

GREEN PARK WIND ENERGY SURVEY REPORT - SUMMARY

1. Background

In 2003, Ecotricity submitted a planning application to Wokingham District Council to build a 2 megawatt turbine at Green Park Business Park, near Junction 11 of the M4 motorway, and on the 28th July, Wokingham District Council Development Control Committee voted in favour of an application for the first large wind turbine in Berkshire .

The 2MW wind turbine is being built specifically to supply clean electricity for local consumption. It will generate 3.5 million units of green electricity every year - enough to power over 1,000 homes (2% of homes in Wokingham District), saving over 3,018 tonnes of carbon dioxide and 35 tonnes of sulphur dioxide emissions each year.

2. Objectives

The purpose of this research is part of a longitudinal public consultation exercise, in which the views of residents in several Wokingham and Reading wards will be sought towards the construction of a large wind turbine in the area. A longitudinal study is a research design in which the researcher collects data from the same population at more than one point in time. This does not always mean that the same subjects are used to collect data at each point, but that the subjects are selected from the same group or population for data.

3. Sampling

The sample was taken from 7 council wards: 5 in the district of Wokingham and 2 within Reading Borough Council, with households as the unit of analysis and mail delivery as the means of data collection.

The questionnaires were distributed by two mail-outs during the month of February 2005 to 1000 households with two weeks between the first and second mailing. The second was to those households who had not returned the questionnaire. Each questionnaire was accompanied by a letter to residents explaining the nature of the research, the organisations involved in conducting the study and the emphasis concerning the anonymity of respondents' identification in compliance with the Data Protection Act of 1998.

4. The Questionnaire

The questionnaire was designed in a three stage format. The first section asked the respondent about their views on general environmental issues and their level of support for different types of energy sources. Section

two concentrated specifically on the wind turbine development and the third section focused on demographic information.

5. **Response and representation**

The level of response per ward varied considerably. Overall 37% or 370 valid questionnaires were returned with the success rate for some wards greater than others. 25% of those came from the first mailing and 12% from the second, illustrating the importance of secondary mailing.

Overall the sample was representative of the general population, although respondents in the Reading wards were slightly older than would be expected and in all wards respondents had attained a higher level of education than the ward average.

6. **Data Analysis**

Before more complex statistical analysis could be carried out, initial data exploration consisted of frequency tables, graphs and histograms to identify distribution patterns.

The first section of the questionnaire asked some general questions about people's awareness of environment issues, concern about the earth's climate and support of various energy resources.

Awareness of environmental concepts

Respondents were asked whether the following concepts were familiar; global warming, the greenhouse effect, energy efficiency, sustainable development, climate change and renewable energy. For each ward the sum total number of responses was calculated to produce a histogram of the results. All wards yielded a high level of knowledge of these environmental concepts. Those best understood were 'global warming' and 'climate change' each with 98% of respondents claiming to be familiar with the concepts. Renewable energy awareness followed at 88% and awareness of energy efficiency was claimed by 87% of respondents. Sustainable development was understood by 72.6% but only 3 respondents claimed not to be familiar with any of the above issues.

Level of concern for climate and support for more renewable energy in Berkshire

The level of concern for the earth's climate was high over the entire sample and 96% of respondents through that Berkshire should be increasing its contribution to renewable energy.

Level of support for wind energy

One of the key areas of this study was to understand the level of support that local residents had for wind energy. However, it has been assumed that not all wards are equally enthusiastic of this technology as is borne out by the table below showing that wards such as Arborfield (furthest away from turbine site) and Shinfield North are least in favour with other wards, notably Whitley (closest to the site) have no respondents who opposed wind energy.

Percentage level of support for wind energy			
	Oppose	No real opinion	Support
Arborfield	19.4	16.1	64.5
Hawkedon	6.0	6.0	88.0
Shinfield South	1.9	11.1	87.0
Shinfield North	21.7	4.3	73.9
Hillside	4.1	8.2	87.6
Whitley	0	12.2	87.8
Church	5.1	10.3	84.6

Support for other forms of energy generation

Levels of support for other technologies revealed that solar energy had high appeal across the sample as did Hydro. Nuclear power was most supported in Arborfield (the area most opposed to wind energy) and biomass had a support rate of about 40%, which is encouraging as there are no large scale biomass plants in the sample area. It should be noted that Arborfield had the highest level of opposition across all technologies other than nuclear compared to other wards.

Awareness of Green Park wind turbine

Awareness of the planned Green Park wind turbine was low across the sample, and for those who had heard about the project, information tended to come from local newspapers and TV and radio.

Experience of seeing a wind turbine

At various points during the questionnaire, residents were asked to consider the issue of wind energy from a more personal standpoint. Answers to seeing a wind turbine other than on TV resulted in a varied response by ward. Those that had experienced a wind turbine at close hand were then asked how it made them feel concerning the proposal for a wind turbine in their local area. In Arborfield 30% of respondents either opposed or strongly opposed the idea of a local wind turbine, in Church it was 2% but the most notable result came from Whitley whose residents did not register any opposition to a local wind turbine at all from those who had seen one.

What did residents like about the idea of a wind turbine in their locality?

Positive attitudes to the idea of a wind turbine in the local area were predominantly driven by statements such as “renewable energy”, “environmentally friendly”, “less pollution”, “saving energy”, “local energy production” and “pleasing to the eye”, several respondents also indicated that they liked “nothing” about a local wind turbine, and these came mostly from the Arborfield ward at 22%.

What did residents not like about the idea of a wind turbine in their local area?

Respondents were also asked what in particular they disliked about a wind turbine in their local area. The major concerns seemed to be: “noise”, negative perceptions towards visual impact such as “obtrusiveness” and “unsightly structures,” with “wildlife destruction” and “quantity of turbines” around residential environments being lesser features that people registered as dislikes about the development. However, many respondents stated that they did not have any particular dislikes and this was especially the case in Whitley with 66% of respondents, conversely only 24% and 25% of respondents in Shinfield South and Arborfield respectively expressed no dislikes.

Potential perceived problems associated with the installation of a wind turbine

Possible problems with several features attributed to the wind turbine were suggested to respondents. Firstly, they were asked whether noise would be considered a problem and an average of 45% of respondents thought that this might be the case. In particular, 61% of Arborfield residents believed that the wind turbine would be noisy, although only 32% of people living in Whitley and 33% in Church considered this to be an issue. This is interesting as once again Arborfield residents who live furthest away seem to suggest that they would be most affected by noise.

The look of the landscape after the installation of the wind turbine was seen as a potential problem for 65% of Arborfield residents and 56% of Shinfield South residents but as with noise was far less of a problem for Whitley and Church respondents at 22% and 36% respectively. Problems associated with TV reception were not rated very highly amongst the majority of residents and damage to wildlife and plants was rated as relatively low for most wards. Some residents thought that noise during the construction phase could be a problem and others were concerned about extra traffic during the construction phase. The only other problem stated was increase in motorway accidents from driver distraction which came from several residents in Shinfield South. Overall, Arborfield residents perceive the most potential problems with the wind turbine and Whitley and Church the least.

In what circumstances will respondents be able to see the Green Park turbine?

The majority of respondents thought that they would be able to see the wind turbine either driving to and from work or when using the M4 and surrounding areas. Only 12.2% believed that they would see the turbine from their homes and gardens and these mainly came from Whitley and Church, which is to be expected considering the geographical distance to the site. Several people also mentioned being able to see the wind turbine whilst going shopping or when travelling to watch a match at the Madjeski Stadium and there were some (9%) who did not think they would see it at all.

Perceived audible distance from the wind turbine

Perception of noise that might be generated from the turbine yielded similar response rates from each of the wards. About 36% of the population sample suggested that the turbine noise would only be heard under a quarter of a mile, 27% between one quarter and one half of a mile and 18% between one half of a mile and a mile. Only 5% of respondents believed that the noise from the wind turbine would be audible for more than two miles. However this differs slightly by wards. Whitley, Hillside, Hawkedon, Shinfield North and South reflect the general pattern, but 41% of Church residents perceive the audible distance to be under one quarter of a mile and 13% of Arborfield residents believe that the noise from the turbine will be heard for more than two miles.

Expected benefits from the wind turbine

Expected benefits from the wind turbine consisted of reduced pollution, local electricity generation, increased tourism, cheaper electricity, local jobs created and “no benefits”. In all the wards the benefit of reduced pollution scored highly at about 73% although the idea of have a local electricity provision was considered a greater benefit at an average of 83%, and for the residents of Whitley ward 89%. Tourism was not seen as a great advantage, cheaper electricity was considered to be important with 55% of respondents from Whitley believing this to be the case, but not so for those living in Shinfield South where it scored only 26%. Those who thought the wind turbine would provide local employment came from Whitley, Shinfield North and Church but those from Shinfield South, Hawkedon and Arborfield did not rate this as being a particular benefit. Finally respondents were asked whether they thought there would be no perceived benefits from the wind turbine and this yielded a low score from each of the wards, in fact all respondents from Whitley considered that there would be some benefits from the wind turbine. The higher scores for “no benefits” came from Arborfield and Shinfield North wards.

How did respondents describe their local area?

Based on their knowledge of the local area, respondents were asked to describe the site and its surroundings from a series of statements. These were to state whether the area was pleasant or unpleasant, peaceful or noisy, beautiful or ugly, exciting or boring. Respondents were then asked to consider whether they thought the area would change after the installation of the wind turbine, i.e. whether it would be more pleasant or unpleasant, more peaceful or noisier, more beautiful or uglier, more exciting or more boring. All wards considered the area around Green Park a fairly pleasant place to be with those in Whitley particularly supporting this statement. Conversely a high percentage of people stated that the area was noisy and this would reflect its proximity to the M4 motorway. The area was seen by most to be fairly ugly and the majority of respondents also thought it *boring*. Post installation of the wind turbine more than half of residents thought the area would become more unpleasant, many also believed that it would be noisier and uglier. However most people thought that the once boring location would become far more exciting with the installation of the wind turbine and this was reflected in all wards, Whitley in particular with a response rate of 87%.

Feelings about another wind turbine in the local area

The Green Park site is for a single wind turbine, however residents were asked how they would feel if another wind turbine were to be located in their local area.

Overall about 65% of respondents expressed unconcern or indifference towards a further wind turbine in their area. However, there were ward variations, Arborfield residents clearly had concerns about a further turbine in their area and 58% of respondents were either concerned or very concerned if it were to occur. In Shinfield North this concern is still fairly high but only at 43%. In Hawkedon those who strongly opposed another development is 31% and for Hillside it is 37%. However, the residents of Church and Whitley wards 78% had very little concern or were indifferent to a further wind turbine in their area. It would seem then that the level of concern is greater the further away residents are situated from the Green Park site.

Where should wind turbines be sited?

Respondents' views were sought on where they thought wind turbines should be sited. Many residents thought wind turbines should be sited away from residential areas and this did not differ by ward, similarly industrial or brown field sites and country areas were other widely held views for this type of technology, although a few respondents did not think that wind turbines should be featured anywhere. Having said that, at least two thought that wind turbines should be sited everywhere possible!

Demographic information

The final section of the questionnaire consisted of demographic questions such as property ownership, length of time in current address, gender, age, whether people had children under 18 and levels of education experienced.

The majority of respondents own their own homes and have lived in them for more than five years. Gender was evenly distributed but female respondents in Church outweighed males by 50% and in Arborfield the reverse was the case, with twice as many males answering the questionnaire as females. The age of the population varied by wards; with the youngest being in Arborfield and the oldest in Church, elsewhere the predominant age group was 35-44. This was related to those with children under 18, the highest number of respondents with children under 18 coming from Arborfield and the lowest from Church wards. The final demographic variable was level of education attained. This was highest amongst respondents in Shinfield South, with 60% of respondents studying to at least degree level or equivalent and lowest in Whitley ward with 34% of respondents having no formal qualifications.

7 Inferential Data Analysis and Hypothesis Testing

In the above study the main research question was to elicit local residents' attitudes to wind energy development in the Reading/Wokingham District area. In translating this to a testable hypothesis, it was essential to conduct some preliminary data analysis in order to create a statement of a relationship between population parameters or variables – in other words what we would expect to find. This statement takes the form of predicting differences between groups or of relationships between variables. From previous exploration of the data the hypothesis that emerges is *residents living furthest away from the planned wind turbine are more likely to be opposed to the installation*. Hence the null hypothesis would be *residents living furthest away are less likely to be opposed to the wind energy installation*.

In this study, three dependent variables were analysed further. These were; *level of support for wind energy, personal experience of wind energy from those who had seen a wind turbine and the level of concern if another wind turbine were to be installed in the local area*. The relationship between these and demographic independent variables; were first examined by using cross tabulations and then by bivariate analysis which enables us to detect whether there is a *real relationship* between variables, the direction of the relationship and the strength of the relationship.

Cross tabulations showed that Whitley residents have the least resistance to the wind turbine development and those that do have concerns have lived in their homes for longer. There was slightly more concern from

females and likewise by those with fewer qualifications. For Arborfield residents, concern about a second wind turbine is shown strongly by those who have lived in their homes for longest and conversely to Whitley more men are proportionately resistant to wind energy than women and those with fewer qualifications less concerned about a further development.

Cross tabulations for Hawkedon revealed little significance between variables although older groups are less concerned about another wind turbine. Of the Hillside residents the most concern about another wind turbine was shown by those living in their homes for longest; more males than females support the Green Park development; older groups are more concerned about another wind turbine.

For Church residents, stronger concern for a further wind turbine is related to years spent in the current property, more general opposition from females and high levels of support from the older population with those attaining a lower level of education more likely to oppose the development. Shinfield South revealed that more males support the wind energy development than females, the older age groups are more opposed to the scheme and likewise more opposition came from those without children, contrary to residents from Church, those with a higher level of education were least supportive of the development and this is also the case in Shinfield North. Here as for Hawkedon, little significance between variables with slightly more females than males in overall support for the Green Park development.

From the bivariate tests that were carried out, those who supported wind energy were more likely to be in favour of a local development and less likely to be concerned if a further turbine was to be installed; that is what would be expected and appears in each ward area. However there was a weak association between the time spent in current property and education to the support variables. To identify these correlations in more detail, each ward was examined individually. Notably, Arborfield residents are less likely to support the development the longer they have lived in their homes and this is also the case in Hillside. However, as Hawkedon residents increase in age they show less concern about a further wind turbine in their area and residents in Church register greater concern about a further wind turbine in their locality the lower their level of education.

8. Profile of the opposing group

The final analysis concerned the group of people who were most resistant to the development. These were extracted from the main data set and examined in more detail to identify key characteristics that divided this 'opposer' group from the majority 'support' group.

The opposing group revealed that they own their own property, have lived in it for longer, are less likely to have children under the age of 18 and are therefore older but not the oldest group. They tend not to like anything about a wind turbine and particularly dislike its physical appearance. As has been previously demonstrated Whitley were least opposed and Arborfield the most resistant group.

9. **Conclusions**

The results of the first part of the longitudinal study for the Green Park wind turbine development show that respondents are not only well versed when it comes to environmental concepts but strongly supportive of renewable energy developments in their area. Support of wind energy is especially high with Arborfield residents (those living furthest away from the development) the most resistant and Whitley (those living closest to the development) the most in favour. Solar energy support is also high and biomass support is shown to be increasing compared to previous studies. Views on a local wind energy development from those who had seen a wind turbine revealed again that Whitley residents showed no resistance but residents from Arborfield came from the highest opposing group. It was this ward where many respondents did not like anything about wind turbines, conversely the majority of Whitley residents could not think of anything that they specifically disliked about this technology.

This was the general trend concerning possible problems with the Green Park development, with Arborfield envisaging greater problems and Whitley and Church showing the least concern for issues associated with the development. Once again this suggests the ward furthest away believes that they will be affected more and those closest to the development feel they will be least impinged on. The pattern is replicated for the maximum perceived distance that is expected from the wind turbine, for expected benefits and for the idea of a second wind turbine in the area, which not surprisingly yielded the most concern from Arborfield residents and least from Whitley and Church.

Demographically most respondents owned their own homes and most had lived in them for more than five years. Gender was fairly evenly distributed with the oldest residents living in Church and the youngest from Arborfield. This is an interesting finding as the idea that younger people are more supportive of wind technology does not fit the opinions of Arborfield respondents. Likewise Arborfield residents have a greater proportion of younger children than other wards and this too goes against the pattern of children inspiring and educating parents about renewable energy. Finally levels of education were fairly high in comparison to the average for that ward, the highest levels being from Shinfield South and the lowest from Whitley.

The general conclusions to be made are that whilst there are variations between the opinions of residents in different wards, these are most keenly demonstrated in Arborfield and Whitley offering in many cases polarised viewpoints towards the development and implementation of the Green Park wind energy turbine. Whitley residents are supportive, support the local renewable energy development and are generally unconcerned if another were to be installed in their local area. Arborfield residents on the other hand are most resistant, they tend to dislike wind turbines in general, they envisage many problems associated with this type of development especially noise and visual appearance and they include the youngest population, although within this group those who have lived in their homes for longest in this group and naturally being older are most against the development. Most significantly of all, the residents of Arborfield are those living furthest away from the wind turbine site and those in Whitley closest to the site, it can be concluded then that geographical distance is a major factor to acceptance of this development and we can reject the null hypothesis that this is not the case.