a lot better than if allowed to continue under the wind energy scenario.

In my view the deliberate fencing off of parcels of land from stock in this area will at least

assist this and other small ground-dwelling fauna to survive in the study area into the future.

The establishment of new roads/tracks that have to be done, will involve the clearing of native vegetation in areas that do and may possess potential for wildlife habitat. Turbines 12, 17, 19, 20, 22, 24, 25, 26, 29, 30 and 31 have higher identifiable habitat and connectivity potential and should be removed. Surely if the farmland was as thoroughly cleared and disturbed as implied little or no clearing of native vegetation should be necessitated by such a development proposal.

I believe that a full review of the proposed site is necessary to guarantee the protection of all species of flora and fauna that are found or to be found in the site. I do not agree with the reports findings about vegetation and habitat loss as stated previously the errors of the past is not a right to create errors now or in the future, as we have found with landcare there are better alternatives for the regeneration of native vegetation.

As already stated this area is part of the Strzelecki Ranges and plays a vital part for not just migratory birds but for raptors, bats, woodland/forest birds, all bird species, mammals and fish.

This proposal will harm flora and fauna in this area and with at least 9 migratory birds and another 21 within 5 klms of the site and 9 threatened species in the area. These species all need to be protected and further in depth studies need to be carried out on other species that have failed to be mentioned in any reports. There has also been no mention as to the effects the proposal will have on neighboring properties livestock.

With over 30 km of new roads and tracks that need to be installed on the site plus underground power cables it is bound to have an affect on flora and fauna. The West Gippsland CMA 2000 recognises that it is of fundamental importance for natural areas of remnant vegetation remain as conservation and are irreplaceable. It also states that corridors and linkages are of vital importance and that a landscape approach to maintaining native vegetation is required.

It is also proposed in an area which is covered by an ESO5 overlay as an area prone to landslip and erosion. Any earth works will have a profound effect on water ways in the district affecting local and distant aquatic species. This could have an affect on species as far away as Andersons Inlet, yet there appears to be no mention of this in the report. Once again an EES would have been able to highlight this fact, but it has been overlooked by the proponents and their consultants.

There also seems to have little work carried out on the actual possibility of bird and bat strikes by the proposal. It appears that a simple risk model can be drawn from other wind energy facilities. This is of course not the case, all wind energy facilities are different in terms of size, number, location, topography and so on. The vegetation in the proposed site and surrounding area varies greatly to those of Codrington and Toora as does the species that are found in the proposed site. It is not realistic to say that only one in ten birds will be killed by the turbines when overseas evidence suggests this figure to be much higher, but we will stick with what the risk modelling is predicting for now. The consultants are only assuming that there guesstimates are accurate, but then go on to state that Wedge- tail

Eagles have been killed at both Starfish Hill (23 turbine) and Woolnorth (6 turbine) wind energy facilities in recent times and that large raptors will be under threat of mortality from the proposed site at Dollar/Foster North.

They presume this will only take place for the first six months of operation though. As all the local residents and the panel members who were able to do the site inspection on host properties know that Wedge-tail Eagles are attracted to this area. We also know that the site will act as a sink to these raptors and the mortality rates for this species will be extremely high and would see the continued killings of Wedge-tailed Eagles until they become extinct for this area of South Gippsland or for that matter Victoria. It was also of interest to those of us present for the Biosis expert witness statement to hear that they had not done any studies to find or seek out any Wedge-tail Eagle nesting sites. As stated in their report that if a nest is located a 500 metre no go zone should apply, they also stated that this should be the case for areas frequently visited by the Wedge-tail Eagle.

Bats are also in extreme risk of striking wind turbines as proven at both Toora and Codrington. A report from the USA has found that as many as 4000 bats died at Mountaineer wind energy facility in West Virginia last year 2004

We also are aware from Toora that it does not take long for foxes and wild dogs to know that wind energy facilities can be a good source of food. These scavengers are fully aware of the easy meal that is available from birds and bats striking turbines. It is not surprising that the industry has limited reports of bird/bat deaths in Australia as only searching an area of 50 metres around the base of the turbine is hardly going to give accurate results.

It also fair to say with the existing Toora wind energy facility, the proposed Dollar/FosterNorth, Bald Hills, Wonthaggi, Welshpool and what ever other one or ones that are in the pipeline, that we are yet to know about, will have a cumulative impact on both the fauna and flora of the area. There is a need for all research and observations to be carried out in a manner that is totally satisfactory and not just to Auswea's best practice. As more than one wind energy facility in any given area will have a cumulative impact and this can not be ruled out, especially not with bird species listed under the EPBC Act or the FFG Act. further research is required.

The "net gain" assessment in it self means that something is going to be destroyed in order for this proposal to take place. It is not as simple as the consultants would have you believe. The old tree that is proposed to be cleared means that two other old trees need to be protected and 10 trees planted or 50 new trees planted is ridiculous. For this to happen we have to imagine that two other old trees are/were in danger of being cleared, which may or may not have been the case. Also that the replanting of 10 plants will adequately replace the one old tree which has taken decades to grow to the size that it is/was. As the site has already been declared to have limited remnant vegetation it is clear that the site should remain untouched and the removal of any trees prohibited.

Who will be responsible for the up keep and standard, Meridian energy offer no guarantee's about the rest of the project and we cannot see them guaranteeing that this "off set" would be implemented thoroughly. It is also important that all roadside vegetation is protected as it provides important habitat to all bird species and mammals in the area as well as providing protection from erosion. We have all witnessed what took place in February when summer

rains caused serious erosion problems all over the proposed site and surrounding area. Without this roadside vegetation that provides such important corridors and factors to negate landslip the whole site would be under an enormous strain to remain as it is. The best minimisation that can take place is for this project not to proceed and the practices of landcare allowed to continue in the regeneration of native vegetation of the site and surrounding area.

It will be impossible for this proposal to avoid :soil disturbance, natural hydrology, indigenous flora, introduced flora, control of weeds, drainage in to local waterways, erosion and fauna without having an adverse affect on them no matter what environmental management plans are to be put in place, if any at all.

The report that has be supplied by Biosis is not creditable and until a thorough survey has been completed, it is impossible to say just how much devistation this proposal will have on the flora and fuana. As stated earlier the West Gippsland Catchment Management Authority recognise the importance of parcels of native vegetation owned and cared for by the community. These parcels of native vegetation are very valuable for the region and need added protection, so that this valuable asset is not lost.

It is the State government's duty to ensure that when these reports are commissioned that they are of a standard that can be relied upon without question. This has not been the case with this report, it has only been done to AusWea's standards which are a far cry from what is really required. If the industry is allowed to continue in self rule, there is no hope of saving any native flora or fauna as reports will continued to be doctored to support the proponents. As it appears that credibility, integrity and reputation account for nothing in the Wind Industry.

Potentially adverse impacts on local human communities

Once again with no EES one cannot say that no significant risks are associated with the proposed wind farm.

Meridian Energy is based in New Zealand and wholly owned by the New Zealand Government. No adequate assurance has been provided that the group will take responsibility to ensure that the local or regional environment retains or enhances its aesthetic, ecological, social or economic qualities. Inadequate guarantees are afforded that Meridian will repair or replace property or environmental features in the event of mishap, economic failure of the venture or impairment of any of these environmental factors. The financial status of Meridian Energy has been distanced from this project by firstly calling its self Dollar Wind Farm Pty Ltd and now calling its self Southern Hydo what has Meridian got to lose.

It would appear that they are trying to distance themselves from this project should the desired result not be reached. Or could it be that by calling themselves Southern Hydro they will have insufficient funds to offer realistic guarantees to compensate for or to effectively repair any negative impacts resulting from the proposed development into the

future, even if Meridian Energy NZ possess the resources to do so.

Landscape and visual amenity

As to the aesthetic quality of the turbines, I merely observe that they will become a highly prominent and distracting feature of the Dollar/Foster North and surrounding landscape. Forty Eight turbines at 110 metres is not something that can be easily absorbed by the landscape. No matter how man modified the landscape is. It is very interesting the it was based on a report prepared by Environmental Resources Management Australia that the then Minister for planning Ms Delahunty ruled that no EES would be required for this proposal.

The document was called the Preliminary Landscape Assessment approved by the same Mr Allan Wyatt that has signed off on the Landscape and Visual Assessment – planning permit application.

I was fortunate or unfortunate as the case may be to have spoken in great detail with Ms Bolton on the preliminary landscape as to the validity of this reports contents. Ms Bolton agreed with me that that report was sadly lacking in its authenticity and was seriously flawed stating that it was unfortunate, but because they (meridian) were working to a strict time frame there was nothing she could do to have it corrected.

This information was passed on to the Minister for planning personally by me at a meeting in Inverloch on August 13th 2004. I asked the minister, who was overseeing the reports to make sure that they were accurate and correct in detail, to which she replied that it was the planning department of DSE and that it was the local Traralgon office which was in charge. I then questioned DSE at this same meeting as to how a report so flawed could make it to the Minister without the necessary corrections being made, as it is such an important document. To this a Mr Alan Freitag from DSE stated that it was the responsibility of the proponent to supply such reports as the proponents and consultants have their integrity to protect and not for DSE to do the report for the proponent. This was all very nice, but my question was not answered and nor did anyone intend to answer it.

The Minister then decided that a meeting between DSE and the members of certain groups, that were to be affected by such proposals should be arranged. The meeting was held the in the following weeks the details of which I shall talk about later. The fact remains that no one was responsible for checking Mr Wyatt's work and therefore this resulted in the proponent not being required to do an EES.

Even though Meridian Energy agreed that the preliminary landscape assessment was flawed, they still chose to contract this same company to do the final flawed report on the landscape and visual assessment.

The methodology that has been used by ERM has to be questioned as to what certain points have to do with the actual landscape. It appears that ERM have done little with regards to the landscape and more on what peoples perception of wind energy facilities.

This is supposed to be about the landscape and the affect that this proposal will have on it. It is contemptuous, the lack of reporting on the landscape characteristics of an area such as this.

What has Mr Wyatt stated about the region, the Strzelecki Ranges, Wilsons Promontory and South Gippsland as a whole? Nothing that what, he has spent little or no time telling us about anything. Five tiny paragraphs on pages 29 & 30 of Supplement B does not describe the landscape and this must put serious doubt and questions in the minds of all who have read the report, as to the credibility of ERM Australia and their agenda. Is it that they are seeking further work from the proponent in the future, one can only believe this to be the case, for someone who has so many credentials surely could not be so blasé in writing such a report.

Anyone who has been to the area let alone the site, knows that this proposed site is anything but gently undulating farmland. It contains some of the steepest hills and deepest gullies in the region. I would be happy if Mr Wyatt was acting as my real estate agent, but for this comment to come from a landscape assessment is far from being realistic. He states that the landscape is man modified, which is correct there isn't many place in Victoria which are not man modified, except for National Parks.

As I have stated earlier in the Flora and Fauna report this does not mean that it is an excuse to vulgarise the landscape further. It is not acceptable to say that just because trees have been removed and agriculture activities are conducted there that this landscape will be able to absorb 48 110metre high by 82 metre wide turbines plus all the other infrastructure that is required to support such a project.

The local and surrounding community all believe that the visual intrusion that this proposal will bring will be over bearing. This is something that has been reported on in the 3 local papers of the area on numerous occasions as well as state and national papers. As for perception studies that continually show that the majority of viewers do not object to the construction of wind energy facilities on anything but the most sensitive and localised landscapes can be manipulated. Depending on what questions are asked and how they are asked and the information available to support the questions. It was reported by Mr Wyatt that in a survey by TQA for the Department of Natural Resources and Environment 2000 that after information was told about climate change and greenhouse gases, support went up for wind energy facilities. I am sure that if these same people were aware that wind turbines in Victoria actually contribute to higher greenhouse emissions, divide communities and destroy the landscape they would have in fact voted a different way.

The Strzelecki Ranges have made it possible for the Turbines to be seen from even greater distances than have been described in ERM's report. The turbines will be clearly visible from over 20 km away and this is confirmed in the peer assessment report. The very nature of the landscape makes it possible to view the proposed turbines from many positions that have not been taken into account by the consultants or Meridian energy. eg Nerrena and Fish Creek.

It will be possible to see the proposed site from over 200 km of highway, main and minor roads that surround and dissect the site. This has grown out even more with the peer review of Mr Wyatt's report. Mitigation measures have been mentioned throughout the report and one need to question this. If the landscape can supposedly absorb the project why are mitigation methods required? This seems to be a contradiction

The proposed site is over 2300 hectares and covers an array of landscape features, many of

which shall be lost if the project is allowed to proceed. As stated in the report the major area that is visually impacted on is a band running from the south west to the north east on the edge of the site. It will be possible for views of all the turbines to be seen from at least 12 km away from this side of the site as they are uninterrupted and will have a major visual affect on the township of Dollar. Page 45 sup B.

It is fair to say that the consultants have tried to play down the effects that the wind energy facility will make visually. They have even gone as far as saying if viewer numbers are low and the landscape sensitivity was high they would still rate the visual impact as low, even though the landscape would not be able to absorb it. This makes as much sense as saying if a tree falls in a forest and no one hears it does it make a sound? There is logic that is sadly missing from this report. Mr Wyatt also professes that due to cloudy and rain days we won't see the turbines and this is another reason why they can be absorbed in the landscape.

He also confesses to the travellers that take the South Gippsland Highway that they won't be visually affected because of the vegetation along the roadside, yet in the next breath he is saying how it will encourage tourism to the area. They are either visually offensive or not. Oh yes that's right they won't see them on cloudy or rainy days because tourists don't go out in the rain.

I wish that someone would tell Mr Wyatt that he cannot have a bit each way on this subject and that he should just stick to doing a landscape assessment not a tourist or a perception survey. Mr Wyatt should have done a more thorough job with this report, we need to know the precise number of homes, residents, vacant land sites and the number of future homes that could be or have the potential to be built. If this was done we would know the full affect on existing and potential residents as only then will we know the full impacts of this proposal. Already we know that the report is incorrect about the number of houses in 2.5 km of the proposed site view shed. Page 56 sup B 126 residents should be 170 residents. It also clearly states in the planning guidelines that the visual effect from dwellings is to be minimised. This is clearly impossible to do when you have 170 houses in 2.5 km of the site.

The viewpoints that ERM have chosen to use are very interesting also and the way that they have been described and presented needs to be clarified.

Viewpoint one on the South Gippsland highway is described as being high in visitor numbers, low in landscape sensitivity and having turbines located within one km, yet the overall visual impact is low? How can this be rated low, when Mr Wyatt has stated earlier that the viewshed is based on the swept path of a single rotor (even though peer review states that the actual tower should also be included in the viewshed) At viewpoint 1 (fig 9.4 page 60 sup B) it will be possible to see at least 24 turbines at once which makes the overall visual impact high. People have the ability to move their heads from side to side as well as up and down, we are not pictures in a book with fixed parts.

Viewpoint two is much the same as viewpoint 1 and the visual impact will once again be high for road users as well as at least four residential properties. It will be possible to see at least 37 turbines using ERM's own photomontages which are not to scale. The distance from this site is under 800 to the closest turbine.

Viewpoint three will have one of the most visible views of the entire site and therefore will have one of the highest visual impacts, as visitor numbers are high and the turbines are located well below one km away. When it is possible to see large numbers of turbines on the rural landscape and all the infrastructure that it brings, it can only make this rural setting become an industrial site.

Viewpoint four is a position from which a cumulative effect from both Toora and the proposed site can be seen. This will make the visual impact quite high as it will look like an industrial site and not a rural agriculture zone as both sites cannot be absorbed by the landscape. Visitor numbers can still be high as it is just off the South Gippsland Highway.

Viewpoint five is on the Foster – Mirboo road as is sign posted as tourist route number one. Over 25 turbines will be visible from this location and they will be a very dominant feature on the landscape for visitors and the adjacent residents in property numbers 56, 57, 58 and 59. Also these turbines will be visible from the lower lying coastal land just outside Foster.

Viewpoint six gives an example of the visual intrusion that will be seen from Grassy Spur, a recreational site that is visited on a regular basis by the local community throughout the year, but especially over the warmer months of the year. The turbines will be highly visible and are not supposed to be put in areas such as this according to the Victorian guidelines, which state “siting and designing to minimise impacts on views from areas used for recreation based landscape values and from dwellings” the turbines that are planned for this area of the site should be removed from the proposal altogether. Being turbine numbers 44, 45, 34, 35, 36 and 11.

Viewpoint seven is located at the intersection of Stony Creek Dollar Road and Carmichael Road there are two houses located at this corner with a third house the other side of the hill (you can see the letter box in the picture) a small block of land located directly behind the stop sign was also planned to be built on. This is no longer the case, with the owner declining to do so with the threat of wind turbines. Still the fact remains that the three houses located at this intersection will have a very high visual impact placed on them by this proposal as they are all under 1 km away from the closest turbines and will see at least 20 turbines.

Viewpoint eight although is approx 7.5 km away the viewshed is still quite large as you can see by the photos of Toora that we have as an example taken with a 65 mm lens from 9 km 5 km and 2.5 km. These photos were taken by a professional photographer to be as close as possible to what the human eye captures. No enhancements of the photos have been made and you can see just how different they are compared to the ones that have been supplied by ERM Australia. They would have you believe that the turbines do not exist.

Viewpoint nine is as for the same as viewpoint eight (photos.) As the landscape is so steep it is possible to view the site from many distant points around it.

Viewpoint ten is one from the Dumbalk township located under five km away from the site. It will be possible to see just about every turbine from here and this will have a major visual effect on the whole town. Forty eight turbines will not be able to be wholly or partly screened, the local primary school is located on the east side of the town and is in full view of the proposal.

The visual impact has to be high even using ERM's figures as visitor numbers are high. It is the main route for travellers to and from the Latrobe Valley.

Viewpoint eleven is also from one of a recreational site, which as stated earlier, wind energy facilities are to avoid. Even though it is located approx. 7 km away you can tell by the photo's of Toora's 12 turbines that 48 will cause a visual effect that the landscape will not be able to absorb. Once again this is a high impact.

Viewpoint twelve is from O'Gradys Ridge Road 4.5 km away and shows the approximate spread of the site that the turbines will fill. ERM state that where a wind farm takes up 50% of the the entire horizontal field of view (between 188 degrees and 220 degrees) it can dominate the horizon. This will be the case at this location as it will be at many other locations in this steep hill country.

Viewpoint thirteen from Duckpoint / Yanakie shows just how far you can be to still see the turbines. This is over 20 km away and they will be able to be seen. This is not something the landscape can absorb no matter how man modified it is. The rating used by ERM shows it as a high landscape sensitivity with medium numbers and yet they still rate it as low visual impact. Very strange, very strange indeed

Viewpoint fourteen will have a clear view of the proposed site and will dominate the horizon, as per the photos of Toora. There are a number of houses in this area that will have the unfortunate pleasure of viewing the wind energy facility as they have built their homes facing the proposed site. Once again the visual impact will be high.

The overall outcome from all of the viewpoints is that the proposal will have a high visual impact on the surrounding landscape and residents in the 12 km viewshed. The South Gippsland Shire discourages tall structures on ridge lines and within view corridors. It is a clear statement made directly at wind energy proponents that they are not wanted here and the shire has the full support of the community.

If this proposal is approved visual mitigation on roadsides needs to be taken into consideration as mentioned earlier with over 200 km roadside viewing within 9 km of the site, it is vital that it is planted out to reduce the visual effects of the proposal and the costs of this should be borne by the proponent. The Shire Council should be fully involved in this process along with abutting landowners to make sure that this does occur.

The nearest operating wind energy facility is at Toora with proposed sites at Welshpool, Bald Hills and Wonthaggi, but there are probably more planned that we just don't know about as yet. Being that as it may the cumulative visual impact that these five site will have, is that they will create an unacceptable degree of adverse effect on many residents of Dollar/Foster North as they will all be combined in a single visual envelope.

As stated in the peer review report it is realistic to make the viewshed larger than 9km as in the ERM report and extend this out to 12 km. When this is done at least four of the proposed and existing wind energy facilities are over lapping in viewsheds. Therefore there will be properties that will suffer for this cumulative effect.

The same can be said for travellers along the South Gippsland Highway and visitors to the region that have been to travelling along the coastal routes either to Sydney or Melbourne, as would travel through both Foster and Wonthaggi and be exposed to all the proposed and existing wind energy facilities.

The amount of houses in direct proximity to the proposed site makes any change on the landscape a significant visual effect and this is certainly the case with this proposal. The landscape sensitivity for residents is extremely high as it is the reason the majority of us have chosen to live here.

The dominance the the proposed forty eight turbines will have on the horizon for many residents will not be able to be mitigated against. The residents of Dollar/Foster North and surrounds should not have to take mitigating action, it should be Meridian Energy that is require to take mitigating measures. Most of the residents have built their homes to take advantage of the pristine views. It is after all some of the best landscape you will find in all of Victoria, with the Strzelecki Ranges and Wilsons Promontory as a back drop, you would be hard pressed to find better.

We have all chosen to live here for the visual amenity and landscape we do not want nor expect to have our views taken away from us by either being screened in with plants or the industrialisation of our hills.

Another point that was raised durring Mr Wyatt's presentation was that he deliberately didn't take photo's from Dollar – Stony Creek Road which runs directly through the proposed site. He stated that this was not done because everyone knows that the visual impact would have been high. I have also failed to be informed by the proponent just how properties were selected for photo's by ERM and in fact if anyone was approached for this to take place.

It would appear, even to someone without any knowledge about landscape assessment or visual amenity reports that the report prepared by Mr Wyatt and ERM as nothing more than a PR operation for the proponent with little detail given to the landscape at all. The mere fact that Grassy Spur Pool was not mentioned at all during the assessment shows just how poor Mr Wyatt's work was or at best a blatant attempt to not inform the panel of its existence. Either way, the report lacks credibility by such an omission of information.

Mr Wyatt also mentioned at the start of his presentation that everyone dislikes transmission towers,(even though they are actually useful) yet some people like wind turbines. This may be the case for some, but it is highly likely that these same people will dislike them when more turbines are littered across the countryside(if allowed to go ahead) just like transmission towers.

As mentioned in the wind energy guidelines it is for Meridian to minimise the impact on the residents of Dollar/Foster North and if this cannot be done to the satisfaction of all residents, them the project should not be allowed to proceed. As they are fully aware that a proposal of this size and type with so many residents located in such close proximity would not be allowed to proceed back in New Zealand, yet they are trying to do it to us with the help of the Victorian Government.

The people of Dollar/Foster North are not newcomers when it comes to wind turbines. We have Toora only five minutes down the road and we are all very aware of how they have changed the the landscape forever. It is not something that we wish to have inflicted on our community nor on anyone else's. The landscape here as in other parts of the shire is far to valuable to be sacrificed by wind turbines that can and will not be absorbed by the landscape no matter how much mitigation is in place.

These turbines are over 35 stories high and have the inequivalent wing span of a jumbo jet, then times that by 48. When you put these details together with over 170 homes within 2.5 km there is simply no way or any type of mitigating measures to stop them from having a significant impact. The ERM report supplied by Mr Wyatt should be taken with the contempt in which it is written it lacks credibility and integrity and therefore should carry no weight in the decision making process.

Technical issues : layout, shadow flicker, EMI, wind efficiency and decommissioning

Megan Wheatley from Sustainable Energy Authority was questioned about the Victorian wind atlas, as to its reliability to which she replied that it was only a guide and any proponent should undertake wind monitoring for at least 12 to 18 months as wind speeds can vary greatly over the distance of 3 km.

I found this information to be very interesting when Mr Graeme White from Garrad Hassan gave his report. Mr White stated that his company were experts in site wind monitoring and that the proposed site have a capacity factor of between 30-50%. This is quite a staggering remark to make, firstly the fact that the northern section of the proposal is over 3 km away from the nearest wind monitor, secondly Mr White prepared a report for Pacific Hydro on the Portland proposal which states that the capacity factor for this coastal location would be below 25 % for 92% of the time and thirdly that the international average capacity is only 23% and getting lower everyday. (more on that later)

With all of this in mind it is extremely difficult and highly unlikely that Mr White could have undertaken any thorough layout design as the northern section of the proposal has no records of wind speeds or direction, just how can one do any analysis when there is no information to do one with. It is also extremely unlikely that turbines 12, 14, 15 and 16 will be able to receive any where near the same amount of wind resource as they are at the lowest points of the proposed facility. If Mr White had done a thorough report he would have also note that turbines 33, 31 and 41 are all situated on low lying ridges, and therefore will not be taking advantage of any available wind resource.

If Mr White is suggesting that the locations of some of these low lying locations is due to shadow flicker issues, I would like to know which houses he is taking about because I dont believe this to be the case. Or is it because of the native vegetation, visual effect or erosion problems associated with the site, not to mention noise. It couldn't be as we have heard from the landscape expert and flora and fauna experts, that they are not a problem.

The only input that Garrad Hassan has had into the layout of this proposal is to do with shadow flicker and even this input would appear to have been very limited. Mr White could not

explain why house 18 was only receiving 30 hours of shadow flicker (legal limit) while house 17 was receiving over 68 hours. The same question needs to be asked of houses 76 and 16 in regards to house 17. Houses 57 and 58 were also questioned to which Mr White could not answer why there was such a discrepancy between them.

The shadow flicker report was based on computer modelling and no vegetation or cloud cover was supposedly taken into account. The only limit that was applied was the 1 km shadow cast, which we know from Toora can be much longer and therefore should not have been used for this project. It would have been very easy in today's modern world for Mr White to actually show the panel and public as part of his presentation on a computer, but unfortunately this did not take place and as such doubts remain over the credibility of this witness's report.

As for the assessment of the electromagnetic interference I would suggest that turbines 46, 44 and 45 need to be removed as they are still extremely close to the signal line and with blades that span over 82 metres could still result in interference to this microwave signal due to the fact that the turbines rotate 360 degrees searching for the wind. It also appears that the proponent has not allowed for any alterations or upkeep of the communication and television broadcasting towers. Surely the proponent is not suggesting that no upgrades to these systems is expected to be carried out on these towers over the next 25 years. The proponent should also take into account any limitations that their proposal will have on the residents and broader community regarding broadband technology and alike. Rural communities are already behind our city counterparts when it comes to having access to modern technology, we do not need the added burden of wind energy facilities interfering with this process.

Now I would like to talk about wind efficiency or the lack of it. We are being told by the Bracks government, the wind industry and the proponent that wind energy facilities are a way of reducing global warming by the reduction of CO2 emissions. Wind energy facilities have been operating for over 20 years in Europe with Denmark and now Germany supposedly being the world leaders.

I would now like to take you through some of the latest reports that have come from these countries as well as the UK, Ireland and even from our own DSE here in Victoria as well as reports from South Australia and others.

I will start with a report from German company E.ON Netz, which has control of over 46% of the wind energy produced in Germany.

Wind Year 2003 – an overview

In 2003, Germany again led the world in wind energy use thanks to the Renewable Energy Act (EEG). At the end of 2003, wind power plants with a total installed capacity of around 14,350 Megawatts (MW) fed German electricity grids. Of this, the greatest proportion at around 6,250 MW was connected in the E.ON control area.

For technical reasons, the intensive use of wind power in Germany is associated with

significant operational challenges:

- Only limited wind power is available. In order to cover electricity demands, traditional power station capacities must be maintained as so-called "shadow power stations" at a total level of more than 80 % of the installed wind energy capacity, so that the electricity consumption is also covered during economically difficult periods.
- Only limited forecasting is possible for wind power infeed. If the wind power forecast differs from the actual infeed, the transmission system operator must cover the difference by utilising reserve capacity. This requires reserve capacities amounting to 50 – 60 % of the installed wind power capacity.
- Wind power requires a corresponding grid infrastructure. The windy coastal regions of Schleswig-Holstein and Lower Saxony are precisely the places where the grids have now reached their capacity limits through wind power. At present, just under 300 km of new high-voltage and extra-high voltage lines are being planned there in order to create the transmission capacities required for transporting the wind power.

Installed wind power capacity in Germany on 31.12.2003 ¹ 14,345 MW
– of which in the E.ON control area 6,250 MW
Average fed-in wind power capacity in the E.ON control area 969 MW
Wind power production in Germany ¹ 18.6 TWh
– of which in the E.ON control area 8.5 TWh
EEG infeed remuneration for wind power (Germany) ² approx. 1,700 million €
– of which to be met by customers in the E.ON control area approx. 510 million €
¹ Source: Institut für Solare Energieversorgungstechnik (ISET), ² Source: Verband der Netzbetreiber (VDN)

Support allows a boom in new wind power construction – E.ON grid territory characterised by new construction

Total wind power capacity installed in Germany (Sources: ISET, ENE)

Year	Capacity (MW)
1990	1,100
1995	6,100
2000	11,900
2002	11,900
2003	14,350

³Source: Institut für Solare Energieversorgungstechnik (ISET)

Germany

At the end of 2003, wind power plants with an installed capacity totalling some 14,350 MW were on line in Germany³. This was over 2,450 MW or just under 21 % more than in 2002. This means that since 2000, installed wind power capacity in Germany has increased by 137 %. FIGURE 1 shows the installed wind power capacity in Germany.

This means that Germany has become the world's Number One wind power country: In 2003, Germany accounted for approximately one third of the world's and half of Europe's installed wind power capacities. In Germany in 2003, some 18.6 Terawatt hours (TWh) of wind energy were fed in. This meant that arithmetically, it was able to cover just under 4% of Germany's demand for electricity. For this wind power, grid operators paid out 1.7 billion € in supply payments in accordance with the regulations of the Renewable Energy Act. This corresponds to an average payment of just over 9 € ct / kWh. In Germany, wind power utilisation differs very much on a regional basis. In 2003 also, Lower Saxony and Schleswig-Holstein and therefore the E.ON control area accounted for most of Germany's wind power production.

E.ON Netz

In 2003, some 8.5 TWh or 46 % of the wind energy produced in Germany were fed in for E.ON Netz (ENE). Approximately 770 million € in infeed payments were paid out for this, with 510 million € of this figure being met by customers in the E.ON control area.

At the end of 2003, a total of 6,250 MW was on line in the E.ON control area – just under 44 % of Germany's entire wind power capacity. This means that in the E.ON control area alone, significantly more wind power generation capacity was installed than on the entire American continent.

For this reason, E.ON Netz GmbH is particularly affected by the technical and operational challenges that massive expansion of wind power brings with it.

Electricity generation from wind fluctuates greatly

The level of wind power infeed fluctuates greatly depending on the prevailing wind strength. Due to these significant fluctuations, in 2003 the contribution made by wind power production to cover the respective peak load in the E.ON territory varied between zero in real terms and just under one third of the grid load (FIGURE 2).

Looked at over the course of the year, as the annual wind infeed curve shows (FIGURE 3), the availability of the installed wind power plants was relatively low:

- Simultaneous wind power infeed was maximum 4,980 MW, equivalent to just under 80 % of the installed capacity.
- The average fed-in capacity was less than one sixth of the wind power capacity installed in the yearly average.
- Over half the year, the wind power fed-in was less than 11% of the wind power capacity installed in the yearly average.

Annual curve

To depict the annual curve, the respective wind power is determined for each quarter-hour of a year and is then shown from left to right in a diagram – in descending order based on the wind power level. If we observe a point on the curve, the associated quarter-hour value (horizontal axis) states how many quarter-hours in the year the wind power plants fed in at least the power that can be read off on the vertical axis. For the

remainder of the year, generation was below this power value.

arithmetical annual average
of the fed-in power: 969 MW

FIGURE 4 shows an example of the wind power infeed pattern in the E.ON territory during a week with strong winds. The difference between minimum and maximum infeed in this example was over 4,300 MW – equivalent to the capacity of six to eight large coal-fired power station blocks.

The wind power infeed changes can occur in a relatively short time. This can be seen in FIGURE 5, which shows the wind power infeed pattern in the E.ON control area in the week of 17th to 23rd November 2003. It is clear that on 19th November, the wind power infeed dropped very sharply – by 3,640 MW within six hours, with an average value of 10 MW per minute.

The experience of the past year has shown that whenever electricity consumption was comparatively high because of the weather, namely during cold wintry or hot summer periods, wind power plants could make only a minor contribution towards covering consumption. The weather determines the wind level Both cold wintry periods and periods of summer heat are attributable to stable high-pressure weather systems. Low wind levels are meteorologically symptomatic of such high-pressure weather systems. This means that in these periods, the contribution made by wind energy plants to covering electricity consumption is correspondingly low.

This relationship was again confirmed in Germany during the heatwave of July / August 2003 (FIGURE 6). The summer electricity consumption was at that time at an above-average high level due to the temperature. At the same time, traditional power stations had to partly reduce their capacity so as not to impermissibly heat up the rivers that serve as sources of cooling water. During this phase, wind power production was also very low due to the lack of wind and was not able to contribute towards relieving the strained supply situation.

FIGURE 7 shows that in the winter of 2003 also, the contribution of wind power towards covering load was low precisely in phases of particularly high electricity demand. The wind power infeed curve during the week of so-called "midweek peak load" in the E.ON grid in 2003 is shown.

In order to also guarantee reliable electricity supplies when wind power plants produce little or no electricity – for example during periods of calm or storm-related shutdowns – traditional power station capacities must be available as a reserve. The characteristics of wind make it necessary for these "shadow power stations" to be available to an extent sufficient to cover over 80% of the installed wind energy capacity. This means that due to their limited availability, wind power plants cannot replace the usual power station capacities to a significant degree, but can basically only save on fuel.

Midweek peak load

The midweek peak load is calculated on the basis of uniform international criteria. This day's load curve is used in energy management to characterise the electricity consumption of a grid

territory, country etc.

Only limited forecasting possible for wind power infeed – demand for wind-based reserve capacity increases with new wind power construction

Large quantities of electrical energy cannot be directly stored. This means that every second, exactly the amount of energy must be fed into the grid that is taken out at the same time. If the amount fed in differs from the amount tapped, this can cause faults or even failure of the supply – as confirmed in 2003 by the wide-scale power failures in the USA, Italy, Sweden and Denmark.

The transmission system operators must therefore at all times ensure a balance in their control areas between generation and tapping (power-frequency control). Generation in traditional power stations can be easily controlled in line with demand. As a result, in the past it was mainly only the time pattern of tapping from the grid that was relevant to power-frequency control. Thanks to constant consumption behaviour, this tapping can be forecast with a high degree of accuracy.

However, the increased use of wind power in Germany has resulted in uncontrollable fluctuations now also occurring on the generation side due to the stochastic character of wind power infeed, thereby increasing the demands placed on control and bringing about rising grid costs (FIGURE 8).

So that stable grid operation is possible despite the high volatility of wind power infeed, transmission system operators depend on the most accurate possible forecasts of the expected wind power infeed. To forecast wind power, E.ON Netz uses a complex forecasting system developed by ISET and based on the forecasting data of the German Meteorological Service.

The quality of wind power forecasting is to a great extent limited by the quality of the wind forecasting. Like all weather forecasting, this is only partly reliable.

In 2003, the average negative forecasting error for the E.ON control area was -370 MW, and the average positive forecasting error was 477 MW. Power-frequency control

The purpose of power-frequency control is to create an equilibrium between generation and consumption in a defined grid territory (control area) at a stable grid frequency of 50 Hz. This is achieved by briefly activating additional generating capacity or by deactivating surplus generating capacity for seconds and minutes.

However, during individual hours the deviations reached much higher levels of up to +/-2,900

MW. This was equivalent to just under half the installed wind power capacity. FIGURE 9 shows the frequency distribution of the forecast error.

The transmission system operator must balance out differences between the wind power forecast and the wind power actually fed in by using the controlling power range and reserve capacity. Of crucial importance to the wind-related demand for reserve capacity is the expected maximum forecast deviation and not, for example, the mean forecast error. This is because even if the actual infeed deviates from the forecast level only on a few days in the year, the transmission system operator must also be prepared for this eventuality and have sufficient capacity available so that a reliable supply is still guaranteed. FIGURES 10 and 11 show examples of the deviation between the actual wind power infeed and the forecast.

The massive increase in the construction of new wind power plants in recent years has greatly increased the need for wind-related reserve capacity in Germany. In 2003, costs amounting to around 100 million € for this were incurred in the case of E.ON Netz alone. Operational experience over the past few years has shown that reserve capacities in the order of magnitude of up to 60 % of the installed wind power capacity must be kept for wind balancing in years when wind levels are normal. The need for reserve capacity and the resulting costs will therefore continue to rise in future parallel to the further expansion of wind power.

In 2003, wind levels and therefore also the absolute fluctuation range of the wind power infeed were at above-average high levels. This meant that in retrospect, only reserve capacity amounting to around 50 % of the installed wind power capacity actually had to be used.

Forecasting error

The forecasting error is calculated from the actual wind infeed minus the forecast wind infeed. A forecasting error of $-1,000$ MW therefore means that the forecast was 1,000 MW too high.

Wind-related reserve capacity

This means power station capacities that can be brought onto or taken off load at short notice and which are reserved with the power station operators by the transmission system operators for a fee to be used for balancing out deviations between the actual and forecast wind power infeeds.

Wind energy leads to regional price distortions – even load distribution overdue

In 2003, the expense required for balancing out the wind power fluctuations differed greatly in the four German control areas, depending on the wind power capacities installed there. Approximately half the wind balance was done by E.ON Netz GmbH, even though its share of the ultimate consumer sales in Germany was only 30 %. The

Renewable Energy Act provides for national distribution of the EEG infeed remuneration and energy quantities (work equalisation). However, so far there is no law covering a national allocation of the costs incurred for balancing out the fluctuating wind power infeed (capacity equalisation). The result of this is a higher grid utilization cost burden in the "windy" control areas.

In the E.ON Netz territory alone, almost 10,000 MW of on-shore wind power capacity and some 2,500 MW of offshore wind power capacity are expected by 2010. In total, according to forecasts of the German Energy Agency (DENA), the wind power capacity installed in Germany should increase by 75 % to 25,000 MW by 2010 (FIGURE 12).

Demand for wind-based reserve capacity will continue to increase accordingly. If the framework conditions were to remain unchanged, this would lead to a further intensification of the existing imbalance between the transmission system operators. In addition to the already existing allocation mechanisms in the EEG, it is therefore necessary to also establish a simultaneous proportional involvement of all transmission system operators in the wind equalization program.

Technical implementation of such a legal ruling is possible within a few months. It would eliminate existing wind-related grid price distortions and also reduce the total wind-related reserve requirement in Germany, because wind patterns are not the same in all regions of Germany and the wind power fluctuations would therefore partly balance each other out.

Wind power needs a corresponding grid infrastructure – grid expansion necessary

One decisive factor for the further expansion of wind energy use will be the capacities of the electricity grids. Today, the grids in some regions of Germany, for example in Schleswig-Holstein and Lower Saxony, are already approaching their capacity limits. When the wind is strong, they are unable to take any additional wind power. The reason: Up to now, electricity supplies in Germany have largely been decentralized, with power stations having been built across the country as close to the points of consumption as possible. This has made it possible to avoid transporting electricity across long distances.

The power grids were built to bring the energy from these power stations to the consumers, which has meant that, expressed in simple terms, energy has always flown in one direction and only across relatively short distances. This has changed with the boom in wind energy. An increasing number of wind parks have been and are being built primarily in coastal and relatively sparsely populated areas of low consumption, which in periods of strong wind generate more energy than the area in question consumes at the same time. Consequently,

this surplus energy must be transported over long distances. The line grids in the coastal regions can no longer do this in their current state without limits.

The Renewable Energy Act obligates grid operators to remedy wind-related grid congestion at their own expense. As a transmission system operator in the north German coastal states of Schleswig- Holstein and Lower Saxony, E.ON Netz GmbH is particularly affected by this obligation.

To remedy wind-related congestions, E.ON Netz is planning around 110 km of new 110 kV high-voltage lines in Schleswig-Holstein, the cost of which is estimated at 70 million €. Approximately 180 km of high-voltage and extra-high voltage lines are being planned in Lower Saxony, including for the first time a new windrelated extra-high voltage route in the Oldenburg Münsterland. The estimated cost for the line construction in Lower Saxony is around 120 million € (FIGURE 13).

In both cases, the plans are based on pure onshore expansion scenarios. If offshore wind parks will also be built on a greater scale in the future, additional grid expansion measures would also be necessary in the extra-high voltage grid.

Wind power does not only cause regional grid congestion in the north German Federal States. In Schleswig-Holstein and Lower Saxony, far more wind power is generated under conditions of high wind and low load than is consumed in these states. Since in the coming years the expansion of wind power is set to progress on the basis of political will, by the end of the decade at the latest, Schleswig-Holstein and Lower Saxony will be wind power export states across long distances. The same will probably also then apply to Mecklenburg- Vorpommern if the current offshore plans become reality. This will drastically change the current principle of decentralized electricity generation close to the point of consumption. Cross-border electricity trading will also be significantly hindered by increased grid congestion. New transport lines will be necessary on a large scale in order to bring wind power generated on the coast and at sea to the consumer centres in the Ruhr or Rhine-Main region. In its expert assessment relating to this, the Institute for Electrical Plant and Energy Management of the RWTH Aachen assumes that by 2016, up to 1,500 km of new high-voltage and extra-high voltage power lines will be required for this in Germany⁴.

Grid expansion needs planning and investment security

The grid operators require planning and investment security for expanding the wind power grid. Politicians, wind park planners and grid operators must therefore develop realistic scenarios for the further expansion of wind power – including offshore – that can serve the grid operators as a planning basis for the additional capacity requirement. As part of the so-called DENA study, a national reference scenario is being worked on for the first time by the German Energy Agency in collaboration with

plant operators, wind park planners and politicians, with the support of E.ON Netz GmbH.

Grid expansion and new wind power construction must take place in parallel

Due to the often lengthy approvals procedures that are involved, comparatively long realization times must be expected in Germany for the construction of new high-voltage and extra-high voltage power lines, as is currently becoming clear in the case of the power line construction plans in Schleswig- Holstein.

It is therefore necessary to speed up the approvals procedures for the construction of required new lines for wind power and to in future link the approvals procedures for new wind parks to the approvals procedures for the required grid expansion.

There is a risk of bad investments being made if this is not successful: Wind parks without a sufficient grid connection, or lines set up for wind power but for which there is no supply.

Generation management – grid safety and renewable energy in harmony

In Schleswig-Holstein, due to the many wind power plants installed there, the grid capacities are now exhausted when there is strong wind. Although the approvals procedures for the required grid expansion measures have already been initiated, it can be assumed that it will be several years before the planned power lines are realized. So that additional wind parks can still be brought on line until completion of the grid expansion, in 2003 E.ON Netz GmbH introduced what is referred to as "generation management" in Schleswig-Holstein.

This refers to a temporary reduction in the power fed in by wind energy plants when there is strong wind in order to protect grid infrastructure such as overhead lines or transformers against supply- related overloads and to avoid supply failures.

The aim is to guarantee a reliable electricity supply and still make optimum use of the grids for the receiving electricity generated from wind power.

At present in Schleswig-Holstein, wind power plants with an installed capacity of 600 MW – just under one third of the total wind power capacities in Schleswig-Holstein – are involved in the generation management.

Until the grid expansion is completed, new wind parks in Schleswig-Holstein can be granted only conditional grid connection approval. A condition is agreement to participate in the

generation management. Without generation management, further expansion of wind power in Schleswig-Holstein is for the time being not possible. In view of the wind power-related grid congestions in Lower Saxony, E.ON Netz is also introducing generation management there.

How generation management functions in Schleswig-Holstein Based on grid calculations, the E.ON grid has been divided up into ten regions in Schleswig-Holstein. Every impermissible load on equipment is automatically forwarded to the grid management centre of E.ON Netz GmbH in Lübeck. Following identification of the affected region, a signal is sent to the wind parks feeding in electricity in this region. The signal defines the maximum active power at which the region's wind energy plants can feed electricity into the grid in view of the current grid situation.

The wind park operators are responsible for the demanded reduction in the infeed power. They therefore make an essential contribution towards maintaining a safe supply. Direct power control of the plants by E.ON Netz is not possible for technical reasons. When sufficient grid capacities are available again, the power restrictions are immediately lifted again – also via a signal sent to the respective wind park management system.

Wind energy plants must in future also contribute towards stable grid operation

The foreseeable further expansion of wind energy in Germany and Europe means that in future, it will be necessary to pay more attention than before to supply reliability when designing new wind energy plants.

The operational behaviour of wind power plants has so far differed greatly from that of traditional large power stations. Due to the massive and ongoing new expansion of wind power, it has therefore become increasingly difficult to guarantee the stability of the electricity supply – particularly in the event of a power failure.

This means that wind power plants do not contribute to the same extent towards stabilising the grid frequency and to voltage stabilising as is the case with traditional power stations, which are actively involved in grid control.

But even more serious is the fact that wind power plants of the usual type have so far disconnected themselves from the grid even in the event of minor, brief voltage dips, whereas large thermal power stations are disconnected only following serious grid failures.

Faults in the extra-high voltage grid can therefore result in all wind power plants in the affected region failing suddenly. This means that within a very short time, the wind power supply of up to 3,000 MW can fail, thereby putting the grid stability at risk.

New grid connection regulations for wind power plants Even today, the failure of wind power generation in the event of grid problems is barely possible to master via system technology.

With regard to the further expansion of wind power, E.ON Netz

therefore published new grid connection regulations in August 2003. The minimum technical requirements for wind power plants defined therein are essential in the interests of grid stability

and supply reliability.

In future, wind power plants may no longer be disconnected from the grid following a grid failure. They must operate without reaction and must be able to act so as to provide voltage back-up on the grid when there is an operational fault. Like conventional power stations, wind power plants must in future also feed active power into the transmission system to support the grid frequency immediately after the grid failure has been remedied.

As an example, FIGURE 14 shows the voltage dip as a percentage of the grid nominal voltage in the case of a fictitious three-phase fault close to the Dollern substation.

In this case, the grid voltage would briefly fall to below 80 % everywhere. This would result in the sudden failure of almost the entire wind power supply in this area.

Download the grid connection regulations under www.eon-netz.com

This report is quite clear about the lack of efficiency of wind as an energy source. It states that for the year the feed in capacity was less than 16 % of installed capacity which is a long way short of 30-50% capacity that Mr White has stated for this proposal. These figures that are reported in this document are actuals not like the proponents, that are probabilities and we have seen no evidence to back up Mr White or the proponents figures and we are very unlikely too.

With 16,000 turbines in Germany you would think that the use of fossil fuels would have decreased, but by being so reliant on wind it has actually increased for the reasons stated in the report. The Danes are in a similar situation to the Germans if not worse.

Denmark (population 5.3 million) has over 6,000 turbines that produced electricity equal to 19% of what the country used in 2002. Yet no conventional power plant has been shut down. Because of the intermittency and variability of the wind, conventional power plants must be kept running at full capacity to meet the actual demand for electricity. Most cannot simply be turned on and off as the wind dies and rises, and the quick ramping up and down of those plants that can be would actually increase their output of pollution and carbon dioxide (the primary "greenhouse" gas). So when the wind is blowing just right for the turbines, the power they generate is usually a surplus and sold to other countries at an extremely discounted price, or the turbines are simply shut off.

An writer in *The Utilities Journal* (David J. White, "Danish Wind: Too Good To Be True?," July 2004) found that 84% of western Denmark's wind-generated electricity was exported (at a revenue loss) in 2003. According to *The Wall Street Journal Europe*, the Copenhagen newspaper Politiken reported that wind actually met only 1.7% of Denmark's total demand in 1999. Besides the amount exported, this low figure may also reflect the actual *net* contribution. The large amount of electricity used by the turbines themselves is typically not accounted for in, and may in many cases be more than, the usually cited output figures.

Denmark is just dependent enough on wind power that when the wind is not blowing right they must import electricity. In 2000 they imported more electricity than they exported. And added to the Danish electric bill is the subsidy that supports the private

companies building the wind towers. Danish electricity costs for the consumer are the highest in Europe.

Even the head of U.S. Company Xcel Energy, Wayne Brunetti, has been quoted as saying, "We're a big supporter of wind, but at the time when customers have the greatest needs, it's typically not available." A study by the U.K. Department of Trade and Industry (DTI) in 1998 found that wind turbines produced on average less than 25% of their theoretical (or *rated*) capacity over a year. Throughout Europe, the average was less than 20%. The figure in Denmark was 16.8% in 2002 and 19% in 2003 (in February 2003, the output of over 6,000 turbines in Denmark was 0!). On-shore turbines in the U.K. produced at 24.1% of their capacity in 2003. The average in Germany for 1998-2003 was 14.7%. Yet like both the British and the American Wind Energy Associations the Victorian government is planning for 30-35% capacity. In California, the average is 20%. The claimed generating capacity only occurs during 100% ideal conditions, typically a sustained wind speed over 10 metres per second. As the wind slows, electricity output falls off sharply.

In high winds, ironically, the turbines must be stopped because they are easily damaged. Build-up of dead bugs has been shown to halve the maximum power generated by a wind turbine, reducing the average power generated by 25% and more. Build-up of salt on off-shore and coastal turbines blades similarly has been shown to reduce the power generated by 20%-30%.

The Danish government has cancelled plans for three offshore windfarms planned for 2008 and has scheduled the withdrawal of subsidies from existing sites. Development of onshore wind plants in Denmark has effectively stopped. Because Danish companies dominate the wind industry, however, the government is under pressure to continue their support. Spain began withdrawing subsidies in 2002. Germany is considering ending subsidies to wind power. Switzerland also is cutting subsidies as too expensive for the lack of significant benefit. It is reported that California will no longer seek new installations and will instead upgrade those that already exist (which also face the problem of high rates of bird deaths). Ireland in December 2003 halted all new wind-power connections to the national grid, because of the serious instability they cause.

In Germany, utilities are forced to buy renewable energy at sometimes more than 10 times the cost of conventional power, in France 3 times. In the U.K., the *Telegraph* has reported that rather than providing cheaper energy, wind power costs the electric companies £50 per megawatt-hour, compared to £15 for conventional power.

The wind industry is worried that the U.K., too, is starting to see that it is only subsidies and requiring utilities to buy a certain amount of "green" power that prop up the wind towers and that it is a colossal waste of resources. The British Wind Energy Association has even resorted to threatening prominent opponents as more projects are successfully blocked. Interestingly, long-term plans for energy use and emissions reduction by both the U.K. and the U.S. governments do not mention wind.

Installation of wind towers cannot hope to keep up with the continuing increase of energy use. Denmark's annual production from wind turbines increased 28 petajoules

from 1990 to 1998, but total energy consumption increased 115 PJ. The International Energy Agency reports that from 1990 to 2002, Denmark's annual production from wind turbines rose 3,689 GW-h, but total electricity production rose 12,730 GW-h. In Germany (population 82.5 million), a group of engineers and other scientists pointed out in 1998 that more than 5,000 turbines provided less than 1% of their electricity. At the end of 2002, the figure was about 14,000 turbines, one-third of the world's total wind power, producing just over 2% of Germany's electricity. A study in *Science* (November 1, 2002) figured that world energy demand will increase severalfold by midcentury; the researchers found that there is no viable technology today for significantly replacing even today's fossil fuel use.

In the U.K. (population 60 million), 1,010 wind turbines produced 0.1% of their electricity in 2002, according to the Department of Trade and Industry. The government hopes to increase the use of renewables to 10.4% by 2010 and 20.4% by 2020, requiring many tens of thousands more towers. As demand will have grown, however, even more turbines would be required. In California (population 35 million), according to the state energy commission, 14,000 turbines produced half of one percent of their electricity in 2000. Extrapolating this record to the U.S. as a whole, and without accounting for an increase in energy demand, 1.2 million wind towers (costing about \$2.4 trillion) would be necessary to meet the DOE's goal of a mere 5% of the country's electricity from wind by 2010.

The DOE says there are 18,000 square miles of good wind sites in the U.S., which with current technology could produce 20% of the country's electricity. (This rosy plan, based on only the wind industry's sales brochures, as well as on a claim of electricity use that is only three-quarters of the actual use in 2002, would require "only" 142,060 1.5-MW towers.) They also explain, "If the wind resource is well matched to peak loads, wind energy can effectively contribute to system capacity." That's a big *if* -- counting on the wind to blow exactly when demand rises, especially if you expect the wind to cover 20% (or even 5%) of that demand. As in Denmark, you would quickly learn that the prudent thing to do is to look elsewhere first in meeting the load demand. It appears the wind industry and Victorian government is not doing much research in this area if any at all. I believe that even Mr White stated that 20,000 turbines in Victoria would not make a difference to spinning reserve.

As in Denmark, the electricity from those towers -- no matter how many -- would be too variable to provide the constant supply that the grid demands. (More than two-thirds of the time, a tower is effectively not generating electricity at all.) They have no effect on established electricity generation, energy use, or continuing pollution. Christopher Dutton, the CEO of Green Mountain Power, a partner in the Searsburg wind farm in Vermont and an advocate of alternative energy sources, has said (in an interview with Montpelier's *The Bridge*) that there is no way that wind power can replace more traditional sources, that its value is only as a supplemental source that has no impact on the base load supply. "By its very nature, it's unreliable," says Jay Morrison, senior regulatory counsel for the National Rural Electric Cooperative Association.

Closer to home Dr Mark Diesendorf a founding member of AusWea has stated that wind

power will not work in Victoria because of our heavy reliance on coal (over 87%) as it is not possible to shut down or start up a coal fired power station in under 6-8 hours. It therefore makes no difference to the amount of coal being burnt to fire the power stations. We are being told by the Brack's government and the wind industry that wind will reduce our dependance on fossil fuels, this simply is not true

The Country Guardian, a U.K. conservation group, puts it, wind farms constitute an *increase* in energy supply, not a replacement. They do not reduce the costs -- environmental and economic -- of other means of energy production. If wind towers do not reduce conventional power use, then their manufacture, transport, and construction only increases the use of dirty energy. The presence of "free and green" wind power may even give people license to use *more* energy.

Victoria is connected to the south eastern Australian grid, which connects Victoria with South Australia, New South Wales and Queensland. This allows electricity to be exported and imported to the other states, mainly New South Wales and South Australia. The Victorian government's Greenhouse Gas Inventory report 1999 upgraded in 2002 states that the greenhouse gas coefficient per unit of delivered electricity *in each state* is calculated as the sum of emissions associated with fuel extraction and combustion divided by the electrical energy delivered to users in that state. The key values are therefore the type and amount of power station fuel (so that the CO₂ emissions can be calculated), the combustion characteristics of each power station (so that the non-CO₂ emissions can be calculated), and the energy delivered to users.

The following principles were used in this study:

- "direct" emissions from fuel combustion at power stations, plus "indirect" emissions associated with producing and transporting fuel to power stations, are included in the electricity emission factors;
- emissions are accounted to the State of electricity use rather than the location of production. This makes it necessary to track the energy exchanges between Victoria, SA, NSW and Queensland.
- the ACT electricity grid is treated as part of the NSW grid;
- the output of the Snowy Mountains hydro-electric scheme is allocated to Victoria and NSW according to the proportions in the historical operating agreement between the States and the Commonwealth. (The share allocated to the ACT is absorbed in the combined ACT and NSW grid);
- exchanges between the public power grid and private power stations are accounted where there is sufficient data. WA is the only State where this can be estimated for all three years.

Direct and Indirect Emissions from Fuel Use

The direct emissions from fuel combustion in power stations in each State were taken from the worksheets for the NGGI and VGGI, in which emissions were calculated using the methodology in Workbook 1.1. Although emissions were calculated for each individual power station, these are not shown because the fuel consumption data were obtained in confidence in many cases.

For black coal, natural gas and petroleum fuels, indirect emissions from venting at the mine, gasfield or production platform and combustion emissions from fuel production

and transport have also been included in the electricity factors. There are no additional indirect emissions from brown coal, since low rank coals near the surface contain negligible methane, and the electricity used in mining the coal is accounted as a power station auxiliary.

Electricity Consumption

Between 1990 and 1995, Victoria's public electricity consumption increased by 6.9%, compared with 16.1% in the rest of Australia. Between 1995 and 1999 Victoria's electricity consumption increased by 10.6%, compared with 16.5% in the rest of Australia. Energy is exchanged between some of the State and Territory systems and also between private generators and the public grids. The net electricity trade between States increased over the period, from about 0.4% in 1990, to 1.8% in 1995 and 3.4% in 1999. Table 21 summarises the exports of electricity from Victoria. The share of electricity sent out increased from 1.1% in 1990 to 6.6% in 1995, and 12.6% in 1999. This accounts for the growing gap between Victorian emissions calculated using the VGGI methodology (NRE 2002) and emissions calculated using fuel cycle coefficients, which allocate emissions to the point of use.

Table 21 Electricity sent out to Victorian grid and exported

	1990		1995		1999	
	GWh	% of Gen	GWh	% of Gen	GWh	% of Gen
Electricity generated	36930	100.0%	39557	100.0%	49769	100.0%
Site use	2618	7.1%	2630	6.6%	3252	6.5%
Sent out	34312	92.9%	36927	93.4%	46517	93.5%
Net exports to NSW	139	0.4%	75	0.2%	2160	4.3%
Net exports to SA	254	0.7%	2360	6.0%	3698	7.4%
For use in Victoria (a)	33919	91.8%	34492	87.2%	40659	81.7%
Exports/Sent out	1.1%	100.0%	6.6%	100.0%	12.6%	100.0%

The above table makes a complete mockery of the the Brack's government commitment to reduce CO2 emissions in this State. If the government was actually committed to reducing greenhouse gases it could have been reduced by this 12.6% which is more than the 10% level of renewable energy that the Brack's government is wanting installed by 2010. One also has to question if renewable energy is to be generated in Victoria who will it go to, could it also be exported to South Australia or New South Wales or will just mean more of our brown coal power stations electricity will be exported.

Also of note is the fact that the Victoria Greenhouse Gas Emissions report includes petroleum refining as part of the figures used in electricity production for co2 emissions. This no doubt would have added an increase in the calculation of CO2 emissions from stationary energy sources. The information that is being supplied to the government must be reliable if assumptions are to be made from them regarding greenhouse gas abatement. Sustainable Energy reported that it does not have the information available about how much coal has be saved since the three current wind energy facilities have come online. Yet they are telling us that there has been a reduction without any proof what so ever. Maybe they should take a closer look at a report prepared for DSE which is dated November 2004 called Spinning Reserve in Electricity Markets – Implications on Fuel Consumption and Greenhouse Emissions

1. OVERVIEW

In the Australian market, spinning reserve refers to unused capacity from fuel-burning generators. NEMMCO always ensures that there is adequate spinning reserve on the national grid by allocating contracts to generators at less than their full capacity. It may pay some generators to provide spinning reserve rather than bid for contracts to their full capacity.

The structure of the market and the pricing behaviour of large generators such as the Victorian brown coal producers means that the amount of spinning reserve is adjusted by varying the proportion of the capacity these generators deploy. This is done by varying the amount of fuel they burn.

Some critics have suggested that wind power's contribution to greenhouse reductions is negated by the requirement for fuel-burning generators to provide spinning reserve - because of the intermittent supply of wind, it cannot reliably displace the fuel-burning generator capacity needed for spinning reserve. However, this criticism is irrelevant from a greenhouse emissions viewpoint, as it is not total capacity that determines greenhouse emissions but the proportion of the capacity being used. The fuel burnt by the generators, and hence greenhouse emissions, reduces or increases in almost direct proportion to the capacity at which the plant is operating.

Large producers such as the brown coal fired generators always stay online except when undergoing repairs and maintenance. Demand is sufficient at all times for them to sell some power into the grid. Some smaller, fast start' generators fired by gas or diesel find it economic to come on and offline to sell into the lucrative peak load market. They may burn some fuel while offline to maintain their boilers warm.

However, fast start generators are a tiny proportion of the grid capacity and in the offline, boiler-warm state, they would be burning their minimum amount of fuel. In the meantime, intermittent supply from wind means that wind power producers cannot come on or go offline as reliably nor as frequently as the fast start generators. Marginal benefits from additional wind power would be low[^] but not negative.

The amount of wind capacity[^] would have to rise dramatically in order to have an impact on the spinning reserve, and (even the most ambitious plans for wind do not currently approach this level. A major jump in fuel price as a result of a carbon tax/trading market might also have an impact on spinning reserve if it made a major fuel-fired station uneconomic and forced it out of the national market. However, there would be powerful incentives under that scenario for alternative, stable suppliers to enter the market and make up the lost spinning reserve.

2. MATCHING SUPPLY AND DEMAND IN THE POWER INDUSTRY

2.1 Variable demand

Balancing the supply of power with a variable and partly unpredictable demand is one of the fundamental issues confronting the power system. Generators have to vary their power output to match the aggregate load created from many consumers of varying size who make their call on the system at will. In Victoria during 2003, total demand varied from a peak of 8.5GW to a low of 3.8 GW - about a 50% variation of total State capacity.

This aggregate load includes some underlying stable usage patterns that are used in planning the delivery of power. These underlying patterns reflect the cycles of community life - around breakfast and dinner there are regular peaks in domestic demand; industrial demand falls at the end of the working day; and demand from all sources falls significantly late in the evening and in the early hours of the morning. Seasonal variations in weather and short-term weather forecasts could also be used to anticipate rises in demand from sources such as heating and cooling of buildings.

Overlaying these broad cycles are unpredictable fluctuations caused by the normal variation in the behaviour of consumers - such as an unusual number of people turning on or off appliances, workplaces changing production schedules, or sudden changes in weather. When variations are so sudden and large that the generators are unable to balance supply and demand, system failures occur leading to swings in the power supply, equipment failures and service disruptions (brownouts).

The greater the number of generators on the grid, the more complex is the task they face to match their power output to demand, as each power station's output is dependent not only on demand, but on the power output of the other generators. When intermittent power sources such as wind are included, the complexity increases even further, as their output is less predictable than generators that use a controlled fuel or energy source, such as coal, oil, gas or falling water (hydro-electricity).

2.2 Supply management

There are a number of ways that a generator can respond to varying demand. A turbine generator could simply allow the cycles of the alternating current to change as demand for power changes. However, such cycle variation would mean variable frequencies and voltages on the grid, and create major problems for users who require constant power delivery and who rely on a constant AC cycle to govern speed and/or time in electric devices.

Consequently, power stations seek to keep a constant turbine speed within a tight range (around plus or minus 1 %) irrespective of demand. Power output thus has to be varied by other means.

Coal, oil and gas-fired generators can vary their power output by varying the fuel intake, in much the same way as a car changes power according to traffic conditions and terrain. However, very large power stations take a long time to fire-up and to cool down. The time taken will vary according to the size of the boiler - the larger the boiler, the longer the time required to build up temperature.

In addition, all generators can make minor adjustments to the power output from the generator by using governors to adjust steam pressure. Minor variations in cycle speed (within the acceptable cycle variation) can also enable the system to adapt to minor load fluctuations.

Hydroelectricity generators are able to respond quickly to changes in demand because they do not have a thermal load to dissipate. They simply vary the amount of water flowing through to turn the turbines and so change power output.

A grid will often include a number of large generators that supply the base load. However, it is not economic to build large generators to cover the highest peak loads, as this would mean that on average, there would be a significant idle capacity in the grid. Instead, a number of smaller, faster-response generators are used to cover peak demand. These tend to be hydro or gas generators with a fast start' capacity so that they can come on and offline rapidly as demand dictates.

2.3 Spinning reserve

Spinning reserve is spare capacity in the grid to ensure security of supply. The overall grid manager will ensure that there is sufficient spare generator capacity connected to the grid readily available to cover a serious supply or demand shift - such as the unexpected withdrawal from the grid of a generator.

This spare capacity will usually be spread across a number of generators, including the large generators that provide the base load. These large generators will operate at less than full capacity, even during periods of peak demand, so that they can increase output if there is a major disruption at another large generator. The fast start generators will also form part of the spinning reserve.

3. POWER SUPPLY IN VICTORIA

In Victoria, the supply infrastructure was largely built by the SECV. As a monopoly organisation, the SECV was able to centrally plan power investment and the operation of the grid to match supply and demand.

The Victorian grid constructed by the SECV is dominated by large brown coal power stations built by the former SECV. These produce very cheap power but are slow to respond to variations in demand, both because of their size and fuel source. To compensate for this, the former SECV also used faster response hydro, gas-fired and diesel-fired power stations that are able to cover peak loads and respond faster to small changes in demand.

The SECV planned the output of the large-scale brown coal plants on the basis of stable usage patterns (the base load), and used the more responsive plants to manage peak power requirements and minor, short-term fluctuations. The SECV shunned the use of intermittent sources of power such as wind, and other variable sources such as excess power from cogenerators, in large part, because of the added complication they gave to demand management.

Since privatisation, the former SECV plants have continued to dominate power supply in Victoria. New investment is taking place in wind, and a gas-fired plant was recently commissioned to meet peak power supplies, especially during hot weather in summer when air conditioning loads peak.

The competitive national market that now operates to match supply and demand uses price signals to match power supply and demand, as described in the next section. These price signals continue to favour large brown coal producers providing the base load, while smaller generators profit by providing peak power requirements and a fast response capacity.

The creation of a competitive national market has also enabled Victoria to become a net exporter of power on an annual basis, exporting about 2% of total annual power production. Brown coal power producers have been able to exploit their cost advantages relative to more expensive fuel sources. The surplus is achieved because exports of power for most of the year exceed Victoria's need to import at times of peak demand, such as on days of extreme temperatures in summer.

A list of current Victorian generators and their capacity is provided in Appendix 1.

4. THE NATIONAL GRID

4.1 Using pricing to regulate supply

In the competitive National Grid introduced in the 90s, generators compete to supply power and the old central planning for power has been replaced by a market mechanism. In the market, power retailers post contracts for the supply of power through the National Electricity Market Management Company (NEMMCO) every 5 minutes. Prices are set in 30-minute intervals. Generators bid competitively to supply these contracts and the price reflects the demand at that time.

These price signals moderate supply, with NEMMCO taking an overriding responsibility for system stability (e.g. spinning reserve capacity, peak power capacity and performance standards from suppliers). To do this, NEMMCO restricts large, fuel-burning generators such as Victoria's brown coal plants to bidding for the more predictable base load.

NEMMCO also registers a number of small, gas-fired and hydro plants as 'fast-start' generators which are exclusively able to bid for peak load contracts. These contracts command a significant price premium for urgent supply, which compensates them for the higher cost structure that comes with their smaller size, periods of downtime and/or higher fuel costs.

Fast start generators are also able to bid for the base load contracts but have difficulty competing with the larger producers. The split of the market between base load and peak requirements allows NEMMCO to keep a balance in the generator capacity by ensuring that the fast start' generators can make an adequate return on investment.

The larger numbers of generators on the national grid means that Victorian peak power demand can now be met from either the local, small gas-fired stations or from interstate fast start generators, including hydro producers. This has significantly increased the flexibility of the system, and is a key advantage of the national grid, allowing fluctuations to be smoothed out over a larger consumer population.

4.2 Brown coal producers' market behaviour

The high start-up and shut-down costs of a brown coal producer means that these generators have a strong interest in staying online. The brown coal producers are Australia's lowest cost power producers and will offer power at a very cheap price rather than shut their plant down. Indeed, the costs of re firing a brown coal plant are such that these generators may even sell at a loss in the short term rather than close their generators down.

Spinning reserve in electricity markets Implications on greenhouse emissions

This pricing behaviour also forces the gas-fired plants and other fast response producers out of the base load market first when demand falls. Their higher fuel costs and easier shutdown procedures mean that it is more economic for them to go offline than sell at the very low price. In fact, Victoria's brown coal generators' low fuel cost advantage is so great that they would be the last to be priced out of the market.

This cost advantage plus their dominant capacity relative to base load demand means that in reality, they never go offline except for repairs and maintenance. The generators can drop to as low as 30% capacity during periods of low demand such as at night, by progressively reducing fuel. (Below this capacity the plants must supplement the brown coal fuel with oil or gas, injected into the plant via fuel guns to maintain combustion - this adds to their costs and is not an attractive option.)

But the lowest that Victoria's demand has fallen in recent times is 50% of total State capacity and brown coal producers collectively make up 85% of the State's electricity supply. Thus, collectively the brown coal power producers are needed to meet even the lowest demand conceivable, and individual generators can use the competitive bidding of the market to keep each above 30% capacity.

The creation of the national grid has only boosted their position in this respect. The total national base load into which they are selling has increased and demand fluctuations have been evened out. They are the lowest cost producers in the nation, and the national growth in demand relative to capacity has advantaged them further, with other States facing significant, though seasonal power shortages.

4.3 Spinning reserve in the national market

NEMMCO pays producers not only to provide forecast power demand but also to provide sufficient spinning reserve to guarantee security of supply. Thus NEMMCO may not allow an individual generator to bid to supply power to its full capacity because of its need for latent capacity in the grid to meet contingencies. It may instead pay the generator to keep some of its capacity as part of the spinning reserve.

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5. WIND POWER GENERATORS: THE IMPACT OF INTERMITTENT SUPPLY

5.1 Wind power's position in the national electricity market

Wind power can be profitable if the times of wind coincide with the peaks of power demand, and the producer is able to offer power when prices are high. However, there is no guarantee that periods of high wind will coincide with high demand, and on a cost basis alone, wind cannot compete with any of the fossil fuel providers.

The Federal Government's Mandatory Renewable Energy Target (MRET) requires that from 2010, at least 2 % of the national power supply should come from renewable energy plants that began commercial operation on or after 1 January 1997. This excludes pre-existing hydro capacity from sources such as the Snowy Mountains Hydro Plants, unless they can demonstrate an increase in output from those assets above a relevant historical baseline.

MRET has created a market niche for wind power, as retailers must source a certain quantum of power from renewable sources. This creates a market from which the lower cost fossil fuel generators are excluded.

As there is limited additional hydro potential in Australia, and as solar and geothermal power generation are currently still more costly than wind power, wind has been the chief beneficiary of MRET. Substantial new wind capacity is planned for Victoria in coming years to exploit the State's windy climate. As total wind (and other renewables) capacity has not yet reached the MRET goal of 2%, all wind power is bought.

5.2 Wind power and total greenhouse emissions from the grid

The mandatory purchase of renewable power means that wind power will displace power that fossil fuel based generators would otherwise provide. Generally, the first providers to be displaced will be the gas-fired generators, because they are the highest cost providers and are also the fastest to respond to changes in demand. As hydro providers such as the Snowy Mountains also respond quickly to changes in the market, some displacement of hydro power may also occur when prevailing market prices are low.

However, as wind power capacity expands, and given the wide geographic spread of proposed plants, there is likely to be always some wind supply into the grid. This, plus the ability to monitor and forecast likely wind supply, will influence price expectations in the base load of the NEMMCO trading market.

This could influence the scheduling of brown coal generators and cause them to reduce their power output during extended windy seasons. The result will probably be some displacement of greenhouse emissions from brown coal.

The extent of the displacement by wind power of greenhouse emissions from both brown coal and gas fired stations will also be influenced by changes in efficiency of plants as loads varies. Just as cars operate at higher efficiencies at certain speeds, the efficiency of power production varies at different fuel inputs. In the case of brown coal plants, this variation in efficiency is relatively small, dropping from about 32% net thermal efficiency at full capacity to about 28% when operating at 30% capacity.

When fuel burning plants are operating at lower efficiency, greenhouse emissions per unit of power output will rise slightly. When wind power displaces some of the power from brown coal producers, the fuel consumption of the brown coal generator falls, and so too do total greenhouse emissions. The fall in emissions will however, not be as fast as it would be if the generator's efficiency remained constant.

So, while the greenhouse reductions from wind power may not lead to a direct displacement of the greenhouse emissions from fossil fuel stations for reasons discussed above, it may be possible for positive gains to be achieved.

The more wind power is delivered, the greater the savings will be generally, although in some instances the marginal benefits may go to zero. Nevertheless, greater amounts of wind power will never lead to net increases of emissions.

5.3 Wind power, greenhouse emissions and spinning reserve

Because of wind's intermittent supply, the grid will generally need more reliable sources of spinning reserve. Consequently, while wind may displace fossil fuel power, existing (and increasing as power demand continues to grow) fossil fuel power capacity will be needed to maintain viable spinning reserve levels.

From a greenhouse emissions point of view, this is largely irrelevant in the current market because spinning reserve is latent capacity - it does not produce greenhouse emissions. As noted, to meet the required spinning reserve, the brown coal producers simply reduce fuel to operate at less than full capacity. The greenhouse emissions fall, albeit less quickly as efficiency drops slightly at lower load levels.

Theoretically, as some anti-wind power groups have claimed, if wind power increases significantly, some fuel-burning generators might be forced offline. If the generators expect to come back online quickly, they might continue to burn fuel to maintain thermal mass, rather than shut down. For technical reasons, brown coal producers would avoid this situation in anyway possible, including through its pricing strategy.

However, if the cost structure of the electricity market was to be dramatically shifted, such as through the introduction of a carbon tax and a carbon trading market, it could become uneconomic for brown coal producers to provide power below a certain price. Their effective fuel costs would be significantly higher than at present, and they would face tougher price competition from renewable power generators and from generators burning fuels of lower greenhouse intensity such as gas, including the smaller, fast start generators.

Under these circumstances, the brown coal producer might find it more economic to withdraw supply to minimise fuel costs. They would have to balance the savings in fuel against shutdown costs, and weigh the option of staying online and selling power at a very low price.

Given that large brown coal power producers are not well suited to coming on and offline in this way, it is more likely that in this scenario where effective fuel cost rises to the point where brown coal power stations regularly need to go offline, one or more of the brown coal power generators would be forced out of business. The others would continue to provide a lower level base load. Fast starting, lower carbon emitting gas or liquid fuel plants would be likely to fill the void in the base load.

Potentially, this withdrawal of a major plant could leave the grid exposed through insufficient spinning reserve - intermittent providers such as wind would not be able to provide this. But wind power is a long way from having sufficient capacity in Victoria to have any significant impact on the base load demand of the brown coal providers. A recent British estimate is that wind capacity would have to rise to 20% of the grid before any such spinning reserve impact was felt¹.

Any greenhouse cost loading would also mean that investment in lower greenhouse intensity power stations such as gas, would become more attractive and investment in non-intermittent renewables such as hot rocks and solar power would also become attractive. Since NEMMCO already pays for spinning reserve capacity, providers from these fuels would effectively enjoy a 'security payment' revenue stream that wind would not, and it would enhance their overall business case.

The market will thus have an incentive to provide this capacity and can be expected to respond. If supply of spinning capacity decreases, NEMMCO will have to increase payments for spinning reserve, which should attract new investments. This will, of course, flow through into an increase in total power prices above and beyond the direct carbon tax.

There are also potential time lags to consider. The investment decisions of companies in major power generation have a long lag and national capacity is already under pressure, as evidenced in summer power failures when temperatures go up and air conditioning demand rises accordingly. This is why potential investors in new power capacity want the issue of a carbon tax/trading market resolved before committing to new investment -it will have a major impact on the cost structures and relative competitiveness of different generator types.

It must also be recognised that the carbon tax or a carbon trading market would also have demand impacts, which complicates matters further. An effective rise in fuel costs caused by tax/market tools would also provide incentives for energy efficiencies that would reduce overall demand. This effect was dramatically evident in the aftermath of the oil shocks of the 1970s. A fall in demand would also influence revenue projections and investment necessity and attractiveness.

¹ Study quoted in paragraph 23 of the Welsh Affairs Committee report on Wind Energy. Volume 1, HMSO 1994

This report shows just how little impact wind has as an energy source that will reduce our reliance on fossil fuel reliant power stations and therefore do little if anything in the way of reducing greenhouse gas emissions. It actually states throughout the report that co2 emissions will not be reduced, but they will not increase.

The Bracks government has continually told the people of Victoria that wind energy facilities

will reduce our co2 emissions, now one of his own departments has a report to say they wont. This on top of all the information that is available from around the world should be enough to make this government stop and rethink its strategy on renewable energy regarding wind energy facilities.

Now lets talk about the proposal in question as to what the proponent and the Bracks government would have us believe it is capable of. If we use the Victorian guidelines which have been written by the wind industry in Australia, a capacity factor of 35% for the proposed 79.2 MW facility will generate 242,827.2 MWH, will displace 315,675.3 tonnes of CO2 emissions, be capable of running 45, 558.5 homes, be the equivalent of taking 79,904 cars off the road, the equivalent of planting 471,157 trees, will take up 2.55% of MRET and will be 0.646% of Victoria's proportion of *current* consumption.

Or more realistic figures may be based on the E. on Netz 16% or S.A. 8% which would give us the following results

	16%	8%
MWH	111,006.7	55,503.3
CO2 Displacement	114,308.7	72,154
Homes	20,826.7	10,413
Cars	33,327	16,663
Trees	215,386	107,692
MRET	1.16%	0.58%
Vic Consumption	0.295%	0.147%

Then again, because we had Mr White from Garrad Hassan telling us that we could expect 30-50% capacity, but had no factual evidence to support this statement we could use Garrad Hassan actual figures for the Portland project that Mr White submitted to the Victorian government while working as consultants for Pacific Hydro Pty Ltd. We have all been told that Portland has one of the best wind resources and being on the coast one would have to believe it is at least of the same standard as the Dollar/Foster North winds and not less reliable.

Well the figures that Mr White used for Portland are nothing like the 50% capacity that he has predicted for here. Poor old Portland could only generate 25% capacity or less for 58.7% of the time and only 10% capacity or less for 34.1% of the time and for only 10.8% of the time in excess of 90% capacity. Even if we were to use these figures it still would be a long way short of the prediction used in the guidelines of 35% capacity factor.

Figures from

(Garrad Hassan Pacific document 1081/PR003 issue: 006 Final page 13)

It simply is not possible for the proponent or government to say that a capacity factor of 35% is achievable. A report by the South Australian government by the SA Electricity Supply Industry Planning Council Wind Farm Study detailed the lack of reliability of wind turbines. The SA study concludes that only 8% of a wind energy facilities rated capacity can be considered 'firm'. Further the report suggests that emissions from thermal generators could rise as they "ramp-off" to accommodate wind energy and thus operate less efficiently.

As stated earlier wind turbines are an intermittent for of generating electricity, but the proponents of wind energy facilities cite this as not being a problem and usually mention

countries such as Germany (3% wind), Spain(10%) or Denmark (17%). However, one needs to realise that these countries are connected to the European grid system as well as having major hydro facilities to supply power when there is little or no wind.

Victoria is unlikely to have any back up coming from hydro as the government wont even consider building a new dam for the people of Melbourne for water supply let alone for a power supply. It is for the reasons stated above that wind energy can never provide a secure reliable or affordable energy supply. There is enough evidence from home and abroad which is damming against wind energy facilities as a way of reducing co2 emissions. The State government has a very important role to play in ensuring proper planning for all Victorians future energy needs. It is unfortunate that they are choosing to ignore this role by going down a road that is proven not to work .

This project like other wind energy facilities in this state will not even produce 1% of Victoria current power usage. Hospitals, industry, business, schools, shops, homes and buildings all rely on power 24/7 365 days a year of which wind cannot do.

Reports from Ireland are also damming against the push for wind power and have found that the potential fuel and emissions savings are tempered by the inherent intermittence of wind. For the scenarios studied total generation costs were found to increase significantly. The implied CO2 abatement cost from this approach, for large wind penetration levels, was found to be in excess of €120/tonne.

The EU has set down indicative targets for the production of electricity from renewable sources for all member countries. The EU targets imply that, on average, across all member states, 22% of Europe's electricity needs should be produced from renewable sources. To meet Ireland's target, 13.2% of the primary electricity needs should come from renewable sources by 2010. ESB National Grid seeks to facilitate this move towards greater renewable energy usage. Given Ireland's large wind resource, the increasing technical and commercial experience which has been gained within the industry and the level of interest in Wind Powered Generation (WPG), it is clear that more of our electricity needs will be met by WPG in the future.

It has long been the accepted wisdom that the integration of WPG within the Irish system would impact on overall generation operation and costs. While the examination of the implications of high levels of WPG for other countries provides a useful indication of what might happen in Ireland, the implications for the Irish system, given its small size and lack of strong interconnection, could be much more significant. However the exact nature and scale of these impacts have not previously been quantified as detailed modelling of both WPG and conventional plant is required. The report seeks to quantify and explain, for the first time, some of these impacts, subject to a given set of input assumptions. The report documents studies which simulated Ireland's generation system. The purpose of these studies was to examine the impacts that different levels of WPG will have on operation and economic performance of conventional generation plant. The studies simulate the performance of the power system, at hourly intervals, for each and every hour of the study year.

Analysis based on this time resolution has raised some very significant issues but it is important to understand the context and limits of these studies. They do not examine the interaction of WPG with the transmission network, nor do they deal with the short term (from milliseconds to one hour) impacts on other generation plant. These short term issues would include

minute to minute load following, frequency control and reserve provision. Such issues are being actively considered by ESB National Grid and various industry participants in other forums. Other impacts of wind, such as increased fuel diversity, have not been commented on, as this report focuses on issues which may not have been previously understood or fully quantified.

The simulation studies examined the impacts of Wind Powered Generation (WPG) on conventional plant as the installed wind capacity increases. First, they examined the impact on the Irish power system of increasing the installed wind capacity from 0 to 1,500MW (representing wind energy penetration³ levels from 0% to 16%), for a year when the peak electricity demand is 5,000MW. Using what is largely the current plant portfolio, this study was designed to reflect conditions which may occur at some stage between 2007 and 2010 as a consequence of using WPG to meet Ireland's renewable energy target. Secondly, the impacts of very high levels of wind capacity, from 0 to 3,500MW (representing wind energy penetration levels from 0% to 27%), were considered on a larger system having a peak demand of 6,500MW. This study was designed to examine the long term impacts on a system whose thermal portfolio comprises mainly combined and open cycle gas turbine plant and could reasonably reflect a post 2010 situation. For consistency and brevity we have mostly presented the results for the 5,000MW system in the executive summary. Detailed results for both systems are to be found in the main report.

The input assumptions, outlined below, were chosen to represent a balanced and reasonable view. Alternative assumptions may of course also be modelled. The WPG model used in these simulation studies assumes diverse wind farm locations, and includes the impact of off-shore wind capacity. This assumption will lessen the adverse impact of WPG on conventional plant, as the aggregate output of such dispersed WPG is less volatile and intermittent than if it was all located within a single region and subject to similar, or more homogeneous, wind conditions.

For the purpose of these studies it was assumed that the output of WPG could be predicted with a high degree of accuracy. This is a somewhat optimistic assumption, which reduces the impact on conventional plant. However, the option of assuming little or no forecasting ability was thought to be unrealistic given the current level of research and development activity in this area. We have also assumed that the output of WPG is not constrained or controlled by the system operator and is determined by wind conditions alone. This could be considered as the equivalent of 'priority dispatch'. While this is a conservative assumption, as the absence of such control may tend to accentuate the impact of WPG, it does reflect the lack of control which the system operator currently has over WPG.

³ Throughout this report the term 'wind energy penetration' refers to the amount of energy provided by WPG as a percentage of the total energy requirement, rather than the fraction of the total installed capacity which WPG represents.

1 The effect on capacity requirements and utilisation

It was found that as WPG increases additional or 'surplus' generation capacity is required if security of supply is to be maintained. This is due to the intermittent nature of wind and the fact that large amounts of WPG can fail simultaneously (when wind speeds move outside the operational range of wind turbines). The 'surplus' capacity is necessary as it acts as a back-up for intermittent WPG.

The 'surplus' is defined in terms of the additional capacity required above and beyond that which would be needed if the generation portfolio was made up of conventional plant alone. In addition, as electricity generated from wind was always assumed to be taken by the system (ahead of electricity from conventional plant), the utilisation of all conventional plant was found to be curtailed as WPG increased. Reducing market share would normally lead to the uncompetitive capacity being forced out of the market. However, when WPG displaces conventional generation, this capacity reduction is not possible for system security reasons. In fact the opposite happens; WPG requires the system to operate with a capacity 'surplus', which tends to further reduce the utilisation of the conventional plant.

Capacity Factor⁵ was used to quantify the reduction in the utilisation of conventional plant. In this case it was found that the capacity factor of mid-merit⁶ plant, almost halved from 51% to 29.5% as the WPG was increased from 0 to 1,500 MW. High-merit (low-cost/high-efficiency plant) also saw a reduction in output, while low-merit (high-cost/low-efficiency) plant was largely unaffected.

As generators are exposed to substantial fixed costs this reduction in output implies that the price charged per unit of output must increase if generators are to recover their costs.

2 The impact on production patterns

The simulation studies showed that introducing WPG into the generation portfolio changes the operational regime of the conventional generation. While it is intuitively clear that the introduction of an intermittent source of electricity is likely to cause such an effect, it was only through the use of the hourly simulation studies that we were able to quantify the extent of this effect. Without WPG in the plant portfolio, the units operate around the clock, in general having to carry out just two load changes per day (reduce output at night and pick up again in the morning). With 1500MW of wind on the system, the units are forced to come on and off, curtail and vary its output much more frequently. If high levels of WPG are to be accommodated in the future, existing conventional plant may need to be modified and new plant selected so that it can cope with this type of operation without incurring significant additional costs.

⁴ Generation adequacy is evaluated in terms of loss of load expectation (LOLE) and is expressed as hours per year. The current generation adequacy standard is 8 hours loss of load per year. LOLE is a statistical measure of the likelihood of failure, and does not quantify the extent to which supply fails to meet demand.

⁵ The capacity factor of a unit is a measure of the annual energy that the unit produces compared to the maximum possible production level. Therefore for a unit to have a 100% capacity factor it must operate at its full output for every hour of the year, while a 50% capacity factor can be achieved, for example, by either running at half load for every hour of the year or running at full load for only half the hours of the year. capacity factor is therefore a measure of the utilisation of a unit.

⁶ Mid-merit is defined as medium-cost, load following plant.

In Ireland these changes in the production patterns of conventional plant are accentuated by the fact that, unlike other countries such as Denmark which is strongly interconnected to a highly flexible hydro based generation system in Norway, there is little scope to smooth out the intermittent production pattern of wind. While these figures give a clear visual indication of how the operating regime of this unit is affected, this impact was also encapsulated by enumerating the impact of WPG on 'start-ups' and the 'average load change per hour'. It was found, for example, that if there was no WPG the average number of start-ups for mid-merit units was 12 per year, or once every 4.3 weeks. With 1500 MW of WPG (equivalent to 15.7% wind energy penetration), the number of start-ups for this same category of plant had risen to 103 per year or once every 3.5 days. Such an operating regime would probably have a significant

negative effect on plant reliability.

3 Impact on total generation costs (6,500MW scenario)

The total cost⁷ of meeting customer electricity demand was found to increase as the penetration of wind generation increased. This is largely due to the retention or installation of surplus conventional capacity, for system security reasons, and the operation of all installed conventional capacity in a sub-optimal manner. They estimate that for a system⁸ with a peak of 6,500MW, and a generation portfolio comprising of combined and open cycle gas turbines, and no WPG, that the total annual generation costs would be €1.28bn. When WPG is increased to 1,500MW the total generation costs increases by €96m per annum to €1.48bn. For a system with a peak demand of 6,500 MW, 1500 MW of WPG represents an energy penetration level of 11.7%.

The EU target for Ireland, from all renewable sources, is 13.2%. Therefore it can be estimated that, in the long term, using WPG to comply with the EU target will increase electricity generation costs by 15% (€96m as a percentage of €1.28bn). If WPG is increased further to 2,500MW, Ireland would be in a position to achieve the average EU target for electricity production from renewable sources of 22%. However this would increase the total generation cost by €10m representing an increase in total generation costs over the no wind case of 24%.

It should be noted that it is the total generation costs rather than the delivered electricity price which is referred to here. While total generation costs are a major component of the electricity price there are other components, including use of network charges, losses and system support costs⁹. Consequently, the percent total generation cost increases quoted give an indication, rather than the absolute value, for the price increase which the customer may see as a result of WPG. Such increases will vary by customer category and are likely to be most noticeable for large industrial customers. The reason for this is that total generation costs represent a greater percentage of the end price paid by this customer category because there is no charge for the use of the low voltage network.

The reduction in CO₂ emissions for this 6,500MW system with 1,500MW of WPG (representing wind energy penetration levels of 11.7%) over the case with no wind was found to be 1.42 million tonnes. However the total generation cost increased by €96m implying a cost per tonne, of CO₂ reduction, of €138. One of the key economic considerations for Ireland is the cost of meeting carbon emission reduction targets set by the Government in response to EU and Kyoto protocol obligations. Measures which encourage a reduction in consumption (carbon taxes¹⁰), substitution with non or low carbon technologies (renewables), purchase of emissions quotas (economic reduction of carbon emissions elsewhere), all constitute feasible policy options. In choosing between these options, it is important that a minimum cost objective be adopted in the context of maintaining Ireland's economic competitiveness. The carbon reduction costs implicit in the wind penetration levels considered in this study appear high in comparison, for example, to current estimates for the trading price of carbon allocations.

⁷ This includes the fixed and variable costs for both conventional plant and WPG.

⁸ This analysis was not carried out for the 5000 MW system as full generation costs of the current plant portfolio are not available to ESB National Grid.

⁹ This report does not quantify the impact, favourable or otherwise, of WPG on these other components of the electricity price.

¹⁰ The Department of Finance consultation paper on carbon taxes, February 2004, suggests a tax which varies from 17.25 to 103.5 €/tCO₂ depending on taxation levels and fuel type.

Reference:

W. Leonhard, K. Muller, CIGRE Autumn 2002.
Balancing Fluctuating Wind Energy with Fossil Power Stations.

“Results show that even at this low penetration of wind energy, the infeed causes a hidden increase in the specific fuel consumption in remote fossil generating stations, they are now producing less electrical energy but with higher fuel consumption and CO2 emissions per KWh”.

Based on a set of plausible assumptions, it was found that producing more electricity from wind will have an ever increasing impact on the performance of other generation plant on the system. These impacts tend to be adverse in nature, reducing the efficiency and increasing the operational demands on conventional plant. It was also found that the law of diminishing returns applies. The capacity benefit and emissions savings decline as the penetration of wind increases. The cost of CO2 abatement arising from using large levels of wind energy penetration appears high relative to other alternatives.

We know from reports such as these that Victoria still has a lot of work to do regarding the efficiencies of wind energy facilities and just how they will effect CO2 emissions. It would appear the the Bracks government is taking the word of the manufacturers of the turbines and the industry instead of doing thorough research its self. I hope the panel members point out this information to the government and the responsible departments, so as it can be taken into account for any future work/updates that is done on the Victorian guidelines.

Some other information on the actual power used by the turbines themselves that the proponent, Garrad Hassan and Bracks government have not taken into account when working out the efficiency of turbines.

Among the wind turbine functions that use electricity are the following.*

- yaw mechanism (to keep the blades perpendicular to the wind; also to untwist the electrical cables in the tower when necessary) -- the nacelle (turbine housing) and blades together weigh 92 tons on a GE 1.5-MW turbine
- blade-pitch control (to keep the rotors spinning at a regular rate)
- lights, controllers, communication, sensors, metering, data collection, etc.
- using the generator as a motor (to help the blades start to turn when the wind speed is low or even, it is rumored, to maintain the illusion that the facility is producing electricity when it is not, perhaps during important site tours)
- heating and dehumidifying the nacelle -- according to Danish manufacturer Vestas, "power consumption for heating and dehumidification of the nacelle must be expected during periods with increased humidity, low temperatures and low wind speeds"
- oil heater and pump and cooler in gearbox
- hydraulic brake -- to lock the blades in very high wind
- magnetizing the stator -- the asynchronous (or induction) generators used in most large grid-connected turbines require a "large" amount of continuous electricity from the grid both to keep the generator ready when the wind is not blowing and for the generator to function when the blades are

turning

It may be that each turbine consumes 50% of its rated capacity in its own operation. If so, the plant as a whole -- which may produce only 25% of its rated capacity annually -- would be using (for free!) twice as much electricity as it produces and sells. It may be more or it may be less; the industry doesn't publicize any data that may exist. Whatever the actual amount, it seriously diminishes any claim of providing a significant amount of energy.

It has also been reported that the cable that links all the turbines together underground has been found to lose as much as 12.5% which reduces the capacity factor of the turbines.

Decommissioning

As stated by Mr Dwyer for the proponent in his opening submission, there are no statutory obligations for wind energy operators to undertake decommissioning of a wind energy facility once it has permanently ceased operation. The proponent has nothing in the application for the removal of the turbines after their designated lifespan other than in the accordance with legal requirements of that time.

Nowhere does it actually state that Meridian energy will be responsible for the decommissioning of the turbines and the rehabilitation of the site. Strict procedures need to be enforced by the panel members if the application is granted approval for the removal of all turbines, including blades, nacelles, towers, concrete footings, roads and the land rehabilitated to pre wind energy facility.

As has been the case with other wind energy proponents (Wind power for one) it is not appropriate for the turbines once they have ceased to operate that they become the property of the owner of the land. It is not for the proponent to say that the price of scrap metal or the price of second hand turbines will make it worth their while to have the turbines removed. No one can predict what is going to happen in 25 years time as to the worth of scrap metal or second hand turbines. The people of Dollar/Foster North and surrounding districts need to be guaranteed that the turbines will not be left to decay over the years as a reminder of just how the landscape was destroyed for nothing.

A bond should be put in place right from the start that is added to each year according to CPI rises. We are all too aware what happened when the New Zealand Government took control of Ansett Airlines and we do not need to left holding this baby as well. We are only all too familiar with the way corporate and governments work to know that a bond is required up front for the removal of the turbines and the rehabilitation of the land that will be required. We do not want to be told at the end of the wind energy facilities lifespan that it has been sold to a \$2.00 company and it is no longer the responsibility of the New Zealand government. With the collapse of major power companies like Enron and British Energy, bonds must be taken by the governments to cover the costs of decommissioning wind turbines. Scottish Power, for instance, have debts of £6 billion, equivalent to their total turnover. What guarantee do we have that they will be around in 25 years time to decommission any turbines installed?

For the proponent to suggest that the cost of decommissioning for the project is secured under

arrangements with the landowners is absurd. It is highly unlikely that the proponent could tell us the price of scrap metal in 25 years time, today. It is therefore that the generally accepted view of the industry in regards to this matter be totally ignored and a bond put in its place. As for the reliance of the landholders to be responsible is also absurd, they could and can just as easily walk away for the site without doing anything in regards to decommissioning.

Mr White of Garrad Hassan stated that the wind energy is only just coming to the end of some turbines lifespan and he showed a picture of a turbine in his presentation of a crane next to a turbine unfortunately this turbine was only 22 metre and not a 1.65 MW machine that will be as high as 110 metres. As Mr White stated no one has done this on a scale or level that is being proposed for Dollar/Foster North so it remains to be seen if in fact anything will be done on decommissioning. Mr White also mentioned in his expert witness report that there is a clause /condition number 17 relating to decommissioning, he is fortunate to have seen this, we the people of Dollar/Foster North have not been as fortunate and are left with another unknown from the proponent. So much for consultation, but we will get to that later.

Decommissioning is a serious concern for all that are involved in the project, just as it is for the communities of the surrounding areas. If this issue is not addressed in the manner to which it is deserved the project is in fact a joke and nothing more than a charade for a government intent on gaining green votes and a proponent whose sole intent is to make money by cashing in on the Federal governments lucrative incentives by way of MRET's.

Noise Impact Assessment

The report on the assessment of noise appears to be another report that the proponent seems not to have taken the time or effort to do thoroughly much like the rest of the submission. It contains incorrect and flawed information and lacks the detail a report of this nature requires. The proposed site covers an area of 2300 hectares and has over 150 houses within 2.5 km, yet the assessment for background noise measurements was only conducted at 7 houses of which 2 are under financial arrangements with the proponent(14 & 43), another 2 were conducted on stakeholders properties (73 & 29), 1 was on the property of a relative of a stakeholder(32), a grand total of 2 background noise monitors were not on stakeholders properties, relatives or receiving financial benefits (25 & 44).

Of these two monitors one at location 25 was missing records and the other at location 44 was put next to trees and posts with rails. The report states that more properties were predicted to

have turbine noise levels over 35 dB(A), but they had difficulties in obtaining access to measurements. No one knows just how difficult this was, the panel have not been informed and neither have the residents that neighbor the proposal. Who, how, when, were residents asked or questioned about sound tests for background noise monitoring, this question is still unanswered by the proponent to this day and looks as though it will remain that way.

I can tell you that I know of no one who receive a letter asking for this to take place at anyones home or farm and it was never mentioned at any of the so called open days or sent out in any of the limited information sheets from the proponent. One can only summise that it was done in house as 5 out of 7 being on the books of Meridian does not suggest otherwise.

This report or lack of a report is suppose to contian accurate and vital information for the planning panel and State government to make informed decisions on. I would suggest that it needs to be rewritten and resubmitted with accurate and reliable information contained in it. It has be reviewed and approved by the head of AusWes yet it still contains wrong information throughout it. If the head of AusWea Mr Ian Lloyd Besson can approve this report and it be allowed to be accepted as reliable, then there truly is something rotten in the state of Denmark.

It is absolutely insane that this report could carry any weight to the granting of an application for this proposal to go a head. No wind speed measurements at hub height have been recorded. No wind speed directions have been recorded. Noise monitoring equipment has supposedly failed in the field at two locations (14 & 25) or at least this is what the proponent would have us believe. Tables with incorrect information(2 & 4 on pages 8 & 9) have been supplied in the report and to suggest it was an error with cut and paste on the computer spread sheet is ridiculous, close examination of this report fails to show these figures anywhere and to suggest this was the reason is not acceptable.

The report also states that the total number of data points collected at location 25 was only 1772, saying the microphone was unscrewed between 17.50 and 18.00 on the 27th of June resulting in logger failure and was clearly identifiable and this information was not used. This is a very interesting comment as the time history stops on the 21st of June some six days prior to when the microphone was supposedly unscrewed. We would like to know what is actually true, which if any of these two statements is correct and if one is why was the other one made? Once again this report has been prepared by Mr Lloyd-Besson reviewed by Andrew McKenzie/Malcolm Hayes and then approved by AusWea's own Mr Lloyd-Besson It is very reasonable for the panel and the residents to demand that this report is thoroughly checked and by this we don't mean just over night, if not to be resubmitted. We have no confidence in the report or of the work that has been carried out and relied upon.

Of interest is the timing of the night time analysis, it appears for a company that is familiar with the guidelines for noise monitoring that it was not until the panel from the Bald Hills enquiry questioned night time levels that it had not taken place at this proposed site either. It could be assumed that the proponents had overlooked this small detail as well and only thought that it should be do from that momment, but then surely a project of this size and with the head of AusWea being involved this must have just been a pure coincidence.

Also of note is the fact that different B/G positions were used, Mr Hayes could not explain on the day as to why different B/G locations had been used for hoses that were located on the same height ridgelines (17 18 & 14). The next day he explained that the method he was using

the day before was wrong and the method that was to be used was the proximity of allocation with respect to the measurement location. This does not explain why house location 7 which has turbine 16 being the closest to it, yet B/G position 44 was used for its noise prediction instead of B/G position 73, the same with houses 56,57,58,59,60,61,62,&63 B/G position 44 was used when B/G position 25 or 29 are closer. These are just a few examples that I have been able to find, what would someone that is an expert find or if more time was available to go through the report with closer scrutiny.

Mr Hayes also stated when questioned about the possible movement of recorder at location 32 for background noise monitoring that he had been told that it had not been moved. He then also stated that this site had been involved as part of an earlier survey of which the data has not been used. He also mentioned that during that survey the monitor had been moved from the neighboring property (35). I have been informed that this monitor for B/G noise has in fact been moved on three occasions and at one time it was actually on the deck of the house to try to pick up higher readings coming from the house itself.

As for the explanation of the gaps that appear in the Marshall Day Acoustics, background noise and wind speed vs time at location 29, stating that it was the removal of data for rain periods does little to bolster our confidence, when it is not shown in any other table and also the fact that it also contains lost data.

It is not my nor the communities job to make sure these reports that have been submitted by the proponent are true and correct and it should not be the job of the panel members either, the state government should have proper procedures in place where they are responsible for the checking of accuracy of such reports. Or if it continues the way it has been the proponents will continue to manipulate the figures and reports to what ever way suits them best.

Mr Fowler of Graeme E. Harding and Associates Pty Ltd pointed out the fact that different seasons can affect the characteristics of sound and it is for that reason that he suggested either a longer time frame for recording data or doing recording at various time throughout the year. The people of Dollar/Foster North are very aware of the difference in the seasons here and the sounds that go with them. We feel it is of vital importance that more background noise monitoring be conducted at more locations and at different times of the year.

The report by Hayes McKenzie is largely based on assumptions as does not take into account wind direction or other meteorological conditions that can arise where the wind speed at the surface and at a height of 10 metres is nil or very light, but the wind speed at the turbine hub height remains well above cut in speed. This condition is generally brought about by a nocturnal temperature inversion.

The effect of this is that there is no ambient noise at the surface as the wind has been displaced upwards by the inversion layer, but the turbine noise remains as wind speeds at turbine height are unaffected by the surface inversion.

The fact that the report does not address the occurrence of this condition is a major oversight. A strong and well defined nocturnal temperature inversion is extremely common over the proposed site

due in part to its elevation and inland location. The result of this oversight is that the turbine noise figures produced by Hayes McKenzie are likely to be badly underestimated at times when this condition occurs. (generally at night when people are trying to sleep). As mentioned by Mr Steve Garito on Monday 18/4/05 he had reports of noise limits that were well above any of the forecasts by Stanwell and this may be a possible reason for it.

The nocturnal (radiation) temperature inversion

Nocturnal temperature inversions come about due to the land's ability to absorb solar heat during the day and radiate it rapidly after sunset. During daylight hours the temperature profile of the planetary boundary layer (PBL) is maintained by deep convective mixing which occurs due to solar heating of the surface. This mixing breaks down any stratification (layers) that may form in the lower atmosphere and means that wind blows relatively uniformly throughout, though increasing with height as friction with the surface becomes less of a factor (this increase is known as 'wind gradient').

On reasonably sunny days where convective mixing is occurring, a logarithmic profile for wind speed is suitable.

After sunset the surface cools rapidly as heat is radiated back into the atmosphere. Through conduction, the surface layer (the lowest few metres) of the atmosphere also cools rapidly resulting in a shallow, stable and dense layer near the surface. Above this layer the temperature rises rapidly and the nocturnal inversion is formed. Because the inversion grows largely through conductive processes, it slowly increases in depth, with a maximum depth of some tens of metres usually reached just before dawn (at which time the effects of solar radiation will break down the inversion once more). All frictional effects become confined to the shallow surface layer, and the atmosphere above this layer is decoupled from normal frictional effects. This results in near-surface winds becoming calm (or almost calm), while winds above the inversion remain at a similar speed to the pre-sunset surface winds. In fact it is not unusual for the winds above the inversion to accelerate because of the reduced friction on the bottom boundary (the inversion results in an almost 'free slip' bottom boundary condition for the flow - a condition associated with a well documented phenomenon known as the 'nocturnal jet').

The development of a nocturnal inversion is not dependent on near-calm conditions. While near-calm conditions will result in faster growth of the inversion, it is still common for the inversion to develop when wind speeds are significant.

The nocturnal inversion has been recognised as a hazard to aviation at HMAS Albatross, Nowra. In a document entitled 'Winter Westerlies' the Station's Meteorological Officer states the following (Lance, 2004):

"Cooling of the ground over night causes the lowest few hundred of feet of the atmosphere to cool, creating a temperature inversion near the surface. This inversion causes the winds at the surface to decouple from the winds above, creating large amounts of wind shear. This also creates a false impression of the upper wind conditions due to light winds at the surface. "

In situations where a nocturnal inversion has developed, it is not possible to relate a 10 metre wind speed to the wind speed above the inversion layer. A logarithmic profile will at the very least underestimate the wind speed drastically, and if the 10 metre winds are calm then the data is certainly unrepresentative.

Image 1 and image 2 graphically depict typical day time and night time conditions respectively.

The validity of the information provided above, the detail supplied in the document entitled 'Effects of the wind profile at night on wind turbine sound' and the plight of many wind farm affected residents both in Australia and abroad all indisputably suggest that the results of Noise Impact Assessments being provided by developers are critically flawed.

In Dollar/Foster North's case I would suggest given the proximity of neighbours to landowners signed up with the developer that the noise issue cannot possibly be addressed satisfactorily. This then is enough reason to reject the development.

At least I would recommend that the panel demand a more adequate Noise Impact Assessment from the developer, specifying that it include input wind measurements taken at the proposed turbine height including direction. This way there is no speculation and it is less likely that we will repeat mistakes that have been made elsewhere.

Further to the above comments, the penetrating low-frequency aspect to the noise, a thudding vibration, much like the throbbing bass of a neighboring disco, travels much farther than the usually measured "audible" noise. The beat is often close to the human heart rate, and people

have complained that it causes anxiety and nausea. Depression has also been reported to be associated with wind energy facilities caused by noise. Being physically tired all the time, sick and run down, headaches and muscle pains, churning stomach and not been able to sleep, can all lead to depression. If left untreated can depression can become a serious illness that not only has an effect on the person suffering, but also their family and the community at large.

The European Union published the results of a 5-year investigation into wind power, finding noise complaints to be valid and that noise levels could not be predicted before developing a site. German marketer Retexo-RISP specifies that turbines not be placed within 2 kilometres (1.25 miles) of any dwelling. Vestas the manufacturers of the turbines for this proposed project also state in its guidelines that the terrain topography should be taken into account when designing a site as it will have an effect on the noise levels. The American Wind Energy Association (AWEA) acknowledges that a turbine is quite audible 800 feet away. The National (U.S.) Wind Coordinating Committee (NWCC) states, "wind turbines are highly visible structures that often are located in conspicuous settings ... they also generate noise that can be disturbing to nearby residents." The NWCC recommends that wind turbines be installed no closer than half a mile (thats almost a kilometre) from any dwelling.

Communities in Germany, Wales, and Ireland claim that even 3,000 feet away, the noise is significant. The noise of a wind plant in Ireland was measured in 2002 at 60 dB 1 km (3,280 ft) *upwind*. The sub aural low-frequency noise was above 70 dB (which is 3 times as loud on the logarithmic decibel scale). A German study in 2003 found significant noise levels 1 mile away from a 2-year-old wind farm of 17 1.8-MW turbines, especially at night. In mountainous areas the sound echoes over larger distances. In Vermont, the director of Energy Efficiency for the Department of Public Service, Rob Ide, has said that the noise from the 11 550-KW Searsburg turbines is significant a mile away. Residents 1.5 and even 3 miles downwind in otherwise quiet rural areas suffer significant noise pollution. A criminal suit has been allowed to go forward in Ireland against the owner and operator of a wind plant for noise violations of their environmental law. Also in Ireland, a developer has been forced to compensate a homeowner for loss of property value, and many people have had their tax valuation reduced. In the Lake District of northwest England, a group has sued the owner and operator of the Askam wind plant, claiming it is ruining their lives.

In January 2004, a couple was awarded 20% of the value of their home from the previous owners who did not tell them the Askam wind plant was about to be constructed 1800 feet away, "because of damage to visual amenity, noise pollution, and the irritating flickering caused by the sun going down behind the moving blades." The towers of this plant are only 40 meters (130 feet) high, with the rotors extending a further 24 meters (75 feet).

It has been reported that one of the farmers who leases land for the wind towers had to buy the neighbors' property because of the problems (not just noise but also flicker and lights at night). Wisconsin Public Service, operator of another 14 turbines in Kewaunee County, in 2001 offered to buy six neighboring properties; two owners accepted, but two others filed a lawsuit in January 2004. On January 6, 2004, the *Western Morning News* of Devon UK published three articles about noise problems, particularly the health

effects of low-frequency noise, from wind turbines. Another interesting report, which notes that the Nazis used low-frequency noise for torture, is found in the *Telegraph UK* 25th January 2004.

There are reports of people being signed off sick and unfit for work, there is a growing number of complaints about symptoms such as pulse irregularities and states of anxiety, which are known from the effects of infrasound (sound of frequencies below the normal audible limit)'. [The Darmstadt Manifesto: A Paper on Wind Energy by the German Professors Initiative Group]

'Because of the low rotational rates of the turbine blades, the peak acoustic energy radiated by large wind turbines is in the infrasonic range with a peak in the 8-12Hz range ... [and] it would appear that wind energy does carry health risks. Typically, except very near the source, people out of doors cannot detect the presence of low-frequency noise from a wind turbine. They can, however, if the noise has an impulsive characteristic, "hear" it within homes in nearby communities, again under the right set of circumstances. Because of the impulsive nature of the acoustic low-frequency energy being emitted, there is an interaction between the incident acoustic impulses and the resonance of the homes which serve to amplify the stimulus, creating vibrations as well as redistributing the energy higher into the audible frequency region. Thus the annoyance is often connected with the periodic nature of the emitted sounds rather than the frequency of the acoustic energy'. [Neil Kelley, US National Renewable Energy Laboratory]

All of the above issues are very real and many have been recorded as happening in neighboring Toora. The people of Dollar/Foster North do not wish to have to go through the same terrible ordeal nor should any member of the public no matter where they live.

If this project is to proceed it is imperative that the New Zealand standards be implemented to their fullest degree. That means that all points that are raised in NZS 6808 including 4.5.5 and 5.2.1 are carried out and not selected by the proponent as to what they will and will not do. As it has been mentioned to all of the residents here that neighbour the proposed site, that this project would not be approved in New Zealand because of the proximity of residents to the site.

With the limited work conducted by the proponents consultants and the mistakes that have been found, the panel can only come to one conclusion and that is to advise the Minister against granting an approval of this application.



Engineering issues including geotechnical, drainage and civil works

The report by URS Australia tells us that the proposed site is located in the most seismically active area of south-eastern Australia. This has been confirmed by Mr Gary Gibson who is recognised as being the best in the field when it comes to seismology. I was able to contact Gary and we had a very interesting conversation. Gary told me that the proponent will probably argue that turbines have been built in California on faultlines and that they have no been a problem so far. When I pointed out the fact that California did not really have a choice in the matter because of it located on faultlines, I then asked if he believe that this project would be better suited to an area that was not proned to siesmic activity to which he responded yes.

There has been a number of earthquakes and seismic activity recorded around the world from December 2004 to present. Tasmania had the largest recording 700 km of its coast for the year until the Boxing day tsunami in Indonesia. Since then Indonesia has suffered form many after shocks. The report by URS states that the Strzelecki Ranges has many mapped faults and the proposed site is on the upthrown block for several of these, so there is no doubt that a detailed ground motion recurrence study will yeild a stronger motion than that given in the Australian Standard.

It continues to say that moderate and major earthquakes are infrequent events with average recurrence interval of tens or hundreds of years in active areas. This means that the short history of known earthquakes is not reliable for estimating activity rates. We also know that prior to 1970 ther was no network of seismographs available that could record and locate faults as we do today. So if we did not have this technology available it makes it very difficult if not impossible to predict just when a moderate or major earthquake may happen.

The Turtons Creek and Fish Creek faultlines run directly through the souther section of the proposed site and have 18 turbines located within 1 km of them. Being turbine numbers 11, 18, 30, 31, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47 and 48 these turbines have been clearly identified on the map supplied by URS in figure 4 .

We have been told by the proponent that this project is of both State and National importance as Victoria is connected to the eastern grid which connects Victoria, South Australia, New South Wales (including ACT) and Queensland. It is for this reason that the project should not be approved for in the result of a major earthquake this wind energy facility has the potential to effect the whole eastern side of Australia's power grid or at the very least the eighteen turbines above be removed. It is highly unlikely that the turbine design structure will be able to withstand earthquake expected loads at Dollar/Foster North when the proponent does not know what the loads will be as adequate reports for the area are not available prior to 1970.

The wind turbine foundations pose another problem regarding the hydrology of the area. As seen by the panel member who where able to visit the site would have noticed that the positions of some of the turbines where located on the side of the ridgelines and not on the ridgelines themselves. Most locals are aware that the site has numerous underground springs and watercourses located just below the surface. The size and amount of concrete footings(600-1000 ton) will have an effect on these which may lead to the tunnelling or further erosion problems for the area. This matter needs to be studied in greater detail. As mentioned in the report the site is quite steep in places 30-35 degrees to as steep as 50 degrees in places, we know the site is in an erosion overlay ES05 and is prone to landslips and erosion. This overlay has been put in place by the shire to protect areas prone to erosion by minimising land disturbance and vegetation loss leading to erosion or siltation of watercourses. This project will do nothing to protect the land from these occurrences happening on a regular basis after heavy rain periods or the winter months. It is vital for the site to remain erosion and landslip free as the consequence of it not will affect not only the site but the township of Meeniyan as it rely's on the water from the Tarwin River for its water supply.

This site is not like flat or level and therefore does not have easy access to it, with over 30 km of tracks upto 12 metres wide it will make it impossible not to have a negative effect on the land no matter how much design input is taken into account and as for this amount of earthworks to be absorbed by the landscape will be impossible. The bedrock of the site will be an issue as mentioned in the report, but it has failed to mention exactly what type of equipment will be used to do the excavation work. Will explosives be necessary and if so what happens to the livestock on neighboring properties. Horses are very prone to be scared or spooked by such activities, but there has been no mention of this in the report or what procedures will be put in place if this is to occur.

It also noted that the sandstone material that is to be excavated will not be used on the tracks as it is prone to breaking down, what will happen to all the excavation material will it be taken away or will it be stockpiled and allowed to make its way into the watercourses of the site and cause serious, irreversible damage after rain periods? URS are fully aware that the site is steep and serious issues are raised when it comes to locating turbines, access tracks and underground cables in the site.



As mentioned earlier the West Gippsland CMA 2000 recognises that it is of fundamental importance for natural areas of remnant vegetation remain as conservation and are irreplaceable. It also states that corridors and linkages are of vital importance and that a landscape approach to maintaining native vegetation is required.

The Catchment and Land Protection Act 1994 also has an objective of establishing a framework for the integrated and coordinated management of catchments which will; # maintain and enhance long-term land productivity while also conserving the environment and # aim to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

Neither of the two objectives can be achieved if this proposal is a proved. The direct effect that this proposal would have on native flora and fauna would be devastating.

Once again it would appear that this report presented by the proponent sadly lacking in thorough detail. In section 8 of the report it suggests ways that drainage problems could be handled and what systems should be in place but fails to address the problems associated with the ES05 overlay which is to prevent increased surface runoff or concentration of surface water runoff leading to erosion or siltation of watercourses , as none of the procedures suggested will be able to prevent erosion or landslip from happening on site due to the size of the proposal.

It is also worth mentioning that health issues need to be raised regarding the water quality of the Tarwin River as the watercourses in the site contribute to this river and the township of Meeniyah relies on it for its drinking water. This river also makes its way to Andersons Inlet which is home to a variety of species that can ill afford to have the problems of silt or any negative impact that this proposal may have on it. These are more reasons why the panel members should be advising the Minister that this project should not proceed.

Traffic

This is a major concern for all local road users in the area. We are being told that the tracks and roads that are being built or widened will be restored from 12 metres back to 5 metres, yet in the next breath we are being told that the rotor blades and nacelles may require replacement and for this reason access roads and the hardstand area beside each tower will be retained for the use of the crane and heavy vehicles. Are they being reduced and revegetated or not ?

The survey that has been carried out for Dollar Road is lacking information about traffic volumes and only has records from March 1999 once the measured distance from Dumbalk is over 4.1 km. This information does not represent the volumes of 2005 and is a poor attempt by URS to base a report on such limited information without doing the background work that is required for a project such as this. The information that is being supplied should be as accurate and up to date not some 6 years old.

Most of the roads in and around the site are gravel narrow roads that will not be able to take the loads that are being suggested by the proponent without, major road works being conducted or a major traffic problem occurring for the residents that use these roads. School buses, people going to and from work, farming equipment tractors, milk tankers and other road users will all need to be catered for, as peoples lives need to continue and for many any disruptions that may occur will be seen as another negative impact on their lives.

As I mentioned, many of the roads are gravel and narrow which are not the type of roads that you would want to meet any large scale transport vehicles on. It could be extremely dangerous to do so even in the best condition for driving. With the amount of traffic that is predicted to use these roads if the project is approved it will require a very strict management plan to be put in place for the safety of all road users especially at peak times for people going to and from work and around school times for parents taking and picking up children.

It is also planned for Dollar Road to be widened, this is of particular interest to me as this road has suffered from serious erosion problems over the years and even as recently as February this year when it had 2 landslides occur. Any widening will have an effect on the stability of the road and if trees need to be removed it will also have a negative impact which could result in more landslips and erosion problems. In Supplement D Appendix B figure 8 a landslip occurred right near where it is proposed widening of the road is to take place, if these bends are to be widened by as much as 8 metres as stated in Appendix F the possibility of landslip and erosion problems will be greatly increased.

The condition of the roads at present also needs to be taken into account as it should not be the responsibility of the ratepayers to have to pay for repair to any roads should they be required. This cost and all associated costs should be for the proponent to pay, as with the amount of heavy vehicles that will be using these roads to deliver; aggregate and sand, cement, reinforcing steel, water, tower sections, rotor blades, nacelles and the employees and contractors vehicles will certainly cause damage to the roads in the area.

Proper procedures need to be put in place to allow for any unexpected emergencies that may require either ambulance or fire truck attendances as these 2 vital services need to be able to

attend emergencies at anytime of the day or night without delay. With over 170 houses within 2.5km and more vacant land that is used for agriculture purposes, including tractor work on the steep hills it vital that these services are not impeded by this proposal.

As with any large rotating structure -- and with the turbines being 110m tall -- there is a risk to passers-by from structural failure e.g. lightning strike and storm damage. In winter ice shards forming on the blades when static can be thrown up to a quarter of a mile when the blades begin rotation. If we are indeed due for another ice-age, this will produce formidable safety concerns for windfarms close to residents. Also the rotor blade themselves have been reported to brake and fly off the nacelle travelling distances of upto 400 metres. One only has to go back a couple of months to find a blade broke of in the proponents homeland but they haven't mentioned that to anyone. The two blades were missing from the turbine in the Gebbies Pass area, near Christchurch 12th March 2005

These issues all pose a serious health threat to neighboring residents as well as valuable livestock near the turbines.

Heritage

It was disappointing to read and hear just how little effort was put into this report. Perspective Heritage Solutions Pty Ltd appear to be inline with the other consultants used by the proponent as far as report factual information. The site covers over 2300 hectares with large pockets of native vegetation and natural watercourses running through it. The watercourses are areas where it could be possible to find or locate potential areas of Aboiginal significance, yet the survey only looked at two gullies and one creek in the whole site. (page 34 survey coverage)

Also of note is the visibility that was recorded while this survey took place, it ranged from 0% to a top of 25% for ridgelines and gullies/creeks. Only 11,090m² was effectively surveyed with only three potential historical places – two ruins and an archaeological site-were located on a ridgeline. This is not surprising given just how little of the site was surveyed and the poor visibility within the site.

No Aboriginal sites were found due to the efforts of the survey, yet there is likely to be areas within the site that have a high potential for archaeological deposits to be found including; the area surrounding the swamp at the intersection of Mcknights Road and the South Gippsland Highway, the entire Stony Creek corridor and major creek corridors. These areas are likely to contain potential small to medium artefact scatters, quarries, and grinding grooves as these areas had the potential to be resource zones and drinking water.

Of note in particular is the Middleton Cottage 1 this is the site at which the leishman sisters lived and in the early 1900's built a replica of the wright brothers aircraft. This aircraft was actually flown at the site and flow above 20 feet from the ground for quite some distance before crashing. No one was hurt and the bits and pieces of the plane were stored in a shed on the property for years afterwards.

It is a great pity that this information was not brought to light by Ms Freslov her self during her presentation, as it would have given the appearance that the site and history of the area had been researched thoroughly, but sadly this was not the case. It further points out to the community that no one was approached who had local knowledge of the proposed site and

surrounds that would have been of assistance to this report.

It would appear from the presentation that Ms Freslov gave that it will be the responsibility of the construction crews to find any Aboriginal artefacts that may exist in the site. This does not make one feel secure about this matter as I am sure that Ms Freslov would have had years of experience when it comes to dealing with artifacts compared to the driver or operator of earth moving equipment.

It simply is not good enough to say it is possible that there may be a high to moderate chance that Aboriginal artifacts or site may exist, but due to long grass we are unable to say. Once again this is not a report that gives one confidence about regarding its contents or lack off.

As mentioned earlier the Middleton Cottage 1 should be noted as having not only local significance, but should be of State and Federal significance after the events that took place there. It is no small feat that took place there by the two sisters and this should not be allowed to wash or blown away in this case from the history books.

One other point that I found of interest is the contact made by Mr Alan Browning an Aboriginal Inspector under the Commonwealth Act to Ms Freslov. It appears from reading the report that the Aboriginal community felt there had been insufficient consultation between the proponent and themselves. If this is the case it is another example of just how poorly handled this proposal has been handled by the proponent and its consultants.

The heritage of the site needs to be known and protected, it is too late to protect the heritage of a site once it has gone and this proposal has the ability to cause such a loss.

Tourism

South Gippsland has one of the most scenic and spectacular landscapes in the State if not Australia. It has been proven that residents, visitors and alike come here to enjoy the scenery of Wilson Promontory, Strzelecki Ranges and surrounds.

Mr Cotterill suggests that a wind energy facility will actually bring more people and tourists to the region. This statement is very hard to understand in this case, as the proponent had a proposal for the western district of Victoria on the coast last year, but decided not to go ahead with it due to the negative effect it would have on the region. It was via direct pressure from the State government, Shipwreck Tourism Coast and Great Ocean Road Marketing that

the Bay of Islands proposal was stopped.

This region of Victoria is very similar to that of the Bay of Islands as we receive over 5 million visitors to the region and the Bay of Islands receives over 2.6 million visitors. It is hard to understand how the proponent can suggest that a wind energy facility would actually attract more visitors when we already attract more than the Bay of Islands where they have pulled out of because of the negative effects on tourism a wind energy facility would bring. What's the difference here, besides a safe National party seat?

Many of the local tourism operators have been scathing about the effects of the wind industry as they are already aware of the effects from Stanwell's Toora operation. They have stated that wind turbines deter tourists who come to our region to experience the natural beauty of the sea and land, yet the presence of wind turbines crucify these great assets.

Mr Cotterill gave an example of a survey from Scotland, which I have been able to locate from the web and have included this information below.

VisitScotland (Scottish Tourist Board) commissioned an extremely detailed survey of tourist attitudes to windfarms, published November 2002. [www.scotexchange.com]. 56% of those interviewed said windfarms spoil the landscape; 28% said they would stay away from windfarm areas. Tourism is Scotland's main industry, generating £4.5 billion/annum and supporting 200,000 jobs. In Argyll it generates £330 million and 20,000 jobs at peak. [Argyll, the Isles, Loch Lomond and Trossachs Tourist Board]. If 28% of tourists avoided Argyll -- with 21 windfarms proposed they almost certainly would -- that would mean a loss of £92 million a year and 5,600 jobs. Economic disaster for a highly rural area, as farming, fishing & forestry are all struggling to survive. Directly or indirectly we all depend on tourism, and there is no viable alternative.

In April 2002 we surveyed the last 100 bookings from our self-catering cottages, and 76% of past tenants said they would definitely/probably not visit the area if a windfarm was built in the glen -- as is proposed. If windfarms proliferated in Scotland, 68% said they would definitely/probably not visit again -- a frighteningly high proportion.

VisitScotland markets the country on the people, the history, and the landscape -- justifiably so. If we destroy that landscape with windfarms so that tourists go elsewhere to unspoilt areas, where will that leave our economy, and especially the rural areas? Even a 10% drop in tourism would be economic disaster.

This is the same results that have been found by several B&B operators who have conducted their own surveys here in Dollar/Foster North. It further adds to the argument that wind energy facilities do not attract visitors as has been proven in Europe with where evidence shows that visitor numbers have dropped by up to 40% where windfarms proliferate. Mr Cotterill admitted that wind energy facilities are a novelty and that he did not look at information from Germany or Denmark regarding tourism or visitor numbers.

We are fortunate to have first hand information relating to tourism and visitors to wind energy facilities. Stanweel who operate Toora's wind energy facility had and I stress **had** a visitor information centre which it ran part time 2-3 days a week closed due to lack of number visiting

the centre. This is actual not what may or could happen, it closed because it was not worth being open in Stanwell's eyes. This took place with the facility only being open for under 2 years, it didn't take long for the novelty to run out there.

Wind turbines do not attract people, if you have seen one you have seen them all and it will not take long for them to appear just like transmission towers if the Bracks government gets its way and we have been told by Mr Wyatt from ERM that everyone dislikes them.

Without the support of the local community it will not be possible for the Dollar/Foster North wind energy proposal to be a tourist attraction. It will in fact turn people away, as the panel members will be aware the township of Foster is fully committed to the cause of 'no turbines'.

The businesses know that they will do more harm than good. A perfect example of what can happen to Foster if no tourists come has just happened with the fire at the Prom over the recent school holidays. It has had a huge financial effect on the town as tourist dollars did not make it into the town. In fact the town has felt the pinch so badly that the State government has been asked to help promote the region.

This all has a flow on effect to the whole community, it is not just the businesses that suffer but the community as a whole. The South Gippsland Shire Council understands just how important tourism is to the region as a whole and recognises the vital contribution that the industry makes to employment and the services they provide.

Another interesting point in Mr Cotterill's report that I can't help mentioning, is the number of cars that have been recorded as visiting the Albany wind energy facility, some 230,000. This is a huge amount of vehicle when you consider the fact that the proponent, if using the Victorian government guidelines for wind energy facilities, this proposal will only be the equivalent of being capable of taking 79,904 cars off the road. If we use Mr Cotterill's figures this project is actually creating more CO₂ emissions than it is saving and therefore defeating the purpose.

We are fully aware that this proposal will not bring tourists to the region and know that the proponent is of this belief also. For if it wasn't they would not have been so slow in providing information about a proposed viewing area. They have been working on this proposal for years now, but are still not prepared to say where a viewing area will go, if at all.

If they believed it would generate tourism they would know the site and have the design on display for all to see. The proponent knows only too well from the experience of Toora that a wind energy facility is not a tourist attraction, and especially not if the local community are not supportive of the project, which we are not.

Regional Economic Impact

It is with much interest that I note that the proponent did not choose to have an expert witness present at the hearing regarding this subject. One would have thought that for a project of this size that it would have been a perfect opportunity for the proponent to state the financial benefits to the local community. Could it be the proponent has been unable to come up with

any local or regional companies and suppliers that could have had an input into the construction of the facility?

We have been told by the proponent and the State government that the regional areas of Victoria stand to gain financially from such projects. The report tells us that there will be significant local involvement from the providers of structural steel, plumbing, lighting, fencing, earthworks, concreting, building and car park construction. I, as we all would like to know these companies and just how much of the expenditure is to be spent in the proposed region.

Once again the consultant that have been used, in this case it is URS again, have used a lot of assumptions about what percentages to use for the expenditure amounts and distribution. They state that the regional economic impacts are likely to be strongly positive without knowing what funds are to be spent within Victoria. If this information is not known then it is not possible for them to comment about the likely outcome, at best it is only a guesstimate.

When working out the benefits of a project the consultant should have taken into account the negatives as well. Tourism is one of the negatives that needs to be put into this equation as well as the impacts on property values and health both mental and physical. This project is about more than wind energy and all the issues need to be looked at when working out the financial and economic impacts to the region.

The panel have been shown and told of 40% losses on properties at Toora and from overseas as well as the projected losses to residents in the proposed site if the proposal is approved. With over 170 houses within 2.5 km of the site and the towns of Dumbalk and Foster located as close as 4.8 km away it is fair to say there will be a significant loss to the shire in rate revenue as well as to the owners of these properties.

The shire will need to recoup the lost rate revenue by passing on higher rates to the rest of the shire. This is another burden that the people of South Gippsland are expected to carry for the whole State. One has to ask if this is a fair system, for a power source which will do absolutely nothing to reduce CO2 emissions? We know this because even Mr White from Garrad Hassan told us the coal will still be burned to cover spinning reserve no matter how many wind turbines are installed.

What was also of interest was the report on Salmon Beach (page 41 appendices section 8), the way that it is presented is as though this wind energy facility is still in operation, when in fact this facility closed down some years ago. When it was first installed there were no houses there and there was no subdivision, so saying that the prices have gone up or stayed the same after installation is a nonsense. It was not until the land was subdivided that houses started to be built and 5 of the 6, 22 metre wind turbines were removed and one left as a statue. URS and the proponent and AusWea need to explain why they felt it was necessary to deceive the public as well as the panel members in this way.

The cost on the health system needs to be taken into account as Dr Iser from Foster has reported to the Shire that he has done a brief survey of residents at Toora that are suffering from effects caused by the wind facility there. He has noted that people are suffering and some of them require full time medication and treatment to help with the problem they are facing. Dollar/Foster North will have 4 times as many turbines as Toora if approved and with over 170

residents within 2.5 km the chances of people requiring medical help or treatment is a hell of a lot higher than Toora. The proponent and consultants have not factored any of these costs into the economic impact report.

The cost of wind energy has not been mentioned either this is also going to be an added burden to the community as the price of wind is more than double the price of current coal fired power and with only 2% of electricity users connected to the "green" electricity program, it will be up to all users to pay for the inadequacies of wind. If it was not for MRET the proponent would not be here as it is not feasible to do a project such as this without subsidies. Victorians currently have one of the lowest electricity prices in the world, if prices are forced to increase to pay for wind this will affect not just householders, but manufacturers competing in a global market. All of this has an impact on the economics of not just the region but the State and Nation and this impact will be a negative one.

Sorry I do apologise, but I forgot to mention Vestas, I received a letter from Minister Theo on the 15th December 2004 and he stated that Vestas was willing to invest heavily in the State of Victoria. I found this very interesting because the day before I received this letter I had read that Vestas required 400-500 million euros to restructure the company. What was staggering about this was that even with Governments around the world prepared to subsidise the industry and I quote "No bank will fund this kind of a project as it's going to be money spent on restructuring." As a result of this Vestas lost 15% of its share price in a single day. Perhaps this is why they want to come to Victoria, who knows how much funding or credit has been offered to them by the Brack's government.

Once again it appears that the proponent and URS have tried to put in as little information as possible and been rather flexible with the truth, therefore this report is another that should carry very little weight if any when the panel makes its decision to the Minister.

Land Use Planning

There is nothing I have to say on this issue as the Victorian government has taken the power away from the local council and the State government planning policies override any local policies. I will say that I believe that a wind energy facility should come under the same heading as a coal or gas fired power station and that is that it is an industrial operation and not rural. This is something that needs to be looked at by the decision makers, as wind energy facilities need to be recognised as industrial and not farming.

Aviation

As the panel members are aware the proposed site and surrounds are steep and in many instances the only way to spread super and control weeds is by the use of planes. I have spoken with Mr Graeme Dyke about this issue on many occasions and we are both of the same opinion that the operators of the planes that offer these services will not be able to do so. Mr Dyke has taken this issue further and has spoken to one of the operators of such a service and it has been confirmed that it will no longer be a service that he will be able to offer.

This means that the costs to have these services carried out will skyrocket for weed spraying

as a helicopter will need to be used and as for fertilising the paddocks it may mean that the paddocks will go without which means they wont be as productive or it will be like the old day and be very back breaking. Both of these issues have not been taken into account by the proponent in terms of economic benefit to the region as they will be an added financial burden to the neighboring properties.

Another point about the turbines is that at the moment casa does not require them to have lights on them as they are under 113 metre high, but be very aware that the first time an aircraft regardless of size has an accident it will one of these turbines it will become compulsory for them to have lights on them.

I would also like to know what happens if a bushfire took place with in the site or in the neighbouring native vegetation and thick smoke filled the air, if it is possible for air support to help fight the fire or if it would be left to a ground crew to fight. We are all very aware that air support is vital in fighting such fires as we know how long it has taken to put the fire out at the Prom some 6000 hectares later.

Social Issues

The community consultation report

Where do I start. As we have heard from Mr Offer of Offer Sharp he gave advice that the proponent should enlist the help of a professional consultant to deal with the issue of community consultation, unfortunately this did not happen and the proponent took it on themselves to do this report.

As for most of the reports that have been prepared by other consultants the proponents own report on community consultation followed a similar line of not being totally accurate and contains misinformation with no factual information being presented. The proponent made no attempt to provide a thorough consultation programme and had no strategies in place to make sure it was done.

The then Minister for planning Ms Delahunty had written and spoken to me in person advising me that she had told the proponent that they had to implement a thorough community consultation program, that was to be both informative and that the proponent was to respond to issues raised by the community or members of it. Unfortunately this has not taken place either, as the panel members would be well aware of, as they have been listing to the questions that have been raised by the community during the expert witness cross examination process. Many questions have be asked durring this process that had not been answered before.

Peronally I have lost count of how many letters, emails and faxes that I have sent to the proponent both hear and in New Zealand, but it is well over 20. Even though the Minister told me that the proponent was to respond to issues raised I have only received a response to 2, with a third in response to one of the many letters I had written to the New Zealand Prme Minister, Helen Clarke. I therefore do not consider the wishes of the then Minister for planning were carried out.

It all looks very official in the report, with how, what, where and when all the issues have been addressed and that in fact a proper process has been followed and taken place. If only a quarter of what is stated in this report was actually true or in fact did take place I would be a lot happier. This report is nothing but "spin" the whole project has been shrouded in secrecy. The host landowners were signed up by the "carpet baggers" as they are known in the industry as, and told not to let the general community know anything about the proposal.

Opposition at an early stage is not what the proponent wants or needs if a project is to proceed to this stage. We only have to look at Clarkes Hill and Pipers Creek as to what happens when the information gets out a head of the proponents wishes. People and groups have a chance to be heard at a very early stage and are able to form opposition groups and voice their opinions, they are also fully aware of what the impacts to a region will be if they are not heard at an early stage, mainly thanks to the residents of South Gippsland.

The proponent states in the report that the main approach was to ensure that accurate information was provided to the community, what a pity this has and continues to have never taken place. We now know from this report that their original investigations started in 2001 and in 2002 they held a series of stakeholder meetings. It was not until January-February 2003 some 2 years later that the proponent met with "representatives" from a grand total of 4 properties at the Dollar site. Who were these representatives, are they people having turbines or were they already signed up by the proponent and how many people actually attended this meeting, was it open to anyone to attend, how were these representatives selected? Please don't tell me their names were Grant and Mark though. All of these details are omitted from the report. Once again factual information not supplied.

So now we know that after 2001 some 2 years later they had a so called meeting in Jan-Feb 2003. It is then reported that in January 2003 a newsletter was distributed to over 6000 residents in a 20 km radius of the proposed site, I am still waiting for this some 2 years later and am yet to find anyone within 2.5 km of the proposed site that received one also. The next letter that was supposedly sent out is called the "Initial Introduction Letter" dated October 2003 it would appear that this letter had as much success as the first newsletter had, as I am still waiting for it also. This letter was hand delivered, so we have been told to all adjoining properties. What is an adjoining property and how many is that in total, as reading a copy of the letter in the report it states "As your land is close." This letter is very limited information and has only been delivered to a select few. This was a plan by the proponent to keep this information out of the public arena so it could limit the amount of opposition that would be raised against such a proposal.

In January-February 2003 they state that meetings were held with the Shire, Government representatives, landowners – presumably hosts farms, and Prom Coast Guardians. I would like to know why the community of Dollar/Foster North were not invited to attend. Could it have been a deliberate ploy by the proponent as they would have known that the chances of anyone from Dollar being a member of the Prom Coast Guardians would have been very remote.

January 2004 a Screening meeting was held and still no one from Dollar/Foster North has been invited to attend. That is no one who was not a proponent stakeholder. Three years on from when the proponent first started investigations here and this is all part of community

consultation process. In January 2004 they have realised that there are gaps in the data about neighbouring property owners, this has only taken them another 3 months from the initial introduction letter. They have stated 2 alternative methods of contacting affected landowners, but have they stated this was done? The answer is NO.

The very first letter that I received was the Second Newsletter dated March 2004, which arrived the day before the first Information day was to held in Foster. This newsletter was of much interest and concern to me as it was the first time I heard about the proponent and its plans for Dollar/Foster North. What was even more of a surprise was the fact that not only did my property neighbour the site but 80 acres of land I own was in the proposed site, yet the newsletter explained that I had already been written to or spoken with sometime prior to receiving this newsletter.

It also told me how they will inform the community of each significant development, now if neighbouring the site was not significant being included would have to be wouldn't it. This newsletter caused major concerns with our neighbours who had only recently built a new home at Dollar. They accused me of wanting wind turbines on my property and that it would destroy their lives. It did not take long to convince them that this was not the case and that I had no intention of having turbines on my property.

This newsletter was my first introduction with the proponent and it had already started poorly. Community disharmony was already taking place, and I like many others in the community had not even spoken to the proponent. My neighbours went to the "open day" at Foster and came away with several concerns, as I was working at the time in Foster they came to work to talk to me. They advised me that they had spoken about my property with a Mr Sisson and he had told them not to worry as the ridgelines that had been marked were not going to have turbines on them. My neighbours were relieved to hear this, but also still suspicious about the whole project and not 100% certain that they were being told the truth.

So it was of little surprise when later that night when I attended the "open day" to have them tell me a different story. First I spoke to Jay and I pointed out my property on the map and asked what was happening with the project. She responded by telling me not to worry it is not planned on going as far as my property. To which I responded that I am very interested in this project, (I never said I wanted turbines just very interested) it was from that moment that the full picture came out. Firstly Jay apologised and said there had been that much negetivity today I wasn't sure where you stood, I will get someone who can help.

I now know this is the proponent and the industry's way of doing things and that is they tell you what they think you want to hear.

Brian Hall was the someone that could help, he introduced himself as the projects Business Development Manager and then asked me a few details about who I was and the property in question. I thought he should have known who I was after pointing out my property but he didn't. Maybe this is why I didn't get the original letters that were hand dilivered? Brian went on to inform me that if they can get it to my property they would continue (pointing at the map) all the way to Milford.

At this original "open day" I did not tell Mr Hall where I lived, I only told him of the 80 acres.

Where I live was also on this map as it is a neighboring property. A indicative ridgeline was marked only 300 metres from my house, when I asked Mr Hall how close turbines could be located from a house, he told me 500 metres but they have been as close as 400 metres and we think we can probably get as close as 300 metres. To this day I still don't know how I remained calm, but I knew exactly what I was dealing with.

The proponent couldn't get the details of my 80 acre property fast enough. When I asked about how the project involved my property I was told that it was because my neighbour had approached them as he was wanting to put turbines on his property. I found this hard to believe but thought maybe he did. I am sure you are all aware that my neighbour is also an objector to this proposal. I would like to make it clear to the panel members at

This is what it takes to get any information from the proponent, my neighbours who were concerned and they had every right to have their suspicions confirmed. Open and honest community consultation what an absolute joke. We were not told of turbine locations, type or any other details that you expect to be informed about especially when we now know that they have been working on this project since 2001 except that it will be up to 100mw with up to 61 turbines.

This is all very nice, but it doesn't match the statement by Gerald Patrick Early, First Assistant Secretary, Approvals and Wildlife Division, Department of the Environment and Heritage. Where Meridian Energy Ltd propose to construct and operate a 50-120MW wind energy facility, comprising between 30 and 75 turbines, access tracks and associated infrastructure. This document was dated 24th July 2003 and is a little bit different to the information at the first open day.

This brings me to the third newsletter dated May 2004 was received and informed me of second "open day" to be held in Dumbalk on 19th May. It was to my surprise that on this day the proponent had on display a before and after map of turbine locations and turbine numbers. The before map had 61 turbines on it not 75 as mentioned in the document for the EPBC Act which makes me wonder if they knew prior to the first open day that the project was not going to be 75 turbines it would be fair to say they must have known the locations of the 61 turbines before the first open, as they had already removed 15 turbines from the project.

It was just another ploy by the proponent to delay advising the community of the details of this project. If we don't know the location of the turbines we cannot talk or express our concerns over them. I spoke to Ms Bolton on this day and mentioned my concerns about Toora and how that site had a 66 kv line running through it, yet most of the time at least one turbine was shut down because the line could not handle the power. I explained to Ms Bolton that the community would be very upset if the Dollar/Foster North proposal only had 11-12 turbines running at once. Ms Bolton assured me that this would not be the case because the line at Dollar is much better than the one at Toora as she was aware of the problems that Stanwell were having. I have since spoken to TXU about the line and asked them if the line that is at Toora is any different to the one at the proposed Dollar/Foster North Site to which their answer was that they are almost identical.

If this is the case and I believe it is, who is making sure the infrastructure is capable of handling 48 1.65MW turbines. We know Toora's system cannot handle 12 turbines as Mr White told us

they are 99% reliable so it can only be that the infrastructure the is the cause turbines being shut down. This question needs to be answered we will suffer enough if this project is approved, but to watch over 75% of the turbines remain stationary will just be rubbing salt in the wounds.

I believe that the proponent never intended the proposal to be 75 or 61 turbines in the first place for any company that professes to be Australasia's largest generator of renewable energy would have known that turbines cannot be put next to communication towers. This is an insult to the intelligence of the community and shows the sheer arrogance of the proponent. The community was never consulted nor did it have any input into the proposed location of the turbines and to suggest it did is misleading to say the least.

It was also at this meeting that Ms Bolton asked me if I was ever interest in wind turbines to which I replied I was and continue to be interested in wind turbines, but never on my property. Ms Bolton replied that she hoped to be able to continue talking with me in the future. Unfortunately this has not happened, which leads me to the next development in the consultation process, the house calls.

I came home from work to find a calling card in my letterbox, stating that the proponent was in the area and was willing to talk to concerned residents. Terrific I called the number to arrange what I was led to believe a meeting with the proponent. On the day of the arranged meetin, much to my disappointment two consultant arrived, they could or would not answer any of my questions as they said they were only consultants. Grant and Mark were their names, Mark was concerned about what we had to say and even read most of the copies of the letters we had sent to the proponent. Grant on the other hand was not interested in our concerns and was only interested in telling us how good wind power was and that we are killing the poor man in India. I asked Grant to explain what he meant by this remark to which he responded we have the highest CO2 emissions in the world. I then had to point out to Grant that the poor man in India was actually killing me if anything as India's CO2 emissions are in fact worse than Australia's. He never said another word until we went to our block to see just how close the turbines were going to be to our proposed house site.

That's right it has been so long I almost forgot, we had planned to have a new house built on our property, but when we eventually found out about the proposal that has all been put on hold as well as the American barn that the panel members would have noticed in a flat pack, its been that way since February 2004. It is bad enough to have one house devalued let alone two so my partner and I put our plans on hold to build on our 80 acres and at best it will only be a turnout paddock and not a home site as planned if the proposal is approved. I suppose that is more of a social issue that consultation process. But when the consultants tell you that they suggest that you put the laundry on a particular side of the house it becomes part of the consultation process.

The next stage of the consultation process I was involved in was the noise workshop, although I was not invited I was informed of it by concerned residents. They had advised me that it was for any resident within 1250 metres of any of the turbines. The proponent knew that where we had planned to build at the 80 acre property was within this limit, but I did not receive an invitation. I decided to go anyway, I was greeted at the door by Mr Sisson who informed me it was invite only and only for residents within 1250m of the proposed turbines. Grant happened

to be there as well and it was able to get his attention, I said to Grant that you know where I intended to build is within the 1250m limit, to which he replied not any more. I asked what do you mean and he replied that the turbines had been moved and they are no longer within 1250m of my property.

I was very happy to hear this, but have been involved with the proponent for too long now to know better, so I asked if he would put that in writing for me. Guess what he wouldn't. It wasn't until the people inside, came out that they decided to let me and my partner in as these residents said if we could not come in they were all going home. The information that was on display that night was not on display the following day, so if you were not able or invited to attend you did not have access to this information. I do not believe that this is what the planning Minister had in mind when she requested the proponent conduct an extensive community consultation process. What was also interesting about this night was that there was people already inside that had not been invited and they live further than 1250metre away.

Once again the proponent was being very selective about the information it released to the public and to who it released it too. I feel sorry for the community members who were denied access to the information that was on display at the noise workshop as they have not had the chance to gain more knowledge on this issue.

The third and final 'open day' was on the following day, and you can no doubt understand my anticipation of see the turbines being removed from the proximity of my 80 acre block. Grant was sitting at the front desk, so I was able to ask him whereabouts I would find a map showing me where the turbines had been moved. It didn't take me long to see that no turbines had been moved and I went back to see Grant. He had no answers to any of questions as to why he would lie directly to my face the night before or why he would make such a statement to me the night before. Who had instructed Grant to say such things was it the project manager or Mr Sisson, I don't know as neither of them will talk to me and as for Brian Hall he won't even talk to me on the ABC radio program The Bush Telegraph when the topic is about community consultation process for wind energy facilities. Now if he won't talk to me when the topic is only about consultation what hope have I got when it comes to any of the other issues regarding wind energy facilities.

It is left to poor old Jay and even she admits she doesn't like talking to me because I have done too much research and I don't just believe what they are telling me. Every reason they tell me for saying wind energy is a good thing, I tell them why it is not. The proponent obviously is not aware that we do have internet access in the hills and are able to research this issue in detail.

As for the information supplied in the report about the proponent stating they have the support of the local community, I believe that Mr Saulwick was able to dismiss this claim by the stating the lack of tools used by the proponent that are available to use when making these assumptions. If the consultation team was able to visit and communicate with 150 residents why is it that ranking system was only used on 67 residents? I think that the panel and the proponent should remember there have been over 1555 objections to this proposal and the survey that was conducted by Mr Trevor Smith found that this project only had 2% support for the neighboring properties.

I like many others that live in the area of the proposal have found that the entire consultation process has been nothing more than a tick the box performance by the proponent so they can move on to the next stage. The proponent was invited to attend a public meeting to talk to the community and explain their proposal, they declined. It was not as though they needed to make a special trip from Sydney as the meeting was being held the day after the second "open day". This stage would have given the proponent a chance to speak to over 400 at the once and answer any questions raised. It would have also shown that it was concerned about the local community and that they wished to be a part of it.

I do not believe any genuine effort has gone into listening to the community concerns and has gone out of their way to exclude local residents that do not support their agenda at workshops and other stakeholder meetings. It is very easy to state that you have the support of the community if you only hear it from the people you invite to your meetings that are pro wind.

It states on page 31 of the community consultation report under conclusion, that it was the consultation process that was carried out in January-February 2003 that revealed that the proposed Dollar site had the greatest potential community compatibility, as revealed through discussion. If this is the discussion by the representatives of the 4 (that right I said 4) residents it would appear that this whole process has been nothing more than a scam. What you should be stating is that you have been able to secure leases on people's properties, on the scale that it is necessary to make the project financially viable, whereas at other locations you have been unable to do so.

The propaganda that the proponent has used as a marketing tool (drive and fly-through computer generated simulation) is nothing like what the site will really look like and is far from accurate. This is the same for the photomontages they look as though the turbines are not even there.

This whole process is not something I would ever want to go through again and I don't believe anyone should have to go through this process. I had to resign from my position at work due to having to deal with the host property owners making false and misleading accusations. I do not care where I am if someone has something to say to me they can say it to my face and not behind my back. That was probably another issue for social impacts and what is happening in our community. Once I would talk to several of the farmers who are hosting the turbines now like many others I don't give them the time of day.

The guidelines for wind energy facilities have been written by the industry for the industry, they are not guidelines they are a step by step how to build a wind energy facility anywhere you like, except for National Parks and marginal Labor seats. It is all about politics and not about reducing CO2 emissions. Unfortunately we have all been bogged down in the paper work that goes with panel hearings instead of being in the governments face making things difficult for them. The Premier's statement at the start of the guidelines are incorrect and the premier obviously knows nothing about at all about wind energy facilities. Though this may be just about to change with the report by the Labor Party committee of Economics, Innovation and Industrial Development has done. It questions the cost effectiveness and the viability of wind power and states that wind energy is 62% more expensive than brown coal generated electricity.

This is information that we have known for a long time now and the government is finally starting to acknowledge this same information. It is vital that the government have a chance to discuss this new report before any decision is made about this proposal. As I mentioned earlier the guidelines have been written by the wind industry, but the government has still made it quite clear with the decisions made at both Clarkes Hill and Pipers Creek that the amenity, vista and proximity to location are issues that the government clearly weighted heavily. It chose not to have regard to the governments policy in support of renewable energy development in both of these cases. This therefore sets a precedent that should be use in this case as 170 houses within 2.5 km of the site is much higher than anything at Pipers Creek or Clarkes Hill and I know this because I have been to both of these sites.

Conclusion

While the 14-15 private landholders concerned will realise financial benefits from the proposed development, it is far less likely that other members of the wider Dollar/Foster North community will gain similar benefit. The wind towers are unlikely to gain increased tourist dollars for local businesses if only because of the plethora of similar proposals in the region. This is merely one of several large scale windfarms in varying stages of proposal or development in this part of the South Gippsland.

Clean, low emission energy production as a concept is indeed supported by the the residents of Dollar/Foster North, but the present proposal only appears to offer this at a superficial level.

If this proposal was to do all that is claimed it needs to demonstrate:

- that the energy produced would realistically replace sufficient use of fossil fuels to supplant or at least significantly delay new or existing fossil fuel generators.
- that the impact of the proposal would be negligible or even positive in net environmental terms by providing assurances substantially backed by evidence and financial commitment on behalf of the company. Such impacts include those of :
 - a) a local nature — such as threatened or characteristic local indigenous taxa and communities and local human residents and communities;
 - b) a regional nature — such as the passage of migratory and dispersing fauna, the maintenance of characteristic local native ecosystems and the impact on regional human communities.

No assurances have been given that the parent company will not harvest the profits while the Australian subsidiary is allowed to disappear without the ability to cover its costs and responsibilities. A bond needs to be put in place if this proposal is approved.

Throughout the reports the proponent has made misleading claims for environmental friendliness, community support and the ultimate significance of its contribution to the State electricity grid. This does little to provide meaningful assurance of the sincerity or green credentials of the company.

In conclusion I am opposed to the construction of the Dollar Wind Farm for the reasons stated above.

Should the windfarm development proposal be accepted then I strongly recommend that the turbines that are located within 1 km of the two faultlines in the site be removed as well as the turbines 44 & 45 that over look Grassy Spur Pool. There is no demonstrated need to clear native vegetation in this case. If this alone threatens the economic viability of the proposal then clearly this is the wrong site for the development.

Yours sincerely

Craig Falconer
April 2005

References www.erigrd.com www.esipc.sa.gov.au/site/page.cfm www.eon-netz.com
www.kirbymountain.com/rosenlake/wind/windconsumption.html
www.countryguardian.net/denmark.htm www.iberica2000.org/Es/Articulo.asp?id=1253
<http://icnorthwales.icnetwork.co.uk> www.thisisthelaedistrict.co.uk
www.westernmorningnews.co.uk www.princetownwindfarm.com www.vestas.com
www.seav.vic.gov.au www.greenhouseoffice.vic.gov.au