The Warwick Urban Wind Trial Project

Interim Report

March 2007

www.warwickwindtrials.org.uk

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Action21

The Micropower Council

The British Wind Energy Association

Warwickshire County Council

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Encraft Project Team

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Caveat and context
This report should be read in context. This is clearly a developing market and all the players are going through a learning and development process. In most cases the suppliers make this clear to their customers before they attempt to sell systems. We report facts as true at the time of the study, and this does not mean they will be true in future as companies develop their technologies, operating models and systems.

EXECUTIVE SUMMARY

The Warwick Urban Wind Trial project has engaged in depth with the new market for urban, building mounted wind turbines at a critical time in market development.

By taking the customer perspective and combining technical monitoring with social research into the impact of installations on public perceptions of energy efficiency and wind, the project is providing the most thorough and complete assessment to date of the efficacy of urban wind systems in supporting UK energy and environmental policies.

This is an interim report at the half-way stage of the project. From over 30 customers who volunteered to participate in the trial, 20 sites have completed the planning process, 4 sites have turbines installed and generating power, and nine will probably have systems in place in the next 8-12 weeks.

We expected the first months of the project to be occupied with isolating and overcoming non-technical barriers. This has indeed been the case, but the barriers have not been quite where we expected them: existing more within the industry than with the public.

We have completed two public opinion surveys, both of which demonstrated the market is ready for these systems (as advertised) and there are no substantive public barriers to initial take up. Rather ironically, such barriers may now be being created by some parts of the industry itself.

We have dealt with most of the companies marketing turbines to the domestic market. None have yet demonstrated readiness to supply the market at commercial scale. This creates a gap between lobbying, media and marketing activities and customer reality which is likely to make the market harder to develop in future. This may in turn potentially delay any positive impact this technology may have on UK carbon emissions.

The companies are approaching the market in different ways.

Windsave took orders from customers throughout last year and make repeated delivery promises but have not fulfilled any within our original trial set. All our original trial customers have had site surveys from representatives, and have incurred planning costs on the basis of confirmation of technical site suitability, but none have yet had dates for installation and in all cases are currently being told the company has technical problems meaning no systems are being installed and no dates can be given.

This is consistent with wider national experience: an analysis of planning applications across the UK by a student at Kings College identified 510 small wind installations that had formally applied for permission during 2006. This figure contrasts with claims that between 10 and 20 000 systems have been sold. Our evidence suggests the installed figure is closer to 3-500 to date.

Swift took an order for one site, completed technical feasibility and planning stages, again imposing costs on their customer, and then also withdrew their product (from the market as a whole) for technical reasons.

Ampair are supplying 11 sites and have installed turbines on promised dates so far. At the time we approached Ampair they were not offering their products at mass scale for customers. They are approaching the market in a progressive way and as far as we are aware are still testing the technical and market performance of their systems.

Eclectic and Zephyr have provided quotes for systems for customers but the costs have proved too high so far for our trial customers to be willing to purchase.

FuturEnergy are working with us on one site, again on a trial basis. They do not mount turbines on urban buildings, but have agreed to install one on a steel-framed building on a semi-rural site.

On the technical side, we have been monitoring wind speeds at one urban site for 9 months and have demonstrated that predicted wind speed data is inaccurate for urban sites. Since February we have also had a metered turbine installation on this site, now with two anemometers at different heights providing comparative data.

The second half of the trial will focus on technical reporting of performance on the 10 monitored sites over 12 months, and we will repeat the public opinion survey this summer once we have a mass of installations in place, as well as carrying out individual interviews with property owners and neighbours where turbines are installed.

Table of Contents

1. INTRODUCTION

The Warwick Wind Trial Project ("Microwind – a catalyst for change in UK energy culture?") set out to evaluate the contribution urban wind turbines may make to improving the energy performance of the UK domestic estate in June 2006.

The key question it seeks to answer is:

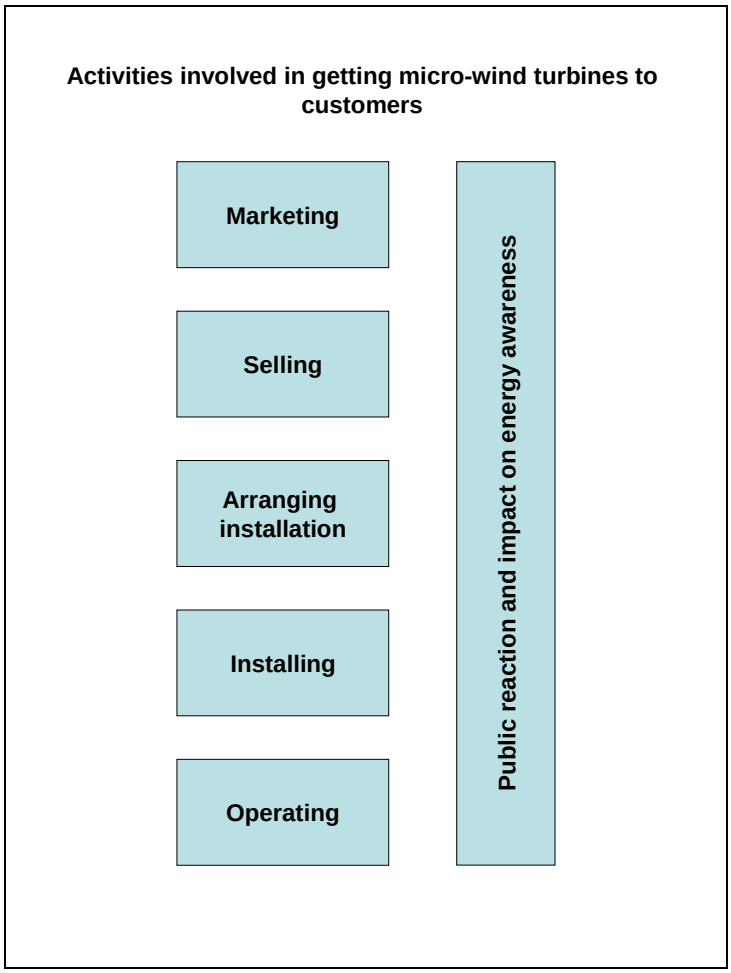
Will the deployment of this technology deliver and encourage greater awareness of energy efficiency in the community?

The two subsidiary aims of the project are to monitor the performance of 10 systems on different urban sites, and to explore actual costs of barriers to take up of the technology in the market.

The trial has been public and open (i.e., customers and suppliers and planners have all been aware they were engaging in a trial). A website has given continuous real-time feedback (www.warwickwindtrials.org.uk).

This is an interim report on the findings of the project at the half-way stage.

The report is structured in sections organised according to the diagram below, which breaks the process of getting an urban wind turbine to a customer down into stages.



Each stage potentially impacts public awareness in a positive or negative way, and in most areas it is still too early to make definitive statements either way, so each section of his report is organised as follows:

- experience and findings to date
- commentary on this evidence
- provisional conclusions as to impact on energy awareness
- questions for further investigation in the next 12 months

A final section summarises the overall conclusions from the trial to date. The appendices include technical data secured so far and a chronology for each site in the trial.

2. PRELIMINARY FINDINGS

2.1. Marketing

2.1.1. Experience and findings to date

Customers and the media are excited by the prospects of urban wind turbines and generating their own power. We needed to make no efforts to recruit volunteers for the trial and have been turning away a continuous stream of enquiries since last May.

The media focus heavily on reactions to the technology. They often link stories to climate change but (with the exception of live radio interviews where we have had some control over the content) none of the dozen newspaper articles have picked up on the energy efficiency angle to any degree, which we always make a point of stressing.

The only generally recognised brand in interviews is B&Q (who market Windsave's product). Most interviewers and journalists do not differentiate between commercial wind farm technology and urban micro-wind systems at the outset but have begun to pick up on his distinction in the past year.

Members of the public make a clear distinction between commercial-scale wind and micro-wind anecdotally, and our volunteer customers all express a clear preference for smaller scale systems, but respondents to our random survey in July 2006 did not differentiate between the two. 79.5% of people supported deployment of rooftop wind systems and 83.3% of people supported large wind farms. This was significantly lower than solar (90%) and significantly higher than waste or biomass to energy schemes (67.9%).

2.1.2. Commentary on this evidence

It is not difficult to get customer or media attention for wind turbines. Indeed the trial has done no PR and the media interest has all come from picking up on planning applications.

This interest is probably partly because of the established track record of controversy surrounding commercial wind farms; partly because climate change is making news at the moment; and partly because of the national efforts and marketing investment of companies such as B&Q, amplified by national media.

The lack of differentiation between small and large wind was unexpected. It may reflect lack of interest or exposure to large wind in the Midlands: there are no large wind turbines in Warwickshire or any imminent likelihood of any being deployed. It may also reflect the gap between the general public (who do not see power generation as a personal issue) and those who are actively involved or thinking about buying their own power system. The latter have a more sophisticated understanding of the market and differentiate between technology types and suppliers.

2.1.3. Provisional conclusions: impact on awareness of energy efficiency

Marketing costs for urban wind turbines generically are low.

This is because there is no meaningful differentiation at mass market scale, other than potentially “B&Q” vs “non-B&Q”. So at the moment all suppliers benefit (or suffer) from the general attention given to the industry and technology.

Wind turbines are becoming something of a media-staple to illustrate stories on climate change. They are dynamic, excite passions both ways, and hence make for lively stories.

In this context urban wind systems are potentially making a positive contribution to enhancing the energy efficiency of the domestic estate because they give the press something tangible and accessible to talk about alongside the more conceptual and global issues of climate change. This is better than nothing: it makes climate change personal and shows people they can do something.

Companies like B&Q have been able to exploit this directly: by including an urban wind turbine in their marketing campaign they were able to attract considerable and sustained attention. In practice of course they were selling a whole range of less glamorous energy efficiency technologies alongside the Windsave system. This meant B&Q (and energy efficiency in general) probably benefited from the publicity whether or not the system worked because people were attracted to buy insulation products (etc) at the same time.

On the other hand, if stories about urban wind are negative and fail to link to energy efficiency (e.g., a recent headline about one of our sites read “£3000 turbine saves £1 in six weeks”) then it may simply encourage people to feel energy is someone else’s problem and they can do nothing about it. This will not encourage energy efficiency in the medium term.

2.1.4. Questions for further investigation

These provisional conclusions suggest we should focus on the following questions during the second half of the trial.

- How are individuals reacting to the increasingly negative stories about urban wind turbines?
- Is the market becoming more sophisticated over time, to the extent that individuals will be able to distinguish between brands and good and bad sites, or will all companies and approaches benefit or suffer equally from ongoing publicity?

2.2. Selling

2.2.1. Experience and findings to date

The volunteer customers in this project placed orders and signed contracts for turbines following site surveys at various points between May 2006 and December 2006 (see appendix A).

In all cases sales people were straightforward to deal with and there was no evidence of pressure sales techniques nor exaggerated claims. In the main trial participants have dealt with technical people whose main job

has been to assess site suitability and get a signed contract. There has been no need for “selling” in the traditional sense.

Windsave still claim on their website that their system can deliver 30% of average annual electricity demand, but this has now been qualified with an explanation of how to predict actual outputs.

We eliminated around half of the potential volunteer sites before surveyors/sales people visited and these were not surveyed.

Getting surveys done proved challenging and usually took considerable chasing. Windsave surveys took between 5 and 15 minutes. We had two rounds: one by the Operations Manager from Windsave in early summer and a second one by the installation subcontractors engaged as part of the mass market roll out in late Autumn. Swift did a fairly extensive technical review of site drawings and plans, and Ampair spent between 30 minutes and an hour per site.

Windsave and Swift accepted all the sites surveyed.

Ampair surveyors eliminated one site on the grounds of access and several others based on photographic surveys. They have a structured process for site surveys and also provided some energy efficiency advice. The surveys were carried out by experienced technical staff (although at the time the surveys were done the product was still at a development stage, so this would be expected).

In general, surveyors always promise delivery 4-8 weeks into the future. This has been consistent throughout the trial, including the first two orders placed at the end of May 2006 for delivery in July. Only Ampair have delivered to promise.

Grants and pricing

All our volunteers had a positive experience of the grants process, applying for DTI low carbon building programme grants online between July and October 2006 and generally getting a positive response within 24 hours. (These experiences predate the substantial rush and much publicised oversubscription of the process in 2007). Unfortunately all these grant applications related to Windsave proposals and have thus been lost as the company has not delivered.

The price point of £1500 was seen as accessible and did not act as a barrier to customers volunteering for the trial. From the outset people were offered the choice of Ampair 600W (600-230) (at £3500) and Windsave WS1000 1kW (at £1500) and all chose Windsave in the absence of any other evidence of quality or performance. Having failed to secure physical turbines from Windsave, four of the original participants have subsequently expressed willingness to pay over twice as much for Ampair systems, and the remainder continue to wait for Windsave.

2.2.2. Commentary on this evidence

Windsave and Swift have both deployed surveyors who (as it turned out) promised more than could be delivered.

We have no evidence yet to say how discerning the surveyors are. Nevertheless, as the industry as a whole now recognises that performance is highly site specific, the skill and integrity of the surveyors and sales people is clearly an important consideration in ensuring this technology is deployed effectively. How Swift and Windsave choose to tackle this when they re-enter the market will be an important touchstone of their sincerity.

Urban wind turbines were not difficult to sell in 2006, and certainly not to the volunteers who joined our trial. Customers became more sophisticated about judging price and value as soon as there was some market experience to build on.

2.2.3. Provisional conclusions: impact on awareness of energy efficiency

Incorporating an energy efficiency survey into the survey visit is an obvious potential extension to the sales process for some suppliers that would enhance the potential contribution urban wind sales might make to overall household energy efficiency.

Making judgements about whether or not price is a barrier to take up of energy efficiency technologies may be premature before performance data exists. Given the choice between two systems only differentiated on price, everybody chose the cheapest. Once a perceived technical and quality difference appeared, half the volunteers became less price sensitive and opted for a more expensive system that was seen as delivering more value.

2.2.4. Questions for further investigation

- What proportion of sites are rejected as part of the sales process as being unsuitable, and are these customers encouraged to secure energy efficiency by other means?
- Can we draw any general conclusions from the trial about the relative suitability of different sites and buildings for urban wind systems, and can these be reduced to guidelines for surveyors?

2.3. Planning and arranging installation

2.3.1. Experience and findings to date

We have taken 18 sites through the planning process. Five went to planning committees: two because planning officers had not dealt with wind turbines before and wished to establish local policy; one because there were more than 5 objections; and two because the properties in question were owned by council officers. Appendix A summarises the chronologies and costs involved for each site.

No sites have been refused planning, including two in conservation areas. There were no objections from statutory bodies, including some

powerful and active local groups concerned with preservation of historic architecture in Leamington and Warwick.

Eight objections were received for one site from members of the public. This site is in a conservation area and the concerns related to noise and visual amenity – the turbine was seen as too large. In the event the environmental health assessment was that the turbine would be inaudible from the nearest houses and the planners felt that the installation was in keeping with the new building on which it would be installed. Permission was granted unanimously by the planning committee and this turbine has now been installed (the noise assessment was correct). Preliminary interviews with neighbours indicate they no longer object but we plan a follow up survey three months after installation.

One turbine is being installed on a public access site owned by the County Council and hence went through a different planning body (County rather than District planners). This caused some difficulties as the individual planning officers chose to take a very cautious and somewhat bureaucratic line that effectively required the planning submission to follow guidelines largely intended for commercial wind farms. A visual impact assessment was required and a 20 page supporting statement covering issues such as potential impact on wildlife had to be submitted. The site is semi-derelict industrial land. Separately we were required to prepare and submit drawings of mounting arrangements and provide comprehensive manuals and electrical connection diagrams showing how the system would be fitted. Planning permission was granted after 10 weeks but requests for additional information are still coming back for this site from other departments in the County Council and the overall approval process has now lasted just over six months, at a minimum cost of £3000 on the applicant's side, ignoring the cost of Council officer time.

2.3.2. Commentary on this evidence

Planning permission has not proved a barrier to progress in all but one case, although this one case does illustrate the potential for unwitting obstruction to occur.

The fundamental problem on the one site that is experiencing high planning and approval costs appears to be related to straightforward risk aversion and lack of confidence or understanding of technology among junior officers. It has no political content: the installation has received letters of support and no objections, and is on a waste management site (recycling centre) where there are no visual or noise issues. The County Council are also partners in this project and senior staff and members are all on record supporting the project and wind power in general. However, it is clear that the key junior officers dealing with the approval are not confident enough technically or culturally to make independent judgements (unlike the District Council planners) in what is a novel area for them. The costs of educating them and their organisation then effectively fall on the applicant.

In all other cases the planning process worked well. It drew media and public attention to the trial, enabling public debate, and gave officers a mechanism to elicit a policy decision from elected members. Objections

were raised, analysed against both scientific facts (noise levels) and committee judgement (visual impact) and a sensible outcome agreed that everyone appears happy with.

2.3.3. Provisional conclusions: impact on awareness of energy efficiency

In confident, well-informed planning authorities the planning permission process works well and can strengthen support for urban wind. It also encourages debate and awareness of energy efficiency through the objections process and local media. For example, one line of objection was that there are more efficient ways to tackle climate change.

In less experienced authorities the process can potentially be disproportionately expensive and obstructive. This issue could be overcome in one of two ways:

- by strengthening the planning process and ensuring officers have access to higher levels of technical understanding
- by overriding the local planning process altogether and granting permitted development status to urban wind

The provisional conclusion from our experience is that strengthening the local planning process would have more positive benefits for awareness of energy efficiency and deployment of urban wind. Overriding the planning process is more likely to lead to stronger local resistance and less informed debate.

2.3.4. Questions for further investigation

- How do the objectors who emerged during the planning process feel now real systems are installed? We will do a follow up survey of these individuals.
- Has this first experience in any way primed the County planners and officers to be more context-sensitive and efficient in dealing with future applications?

2.4. Installing

2.4.1. Experience and findings to date

The installations completed to date have each taken two installers less than a day. The photograph below shows the gable end mounting on Lillington Road with anemometers to the right.

Installations have been carried out by
professional aerial installers, using scaffolding and ladders. One site was used as a training event for a second team.

The system is thoroughly anchored to the building and one of the brackets is bolted internally to the structure of the house.

An inverter and interconnect unit are located next to the consumer unit inside the house, in the case of Lillington Road about 12m from the turbine itself.

2.4.2. Commentary on this evidence

Installing these systems requires care and two people, but the skills are already in existence among commercial aerial installers (for example) and the training requirements for those already competent to do mechanical and electrical installations at height are straightforward.

The critical issues relate to the structural integrity of the building and the quality of the fixings.

2.4.3. Provisional conclusions: impact on awareness of energy efficiency

The installation itself has no impact on awareness of energy efficiency, although it is bringing a new set of skills and individuals into the industry.

2.4.4. Questions for further investigation

- How comfortable and confident are the installation teams with this work? We will review this after the full set of installations has been completed.

2.5. Operating

2.5.1. Experience and findings to date

The systems installed so far have attracted positive comments about their appearance and operation. They have generated small amounts of

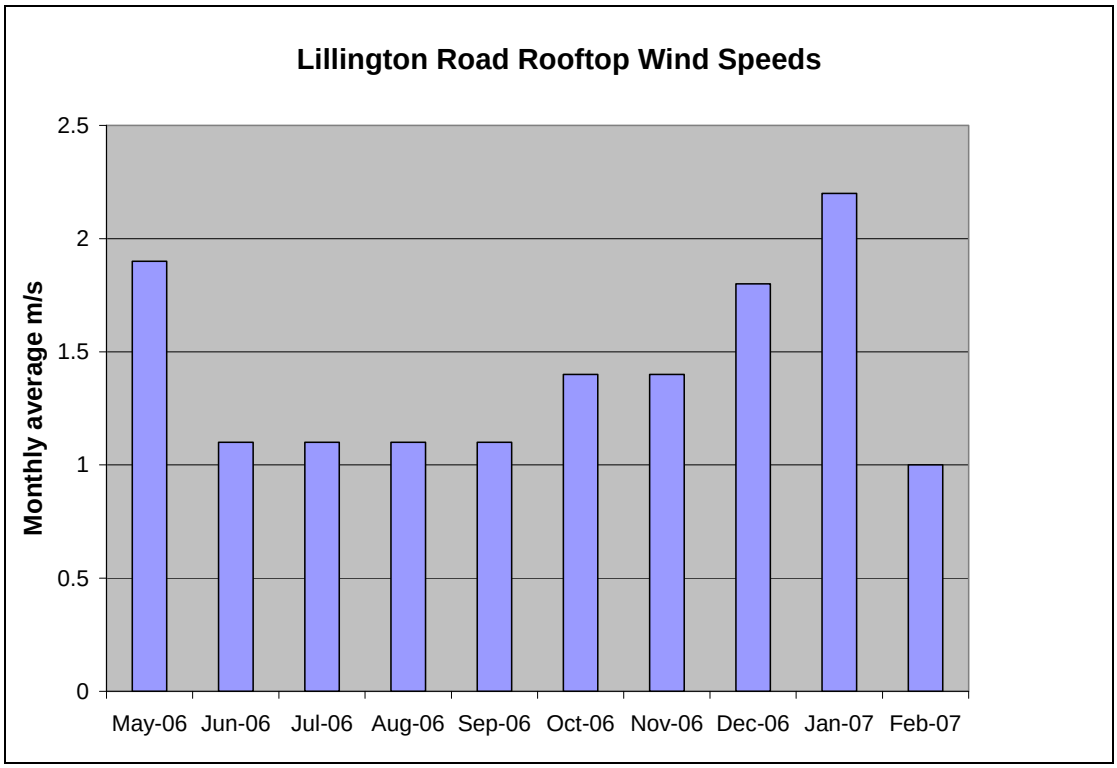
electricity (of the order of 3-10 kWh per month) and this has generated one news story which was factual rather than negative. Appendix B summarises the limited technical data secured so far.

Noise is not an issue externally on any of the sites – there is an audible swishing close to the turbine but this is only noticeable from the ground at the Hill Close Gardens site where the turbine is mounted only 5m up (a single storey building). The noise is clearly wind-related and is not mechanical.

The internal noise levels are higher on Lillington Road and while this is not a concern to the occupant this area is potentially worth monitoring in more depth.

The Ampairs are lighter than Windsave and appear to start rotating at much lower wind speeds. This gives a favourable impression to passers by as the system generally appears to be working even on calm days (for example, when no wind is perceptible at street level).

Two anemometers have been installed on the first site at different heights. The lower one has been logging wind speeds at 0.7m above the ridgeline since May 2006 and the higher one is located at the hub height of the turbine and has been recording wind speeds since installation. The chart below shows the average monthly wind speeds on the lower anemometer.



The predicted average wind speed at this site and height (NOABL) is 4.9 m/s over a full year.

The average wind speed (lower anemometer) at Lillington Road since installation has been 1.3 m/s).

In practice the meters have recorded 14 kWh of electricity generated after the inverter in 694 hours of operation. This equates to an average of 20W.

2.5.2. Commentary on this evidence

We need to gather more data for longer and from more sites to evaluate the technical evidence in more depth. From March we have correlated energy and wind speed data.

The one general statement that can be made from data gathered to date is that NOABL predicted wind speeds overestimate the wind resource in urban areas.

2.5.3. Provisional conclusions: impact on awareness of energy efficiency

The initial results on the technical performance of the systems confirm the theoretical predictions made previously by experts that wind turbines will perform relatively poorly on urban sites where turbulence is a significant factor.

The turbines do appear to attract comment and encourage people to think about energy, but this may be the impact of novelty.

2.5.4. Questions for further investigation

The remaining installations will take place on a variety of sites including 15 storey flats, a semi-rural hilltop and a three storey nursing home. A year's data from these installations will enable us to address the following questions:

- What range of performance can be expected on varying building types and surrounding contexts?
- Is internal noise a problem that needs addressing in more depth?
- Does the presence of a turbine on a neighbouring house make people more aware of their own energy efficiency?
- Will the novelty factor wear off in 12 months?

3. OVERALL INTERIM CONCLUSIONS AGAINST TRIAL OBJECTIVES

3.1. Technical performance

We have very limited data so far because of the delays in installing all 10 systems.

The (very early) data we have suggests urban wind will deliver tens to hundreds of kWh per year on typical urban sites rather than the hundreds to thousands optimistically forecast in the early stages of market development.

3.2. Social impact

The impending installation of the technology has had a strong impact on media reporting but there is limited evidence that this has made any difference to people's views about energy efficiency.

Although the press invited debate on the topic on an almost weekly basis through the summer, only one letter was written and published in a local paper and this was supportive of other energy efficiency measures in place of urban wind.

It is too early to judge real social impact because the physical reality of installed turbines in the trial community is only now beginning to impinge on local consciousness. More robust data on this front will be gathered in the summer.

Our first public opinion surveys in July 2006 put support for urban wind at 80% and a follow up survey in January 2007 indicated support at 78%. Both of these surveys predated actual installations and may reflect theoretical comfort, rather than support based on the physical reality of turbines next door, which we will test next.

3.3. Engagement in energy awareness

As yet we have only anecdotal evidence that developing the trial sites has had a positive impact on engaging people in energy efficiency, with over a dozen press reports and positive feedback from individuals visiting or passing the sites.

We will conduct structured surveys of neighbours once the installations are complete.

The planning system acted positively to raise awareness of energy issues and provided a structured focus for public debate.

4. AGENDA FOR SECOND HALF OF TRIAL

The second half of the trial between March 2007 and March 2008 will include:

- Comparative monitoring of all 10 turbines with anemometers and energy meters providing correlated and comparative data
- Monitoring and comparison of wind speeds at varying heights on Lillington Road
- An assessment of the usefulness and accuracy of NOABL modelled wind speed estimates in urban areas. Can generalisations be made (even at the level of use 30% of NOABL, say?)
- A follow up public opinion survey, including with the 59 random participants in the first survey who agreed to be re-interviewed.
- "Before" and "after" consultations with the residents of the flats where we will put the higher installations
- "After" interviews with the individuals who objected to planning applications
- Quarterly interviews with property owners who have systems installed
- Interviews with neighbours.

We are discussing extending the scope of the technical monitoring work to a larger sample of sites with additional potential partners.

APPENDICES

A. Site inventory and chronologies

Site	Context	Planning		Time required to prepare and submit planning	Manufacturer	Scheduled installation date	Comments
		submitted	obtained				
1 Lillington Road	Victorian terrace conservation area	23 June 06	22 Sept 06	8 hours	Ampair 600W (600-230) (initially Windsave WS1000 1kW)	Installed 31 Jan 07	
2 Hill Close Gardens	Single storey resource centre	9 June 06	22 Sept 06	8 hours	Ampair 600W (600-230) (initially Swift)	Installed 29 Jan 07	
3 Princes Drive	Recycling Centre	7 Aug 06	18 Oct 06	40 hours	Ampair 600W (600-230) (initially Windsave WS1000 1kW)	Delayed	Landlord still to give formal permission
4 Ashfield Road	1960s detached suburban	3 Aug 06	16 Oct 06	3 hours	Windsave WS1000 1kW	Not yet offered	
5 Lawrence Avenue	1960s semi ex-council house	31 Aug 06	19 Oct 06	3 hours	Windsave WS1000 1kW	Jan 9 then cancelled	
6 Beverley Road	1960s detached	No data		3 hours	Windsave WS1000 1kW	Not yet offered	

Site	Context	Planning		Time required to prepare and submit planning	Manufacturer	Scheduled installation date	Comments
		submitted	obtained				
7 Manston Drive	1990s small terrace	25 Aug 06	8 Nov 06	3 hours	Windsave WS1000 1kW	Not yet offered	
8 Mill Lane	Rural detached outbuilding	21 Sept 06	1 Nov 06	3 hours	FuturEnergy (initially Windsave WS1000 1kW)	Provisionally end April	
9 Eden Court 1	14 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	23 Apr 07 (provisional)	
10 Eden Court 2	14 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	23 Apr 07 (provisional)	
11 Eden Court 3	14 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
12 Tannery Court	3 storey old people's home	16 Jan 07	6 Mar 07	3 hours	Ampair 600W (600-230)	23 Apr 07 (provisional)	
13 Ashton Court 1	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
14 Ashton Court 2	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
15 Ashton Court 3	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	

Site	Context	Planning		Time required to prepare and submit planning	Manufacturer	Scheduled installation date	Comments
		submitted	obtained				
16 Southorn Ct 1	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
17 Southorn Ct 2	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
18 Southorn Ct 3	8 storey flats	16 Jan 07	7 Mar 07	3 hours	Ampair 600W (600-230)	Jun 07 (provisional)	
19 Maidenhead	Semi-detached suburban	No data			Windsave WS1000 1kW	Installed Dec 18	Out of area
20 Hemel Hempstead	Detached suburban	Awaiting data			Eclectic	Awaiting data	Out of area

B. Technical monitoring data

Site 1 - Lillington Road

18 Lillington Road is a semidetached Victorian property. It's highly insulated and has low annual electricity demand.

An anemometer was installed approximately 70cm above the ridgeline at the gable end ahead of the trial starting in May 2006. Average wind speeds recorded are listed on p2.

NOABL wind speed estimate
4.9 m/s at 10m over a full year

Planning permission

21 September 2006

Turbine installation

31 January 2007 Ampair 600W 600-230

Observations

12.06 Maximum wind speed 22 m/s.

1.2.07 The turbine is picking up significantly more wind than the (temporary) anemometer, approx 1.5m closer to the ridgeline. We will be mounting the final monitoring equipment in line with the hub of the turbine, and plan to leave the temporary anemometer in place to see how wind speed varies with height.

Data recorded

	Average anemometer readings m/s	**Energy generated kWh**	**Electricity consumed kWh**
May 2006	1.9	*Temporary monitoring equipment (prototype only)*	
June 2006	1.1		
July 2006	1.1		
August 2006	1.1		
Sept 2006	1.1		
Oct 2006	1.4		
Nov 2006	1.4		
Dec 2006	1.8		
Jan 2007	2.2		
Feb 2007	1.0	14 (to 20/3)	1 (to 20/3)
Mar 2007	1.6		

Warwick Wind Trials

Site 2 – Hill Close Gardens

This is a pole mounted Ampair 600 directly next to a single story building. While it is exposed to prevailing winds across the flat expanse of Warwick racecourse, it is the lowest of our trial sites and sheltered on three sides.

This site is having extensive monitoring equipment installed shortly.

NOABL wind speed estimate
4.7 m/s at 10m over a full year

Planning permission

21 September 2006

Turbine installation

29 January 2007 Ampair 600W (600-230)

Observations

This turbine is in a conservation area and had eight objections to planning permission, which was nevertheless granted.

Warwick Wind Trials

Supplementary Site A (19) - Maidenhead

This is the first Windsave installation we have been sent data on. The system was installed on 18 December 2006 and has generated 10.1kWh to 3 March 2007.

We hope to get additional monitoring equipment installed shortly.

NOABL wind speed estimate
4.3 m/s at 10m over a full year

Planning permission

2006

Turbine installation

18 December 2006 Windsave WS1000 1kW

Observations

Comments from property owner 3/07:

The chimney does not seem to get in the way too much as the prevailing wind direction is from the W or SW. It only really gets in the way when the wind is from the NW (not often).

The main reason for locating the turbine where it is, is to take advantage of the orientation of the house (the wall where the turbine is mounted faces due South) and the road outside tends to act as a wind funnel, so this particular corner of the house is exposed to the full force of the prevailing wind.

The turbine did trip out on overspeed when we had the high winds about a month or so ago, but it was easy to reset.

Noise has not been an issue since the turbine was installed, either for us or neighbours. We only had one objection on noise grounds during the planning application but the Council did not consider it sufficiently serious to reject our application.

C. Initial questionnaire results

Sample of 78 local respondents, selected at random (willing to talk to interviewer on the street).
Six interviewers at six locations in Leamington and Kenilworth. Saturday 15 July afternoon and Wednesday 19 July lunchtime.

Q1. How serious is climate change, in your opinion?

	Percent	Cumulative
Most important	34.6	34.6
Equal to other serious issues	51.3	85.9
We can't do anything, so worry about other things	11.5	97.4
Not important	2.6	100.0
Other	0	

Q2. Current environmental behaviour (NB - not opinions, but actual claimed behaviours)?

All figures % non-cumulative	Switch things off when not in use	Consider installing microgeneration	Recycle paper	Recycle glass	Walk, cycle, or bus to reduce carbon emissions
All the time	59.0	2.6	73.1	65.4	37.2
Regularly	32.1	7.7	11.5	19.2	21.8
Sometimes	5.1	19.2	7.7	7.7	20.5
Occasionally	3.8	15.4	1.3	0	9.0
Not at all	0	55.1	6.4	7.7	11.5

Q3. Attitude to local power generation options?

All figures % non-cumulative	Solar	Rooftop wind	Small wind	Large wind	Community power/CHP with biomass
Fully support	69.2	47.4	55.1	53.8	39.7
Agree with in principle	20.5	32.1	32.1	29.5	28.2
Open-minded	6.4	10.3	6.4	9.0	11.5
Need persuasion	2.6	3.8	3.8	3.8	16.7
Opposed	1.3	6.4	2.6	3.8	3.8

Q4. Likely to object to microgeneration through planning if next door?

Yes **7.7%**
No **92.3%**

Q5. Would you ever consider buying microgeneration?

Yes **44.9%**
No **16.7%**
Maybe **38.5%**

27% quoted price as the main reason holding them back. 1 individual was worried about noise, 1 worried about effectiveness, and 1 considered there was too much ‘hassle’ involved. 5 would consider solar but not wind. 1 person felt government should support the technology more.

59 people provided contact details and were willing to participate in the follow up next year.

August 2006.