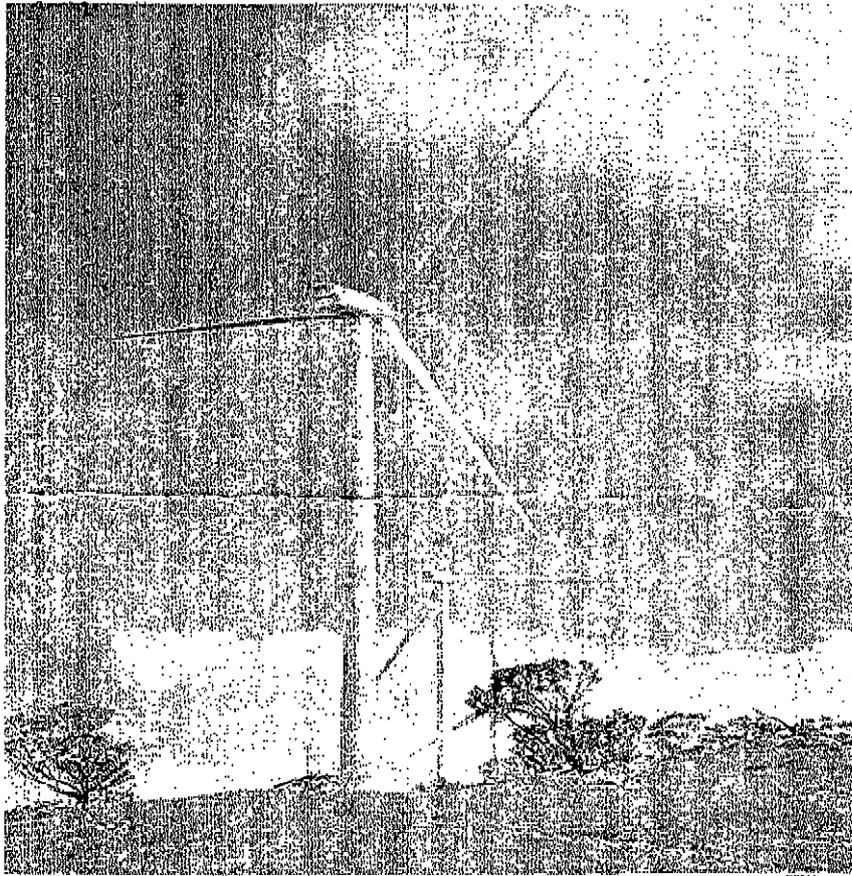


# **Evaluation of Wind Farm Noise Policies in South Australia**

A case study of Waterloo Wind Farm



By

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## 1. Introduction to the study

The government of South Australia issued two series of "Wind farms environmental noise guidelines" in 2003 and 2009, aiming to balance the advantage of wind energy development in South Australia with the protection of amenity of the surrounding community from adverse noise impacts. These Guidelines for wind farms have in fact played regulatory roles in both the planning stage for wind project approval and the operation stage for noise management.

This briefing paper sums up a study undertaken during 2011 evaluating the efficiency and adequacy of these guidelines. The study examined two aspects: (1) the achievement and restraints of the wind energy development; and (2) the situation relating to community amenity near the Waterloo Wind Farm. The findings of this study are expected to help planning authorities and decision makers better devise the strategies for dealing with issues relating to wind farm noise.

This study was conducted as part of the completion of a Master's dissertation by, Zhenhua Wang who was studying in the Discipline of Geography, Environment and Population, University of Adelaide.

## 2. Overview of methods

Documentary analysis method was used to examine the achievement and restraints of the wind energy development in South Australia. Key parameters such as annual growth rate of wind power; wind power share in electricity supply and per capita wind power capacity, were examined and then compared within Australian and international contexts. A literature review provided information about issues relating to wind farm noise in an international context.

A questionnaire was undertaken in the Waterloo Township. A specific aim of the questionnaire was an assessment of community amenity in relation to wind farm noise after nine month's operation of the Waterloo Wind Farm. The questionnaire was additionally supported by a series of in-depth semi-structured interviews with the local residents. These interviews interrogated in more depth community views and conceptions about wind farm noise and views on or about the efficacy of the State "Wind farms environmental noise guidelines".

The questionnaire was conducted on July 15, 2011 at Waterloo Township. A total number of 75 questionnaires were delivered to the local residents (within 5 km from the wind farm) with attached return envelopes and return address. By the 10<sup>th</sup> August 2011, 48 valid questionnaires had been received. The response rate was 64%.

The semi-structured interviews with some of the Waterloo residents were conducted on August 19, 2011 at Manoora Sports Club Room located about 10 km from the Waterloo Township. Six local residents attended the interviews with about 45 minutes for each interviewee.

After further data analysis, conclusion drawing, thesis editing and revising, the dissertation was completed and submitted on November 21, 2011.

### 3. Ethics

An ethics application for this study was submitted to the Human Research Ethics Committee, University of Adelaide and was approved in April 2011.

### 4. Summary of the results

Documentary analysis showed that the average annual growth rate of wind power (from 2003 to 2010) in South Australia was 62.18%. This is very high in contrast to the rate of Australia (30% in the last decade) and to the worldwide rate (28.68% from 1998 to 2010). The wind power share in electricity supply in South Australia in 2010 was 19.4%, being also very high in contrast to the share of Australia (5.1% in 2010 in six main wind power States) and to the share of worldwide (2.5% in 2010); the per capita wind power capacity by the end of 2010 in South Australia was 0.697kw/per capita, being eight times the value of Australian (0.086) and more than three times the value of worldwide (0.201).

Survey results showed that overall more than 70% of the respondents claimed they had been negatively affected by the wind farm noise. 35% of the respondents stated they had been 'moderately affected' and 19% claimed they had been 'very affected'. In total more than 50% of the respondents indicated they had been very or moderately negatively affected by wind farm noise. This is higher than evidence gathered in previous studies: early wind farm noise research in the early 1990s in three European countries showed that the rate of residents who were annoyed by wind farm noise was only 6% to 7%. Later research in the Netherlands in 2007 highlighted that the rate of residents living within 2.5 kilometers of a wind farm who were rather or very annoyed by wind farm noise was only 8%.

Those affected by noise from Waterloo Wind Farm noise experienced it about two days per week. A few respondents claimed that they had been affected every day. At the time of the survey, 39.6% of the respondents held neutral attitudes to wind energy, 35.4% held opposed attitudes and 25% held supportive attitudes. Only 20.8% of the respondents supported further wind development in the area of Waterloo while 66.7% of them held a 'no' attitude and the other 12.5% claimed 'not sure' about supporting the further wind development in their region.

The survey also showed that 38% of the respondents raised wind farm noise complaints to the developer; 25% to the local council; 19% to the Environment Protection Authority. 38% of the affected residents claimed experiencing health issues caused by wind farm noise, while 38% claimed they were not sure about whether their health had been damaged. Health issues mainly related to sleep deprivation and headaches. Many affected respondents took actions to address the annoyance being caused by the wind farm noise. Actions taken by these respondents are highlighted by

these excerpts "moved to other areas for sleeping (resting) well when it is windy"; "had medicine or saw doctor to help sleeping well"; "installed double glazed window to block the wind farm noise"; "planted trees"; "used ear plugs"; even "played music all night" to protect themselves from the annoyance coming from the wind farm noise. Several respondents have bought property in other areas where no wind farms are established. The top two expectations of the affected residents were "turn off the wind turbine during night time" and "affected residents obtain appropriate financial compensation from wind developers".

In summary, results from this study highlight that the guidelines have not fully met their core objective in terms of the case of Waterloo Wind Farm.

Interview results showed that the failure of those guidelines to attain their core objective is attributed to some key flaws residing in the guidelines including: the lack of a clearly established integrated procedure which could be employed to tackle the local community's complaints against the wind farm noise; the failure to utilize an independent third party to conduct valid and trustworthy noise level testing procedures; and the lack of appropriate penalties to be applied if wind developers violate the terms of the guidelines.

## 5. Acknowledgements

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