



Review:
Massey University Survey on Wind Farms

Prepared for
Meridian Energy Limited

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For J R McComish Consulting Limited



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Brighton, Dunedin

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J R McComish Consulting Limited is a subsidiary of McComish Research Limited, a marketing research and consultancy company established in 1982. McComish Research was a founding member of the Association of Market Research Companies Inc.

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SUMMARY

This is a long report on what should have been a straightforward survey. It is long partly because the researchers have not fully disclosed their methods and detailed factual results. Such information is routinely made public precisely because it is needed in order to assess the validity of published research findings.

It must be said that this lack of information has not been due to any oversight on the part of the researchers. They were repeatedly and specifically asked to provide the information, which they are required to provide under every relevant code of practice. After initially refusing, they finally agreed to release the information only to report shortly afterwards that all existing copies of the survey documents, the survey data and their draft final report had been stolen during a daylight break-in at the lead researcher's home.

Because of this default, it has been necessary to piece together details of the survey methods and results from a number of partial and at times inconsistent reports on the survey and the researchers' findings from it. Gaps in the information have had to be filled by making inferences or estimates from the information that has been released.

The other reason the report is long is that there was a lot wrong with the survey. It is apparent from the available information that mistakes were made at all levels in its design, execution and reporting and that these have invalidated the researchers' reported findings.

The questionnaire was strongly and consistently biased to such an extent that, taken as a whole, it reads as if it were intended to influence respondents' attitudes as much as to measure them. Even if the questionnaire had been more neutral in its tone and content, the researchers could not have obtained valid results with it. The survey sample included a substantial number of respondents who lived well outside the defined survey area. Their presence has not been explained and the reported results suggest that their inclusion has added to the weight of negative opinion in the survey. Within the survey area, respondent selection was neither randomised nor systematic and it must be assumed, as a result, that people who had strong views about the wind farms were more likely to participate in the survey than people who didn't.

Besides these technical problems, it is a matter of particular concern that members of the research team were in direct contact with respondents while the survey was in the field. Most reports of adverse effects of the wind farms appear to have come from a group of forty-one people, identified as wind farm opponents, who had discussed the content of the survey with the lead researcher.

The survey took place in a climate of heightened public awareness about wind farms as a result of ongoing campaigns against proposed wind farm developments in the Turitea and at Motorimu. Members of the research team were directly involved in both these campaigns.

Regardless of any effects that might have been caused by the characteristics of the sample, the design of the questionnaire and, perhaps, the persuasive efforts of the researchers, the results of the survey have been reported selectively and inaccurately. Some of the researchers' more dramatic and controversial findings are not supported by the published data. In some cases the findings are so misleading that they are tantamount to a falsification of the data. The results for other key questions, which might have put the reported findings in context, have not been published at all.

It is surprising to find such marked deficiencies in a research project that was carried out under the auspices of a New Zealand university. Under normal circumstances the reader could have assumed that such research would have met the highest standards of competence and impartiality. In this case, however, it appears that the project was not subjected to any of the usual processes of internal evaluation, peer review and departmental approval and supervision. It seems, clearly, to have been a piece of advocacy research carried out under the guise of academic research. Advocacy research is not, in itself, a bad thing but all the available evidence shows that this was advocacy research done very badly. It did not meet minimal criteria of research adequacy.

The survey thus does no credit to the researchers or to Massey University. Its findings are of no value as evidence of the adverse effects of wind turbines or of public attitudes to wind farms. The preliminary report that came from it may well have been of interest to participants at the NZPI Conference on the Politics of Planning, but only as an example of the way the political agenda of an interest group can impinge on the planning process.

The whole exercise may be of some interest as a case study of the need to maintain high standards in academic research in general and survey research in particular.

The human understanding is no dry light, but receives infusion from the will and affections; whence proceed sciences which may be called 'sciences as one would.' For what a man had rather were true he more readily believes. Therefore he rejects difficult things from impatience of research; sober things, because they narrow hope; the deeper things of nature, from superstition; the light of experience, from arrogance and pride; things not commonly believed, out of deference to the opinion of the vulgar. Numberless in short are the ways, and sometimes imperceptible, in which the affections colour and infect the understanding.

Francis Bacon, *Novum Organum*, 1620

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INTRODUCTION

This review has been prepared for Meridian Energy Limited by J R McComish Consulting. It is based on a detailed analysis of a survey that was undertaken under the auspices of Massey University in September 2006, to investigate the effects of the Te Apiti and Tararua wind farms on the attitudes and opinions of nearby residents. The lead researcher was Dr Robyn Phipps, a Senior Lecturer in Building Technology in Massey's Institute of Technology and Engineering (ITE).

The primary source of information on the survey and its findings is a paper entitled *Visual and Noise Effects Reported by Residents Living Close to Manawatu Wind Farms: Preliminary Survey Results*, written by Dr Phipps and three others and presented at the 2007 NZ Planning Institute (NZPI) 'Politics of Planning' Conference in Palmerston North on 28 March 2007. The NZPI paper, together with the survey documents and additional information on the survey's findings, has been produced by Dr Phipps as evidence at resource consent hearings on wind farm applications in Palmerston North and elsewhere. The latest and most complete account of the survey is contained in a brief of evidence produced by Dr Phipps for the Environment Court hearing on an appeal by Motorimu Wind Farm Ltd in April 2008.

According to the NZPI paper and the various briefs of evidence that draw on it, the survey demonstrates that people who live near wind farms are subject to "severe and significant adverse noise and vibration effects"; that these were not anticipated by "the owner of the windfarm" (presumably Meridian Energy) or the consent authority; that significant visual and noise effects are experienced by a larger population and at a much greater distance "than is envisaged under current visual assessment techniques and the New Zealand noise standards"; that the present standard, NZS 6808, is not adequate to protect the health and amenity of residents; and that residents' opinions about the visual effect of the turbines are considerably more negative than reported in previous studies.

Those findings have been questioned by a number of people who have been directly involved in assessing the noise and visual effects of wind farms.

The survey findings have been made available on several anti-wind farm websites on the WorldWideWeb. They have been widely referred to by wind farm opponents in New Zealand and overseas. They have been used in submissions to consent authorities in opposition to several wind farm applications; in articles in the media; in letters to newspapers; and in anti-wind farm campaign material. Some of these uses have grossly misrepresented the survey results.

The purpose of this review has been to make an independent assessment of the survey's findings and, in particular, of their value as evidence in the consent process for wind farm applications.

No final report on the survey has been published to date. The NZPI paper contains a brief description of the survey methods but the researchers have not released all the details of those methods. Similarly, the paper and the various briefs of evidence provide selected results from the survey but detailed tables of results have not been made available and no results at all have been released for some key questions.

On 17 March 2008, a request was made to Dr Phipps to provide detailed information on the research methods and survey results. The request was refused on the grounds that a final report on the survey had been written and was being reviewed prior to publication. Following a further request made to the School of Engineering and Advanced Technology (successor to ITE) it was agreed, on 9 May 2008, that the information would be released. On 19 May, however, before any of the information had been released, Dr Phipps's home was burgled and we have been advised that the survey records, including the completed questionnaires, all copies of the survey data and tabulated results, and all copies of the draft final report were stolen.

The findings of this review should thus be read with the qualification that more detailed information on the survey might have clarified some aspects of the way it was carried out and reported on. Similarly, without access to the survey data it has not been possible to make statistical tests of the reliability and validity of the survey results. With those provisos, however, we consider that the available information has provided a sufficient basis for the conclusions set out in this paper.

SURVEY FINDINGS

The survey is described as a "Survey of Actual Effects Experienced by Residents Living Close to Existing Manawatu Turbines". This description is misleading. The survey collected information about the reported effects of the turbines and not about their actual effects. The difference is more than semantic. There is ample reason to doubt that the findings reported by the researchers accurately reflect the actual effects experienced by people living in the survey area. In the NZPI paper the researchers recommend further research, including physical noise measurements.

Although the various reports repeatedly refer in general terms to "the wind farms" and the people who live near them, this was for all practical purposes a survey of the effects of the Te Apiti wind farm as reported by people who were living in or near Ashhurst. The sample included people who were living closer to the Tararua wind farm or in the Tararua District, but their numbers were too small to have affected the overall results of the survey and their responses have not been reported on separately.

The main finding of the survey, expressed in various ways in all the available reports, is that the survey shows that "the existing wind turbine generators in the Manawatu region are creating considerable adverse visual and noise effects, that are having adverse impacts on a large number of residents". The survey has shown no such thing, as explained below.

Noise effects

The most dramatic conclusions reached by the researchers have to do with the sound of the turbines. It is claimed that the survey results show that "the wind farms have significant noise effects on a larger population and at a greater distance than would be predicted by applying the current New Zealand standard for modelling noise from wind farms". It is said that the survey provides "robust evidence" that these significant adverse effects "extend more than 5 km from the site of the turbines".

Elsewhere, the lead researcher goes further to conclude that, "The evidence from my research ... clearly indicates severe and significant adverse noise and vibration effects on residents that is not anticipated by either the approving authorities or the owner of the windfarm. Such effects are not anticipated in NZS 6808 and this standard is not adequate to protect the health and amenity of residents".

These conclusions are based, at least in part, on the finding that, "Noise from turbines in the area was heard by 75% of all respondents".

In fact only 48% of all respondents indicated that they had ever heard the turbines from their homes and there are good reasons to doubt the reliability of their responses.

As is discussed in more detail later in this paper, respondents were not asked in the questionnaire whether the sounds they claimed to have heard were either "adverse" or "significant". The researchers appear to have made assumptions about the effects of the sounds on the basis of their conversations with a selected group of "wind farm opponents", or on the results of the literature review they undertook, or on the results they had hoped to obtain.

There is nothing in the available information about the survey methods or its results that could possibly support the conclusion that large numbers of people living up to 5 km from the Te Apiti wind farm were experiencing significant adverse effects on their health or their "amenity" as a result of noise or vibrations produced by the turbines.

The only basis for concluding that the turbines were having an adverse effect on people's health appears to be the reported finding that, "Over a quarter of the households reported serious sleep disturbances (frequently or most of the time) from the wind turbine noise".

In fact only 26 respondents indicated that they or someone in their household had their sleep disturbed "frequently" or "most of the time" - or, in other words, 4% of the 614 households included in the survey. As is the case throughout the survey, problems with the selection of respondents, bias in the questionnaire, and influence on respondents by the researchers, all go to suggest that even this modest number has been inflated.

In a similar distortion of the survey's actual results, the researchers reported that, "The special audible character of the noise was of significant concern to many households. Respondents experienced the turbine noise as impulsive in nature (thumping, booming, whooping) or containing tones in the lower frequency end of the spectrum".

Respondents were not asked what they had experienced or how often they had experienced it but only what they thought the turbines "can sound like". They were not asked whether the noise was of concern or, if it was, whether the concern was "significant". They were not asked what the other people in their household thought about the sound. The finding that a few respondents described sounds that were impulsive or included low frequencies is not evidence of "significant concern" – it is simply a description of the sort of sound turbines produce.

One of the most contentious aspects of the survey is the researchers' finding that, "Twelve homes experienced vibration effects which some considered were most disturbing and intrusive and other residents experienced unpleasant physical sensations in their body's (sic) that were more than auditory".

Respondents were not asked in the survey questionnaire whether they found the vibration "disturbing" or "intrusive". That information must have come from the researchers' conversations with the people they characterised as wind farm opponents. Three of the twelve who claimed to be able to feel vibrations caused by the turbines were former neighbours of the lead researcher's who were living some 15 km from Te Apiti up the Pohangina Valley. Whether or not their claims are true, they lived a considerable distance outside the "notional ring" and should not have been included in the survey. No explanation has been given as to how they came to have copies of the questionnaire or why they were included in the analysis of results.

No data have been provided to show that the respondents who experienced unpleasant physical sensations were "other" than the ones who experienced vibrations. In the context of this survey it seems safe to assume that they were the same.

According to the researchers, "For most residents noise was as loud indoors as it was outdoors". They explained this as being probably due to the lightweight construction and lack of insulation in most New Zealand homes. In fact, respondents were not asked how loud the sound of the turbines was, either indoors or outdoors. This finding could not have come from this survey.

The researchers did, however, ask how frequently respondents heard noise from the turbines during the day and during the night. Perhaps they assumed that respondents were always outdoors when they heard the turbines during the day and indoors when they heard them at night. Surprisingly, given the results of the researchers' literature review, there was little difference between daytime and night-time frequencies. Rather than ascribing this anomaly to the peculiarities of New Zealand housing it might be equally plausible to take it as evidence that the survey results are unreliable.

The researchers also reported that “the proportion of households that could hear the wind farm plotted with distance” and they used a chi-square test on the data to show that this result was “statistically significant”. Statistically, “significant” simply means that the observed results were unlikely to have occurred by chance and that, for that reason, they indicate a systematic cause. The suggestion that sound levels actually do diminish with distance is, as the researchers say elsewhere, “unsurprising”.

What is less “unsurprising” about these results is that they do not appear to be supported by the survey data. While it is not clear why people living 5 or more kilometers from a wind farm have been included in the survey, it is clear from the published findings that more of them (52%) said they could hear the wind farms than was the case for people living 2.5 to 3 kilometers away (36%). This anomaly strongly suggests that the survey respondents who lived outside the defined survey area were not representative of the population at large.

Visual effects

According to all reports of the survey findings, “80% of the residents who could see turbines considered them visually intrusive, and 73% thought that they were unattractive.”

Both of these statements are taken out of context and are misleading.

Respondents who could see turbines from their homes and whose responses were completed to the researchers’ satisfaction were asked whether they agreed or disagreed with a series of nine statements in a Likert-type battery apparently designed to measure their attitudes towards the effect of the wind turbines on their “visual amenity”.

The statements that gave rise to the findings reported here were:

- “The turbines are intrusive in my view” and;
- “I think the turbines are quite attractive”.

It appears that 386 respondents either agreed or, perhaps, did not disagree with the statement that the turbines were intrusive “in their view”. The wording is ambiguous and it is not clear what their answers meant in the context in which the question was asked. According to the Sinclair-Thomas Matrix, which provides a subjective scale of the visual impact of wind turbines on the landscape, turbines as tall as those at Te Apiti are, by definition, “intrusive” for everyone who lives in Ashhurst. The survey finding effectively does no more than confirm that the turbines are big and that the people of Ashhurst live close to them. The results of the survey do not tell us whether they were annoyed or upset or bothered in any way by the “intrusion”.

The researchers analysed the results of the “visual amenity” questions using a technique known as Principal Component Analysis. They report that the results of this analysis “demonstrate that

the most important visual effect of wind farms was whether respondents considered that they are visually intrusive. This factor accounted for 69 percent of the variability in the data.” The results of the analysis demonstrate no such thing. According to Professor Phil Gendall, “These results do not allow anything to be said about the importance of individual attitude statements on the visual effects of windfarms. They do not demonstrate that the most important visual effect was whether respondents considered they are visually intrusive or that the flickering motion of the turbine blades affected the views of a significant number of respondents. And it is impossible to tell from the results how many respondents were concerned about any particular effect.” The finding demonstrates only that the researchers have failed to understand or to apply the technique properly. (See Appendix A.)

The second finding says that 353 respondents either disagreed or, perhaps, did not agree with the statement that they thought the turbines were “quite attractive”. The researchers have said that this finding is at odds with a national survey that found that only 25% of the general public thought that wind turbines were ugly. The results are not at odds at all. The residents of Ashhurst are not “the general public”. They are a specific group with particular characteristics who live close to a wind farm and cannot be said to represent the New Zealand population or any other sub-group within it.

Not agreeing that turbines are “quite attractive” is not the same as saying they are ugly. Respondents were not asked whether they minded that the turbines were not quite attractive or whether they were annoyed or upset by their lack of attractiveness.

There are similar issues with the other findings related to the visual effects of the turbines and these are discussed in more detail later in this paper.

Future Developments

Both within the sections headed ‘Visual Impact’ and ‘Noise’ and elsewhere, survey questions have been reported on partially or not at all. The most striking example of these omissions is in the the last section of the questionnaire, which is headed ‘Future Developments’.

This is, in a sense, the capstone to the whole survey. After being repeatedly reminded of the negative effects wind farms could have, respondents were asked whether (a) they approved of further expansion of wind farms along most of the skyline, and (b) whether they would choose to live near a wind farm again. Their answers might have been taken as a clear indication of their approval or disapproval of the wind farms and put their opinions on specific effects into context. Results for the question have not been published. One can only assume that they did not reveal the level of opposition that the researchers were hoping for.

Reliable Findings