

Western House  
Main Street  
Lowick  
Northumberland  
TD15 2UD

01289 388259

Malcolm Phillips,  
Investigations Executive,  
Advertising Standards Authority,  
Mid City Place,  
High Holborn,  
London WC1V 6QT.

21 June 2006

Your Ref: B06-03899/MP/lt

Dear Mr Phillips,

Re: Complaint about SOUL Newsletter from Pendragon Consultants and Force 9 Energy.

Further to your letter of 19 May 2006 regarding this complaint. I am responding on behalf of the SOUL Steering Group, which I chair. As you are aware, we did seek legal advice as to whether our Newsletter fell within your remit. The Steering Group has noted your letter of 19 June to Levy & McCrae, but both ourselves and our legal advisors still retain doubts as to whether or not the ASA is the right body to deal with information presented to the public in a Newsletter. Notwithstanding this, we do have extensive documentation in respect of the information presented and opinions expressed in our Newsletter and are happy to make this documentation available to you, which is all in the public domain.

The Steering Group have carefully considered the complaint. We feel that there is a general point that needs to be considered first, namely that there is a wide diversity of opinion (scientific, professional and lay) regarding the value of wind power. SOUL completely understands why developers will inevitably only put out information which supports the use of wind power. After all, they stand to make considerable sums of money if these wind power stations are built. Nevertheless, there is material in the public domain which calls into question the value of wind power (and, therefore, some of the claims made by developers). The SOUL Steering Group considers that it is only fair that local residents are also exposed to this material and this is what our newsletter was designed to do.

I have attached a large bundle of supporting documentation, in respect of our position, with this letter. Much of this is technical information and some of it is complex. The SOUL newsletter was essentially a distillate of this large mass of information, put in non-technical terms. I am sorry that this will involve much reading for you, but I have tried to highlight some of the key points in each document. I will now try and deal with each area of the complaint (as we understand it) in sequence and will refer to the enclosed documentation that supports our position, as required:

**‘Wind power in the UK’: Sustainable Development Commission (SDC) report, May 2005.**

We did not specifically comment on this SDC report in our Newsletter, but now that it has been mentioned we are happy to do so. As I am sure you are aware, there was considerable concern about the objectivity of this report when it was first published. The Renewable Energy Foundation (REF), in a press release on 19 May 2005 (Document A), called this SDC report “a stale compendium of wind industry special pleading”. Malcolm Keays (from the Oxford Institute of Energy Studies) produced a critical analysis of the SDC report in May 2005 (Document B) and stated that “the Commission ends up as just another cheerleader for wind power”. In his paper, Keays was highly critical of the way in which the SDC reached their conclusions. We (and many others) think that this SDC report can only be regarded as fundamentally flawed.

**Effect of wind power stations on the local environment, local economy and local people.**

The wind turbines in the proposed wind power stations will be 110 metres (360 feet) high. Currently, there are proposals to build 63 such turbines in one small area of rural North Northumberland bounded by the River Tweed to the north, the Cheviot Hills (a National Park) to the west, the Northumberland coast (an Area of Outstanding Natural Beauty) to the east and Alnwick to the south. This is mainly an area of rolling agricultural lowland and structures of this height and in this number will inevitably have a major adverse visual impact on the environment. Indeed, even Force 9 Energy have accepted that this will be the case in their planning application for the Barmoor wind power station (Documents C and D).

It is difficult to see how the local economy will directly benefit from the construction of wind power stations. The turbines themselves are likely to be built overseas and, clearly, specialist construction workers will be needed to erect them in the UK. It seems unlikely that such specialist construction workers will be available locally and they will need to be brought in. Once built, there is unlikely to be the need for a large number of permanent local staff to maintain the turbines.

There is, however, evidence of a potential adverse effect on the local economy if these turbines are built in North Northumberland. The local economy is particularly fragile, having seen a steady reduction in agricultural employment. Indeed, only approximately 7% of local income is now generated from farming. Conversely, there has been a steady

increase in tourism, which now accounts for 36% of the income generated in the Berwick district. Indeed, the Berwick Borough Local Strategic Partnership has estimated visitor numbers within the borough at 75,000 per day in the peak summer period (Document E). Growth in tourism is seen as the major area for economic growth in Berwick Borough (and in the county of Northumberland as a whole) and the BBLSP has a target of increasing visitor numbers to 100,000 per day in the summer months and trying to extend the 'visitor season' throughout the year. Any development that could put the expansion of the tourist industry in this area at risk would be disastrous economically.

There is evidence to suggest that visitors are put off from visiting areas where there are wind power stations. VisitScotland published a survey about the potential effect of wind power stations on tourism in Scotland in 2002 (Document F). They found that "as many as 26% of visitors claimed that they would be less likely to visit an area if a wind farm was developed there". In addition, there was a general consensus amongst visitors that the visual impact was "felt to be sufficiently negative, that as far as possible wind farms should be sited in areas away from those popular with tourists – ideally there was a preference to avoid having to see them at all on their visit".

A report was prepared by the NFO WorldGroup for the Wales Tourist Board on the 'Potential impact of wind farms on tourism in Wales' in 2003 (Document G). Of those surveyed, 67% disagreed with the statement that "it would be an added attraction if wind farms were located in popular tourist areas". 22% of respondents would be "likely to avoid any parts of the countryside with wind farms" and 11% not return to an area for a further holiday if wind turbines were built there.

Cumbria Tourist Board (CTB) carried out surveys of tourism businesses in Cumbria in 2003/04 and of visitors to the area in 2005, regarding the impact of developing wind power stations. The results were given in the submission of the CTB to the Whinash planning enquiry (Document H) in April 2005. Of those surveyed, 54% of tourism businesses thought that wind power stations would be "visually intrusive and damaging to the landscape"; 39% felt that wind power stations would "deter visitors completely" and 42% thought that wind power stations would "detract from the visitor experience". In the first survey of visitors, 15% of people aged over 50 (and this group comprises 40% of Cumbria's visitor base) would "think twice about visiting the Lake District if the proposed wind turbines were built". In a second survey of visitors, 19% would "avoid areas of countryside containing wind turbines". A further 10% stated that they would visit the area less often. The CTB stated in their submission that "a reduction of visitors on this scale would have very damaging consequences for the tourism industry and the economy of Cumbria". In view of the "significant harmful economic impact" of the proposed wind power station, the CTB opposed the application for the Whinash development.

For those local residents who live close to a wind power station, there are auditory as well as visual effects. In 2004, Van der Berg published a paper in the *Journal of Sound and Vibration*, which was reviewed by the REF in September 2004 (Document I). Significant noise was heard by local residents, particularly at night, up to 1.9 km from the

wind turbines. The model used for assessing wind power station noise in planning applications in the UK is 'ETSU-R-97'. There is now concern about this method and a critique from Bowdler in 2005 (Document J) is attached. Such noise may not only be unpleasant for those living close, but may have adverse health effects. A Working Party of the Academie Nationale de Medecine, in Paris, has recently reviewed data on the effects of wind turbines on human health (Document K). They have recommended that no further wind turbines (of 2.5 Mw or more) should be built less than 1500 metres from human habitation.

Perhaps the adverse effects on local residents can be best summarised by those who live close to an existing wind power station (Document L). Residents of the villages of Marton, Askam and Ireleth (in South Cumbria) have stated that: "The windfarm is noisy, it is a visual blight, it does create flicker shadow, it has resulted in very little benefit to the local economy, it has not resulted in an increase in tourism and negotiating with PowerGen Renewables and Wind Prospect has been a most unpleasant experience for all those involved. Simply put, we want our quality of life back..."

### **Evidence from other countries that wind power generation is expensive and inefficient.**

Electricity cannot be stored in commercial quantities. Electricity generation has to match demand. Peak demand in the UK in 2004 was 61 Gigawatts (Gw) and to guarantee meeting this demand at any time, 80 Gw of conventional generating capacity was in operation (*Digest of UK energy statistics; 2005*). Conventional power stations are able to increase/decrease electricity generation in line with demand. Electricity can obviously only be generated from wind turbines when the wind is blowing strongly enough to turn the turbine (see next section)!

E.ON Netz GmbH is a German company which operates the grid for over 40% of Germany's installed wind capacity. They reviewed their experience in 2003 in *Wind Report 2004* (Document M). In 2003, the maximum infeed of power was just under 80% of the installed wind speed capacity. The annual average infeed of electricity from wind turbines was only 16% of their theoretical maximum output. Although some electricity was being generated by these wind turbines for most of the year, for half the year the electricity infeed was less than 11% of the theoretical maximum output of the installed wind turbines. The report also notes that the "wind power infeed changes can occur in a relatively short time" and uses graphs of electricity demand and infeed to illustrate this.

E.ON stated in *Wind Report 2004* that: "In order to guarantee reliable electricity supplies when wind power plants produce little or no electricity....traditional power stations must be available as reserve. The characteristics of wind make it necessary for these 'shadow power stations' to be available to an extent sufficient to cover over 80% of the installed wind capacity. This means that due to their limited availability, wind power plants cannot replace the usual power station capacities to a significant extent".

This need for 'back-up' generators has cost implications. E.ON stated: "The massive increase in the construction of new wind power plants in recent years has greatly increased the need for wind-related reserve capacity in Germany. In 2003, costs amounting to around 100 million euro were incurred in the case of E.ON Netz alone." E.ON also drew attention to the inadequacy of the existing grid infrastructure and highlighted the need for significant investment in the grid system to cope with electricity generated from wind.

In *Wind Report 2005* (Document N), E.ON reviewed their operating experience in 2004. Installed wind capacity in their area rose by 12.8% from 6250 Megawatts (Mw) to 7050 Mw. The maximum infeed of power was around 85% of the installed wind capacity and the average annual infeed of electricity from wind turbines was just over 18% of their installed maximum capacity. For over half the year, the electricity infeed for wind was less than 14% of the theoretical maximum output of the installed wind turbines.

The issue of the need for 'back-up' capacity was reviewed and E.ON stated that, in 2004, two separate studies in Germany had investigated the size of contribution that wind power stations could make to guaranteed capacity within an electricity supply portfolio. Both studies came to virtually identical conclusions: "That wind energy currently contributes to the secure production capacity of the system, by providing 8% of its installed capacity". However, as the number of wind power stations increases, the lower availability of wind power undermines the stability of the entire system to a greater extent.

In *Wind Report 2005*, E.ON revised upwards their estimate for the amount of traditional power stations that would be required as 'back-up' for wind power. They now state that "traditional power stations with capacities equal to 90% of the installed wind power capacity must be permanently online in order to guarantee power supply at all times". More worryingly still, E.ON attempted to assess the situation in 2020 when Germany has a forecast theoretical maximum capacity from wind power of 48,000 Mw. They concluded that only 2000 Mw of traditional power production would be replaced by wind – the remainder of the traditional generating network would have to remain in operation to guarantee supply.

This experience (and Germany has the largest number of wind power stations in the world) is manifestly not that of an efficient electricity generating system, if the average annual output of electricity is only 16%-18% of the installed theoretical maximum generating output and if traditional power stations (with an output of 90% of the installed theoretical maximum output from wind) have to be kept permanently operating to maintain electricity supply.

These difficulties were recognised by Martin Fuchs (CEO of E.ON Netz GmbH) in his annual press conference in June 2005 (Document O). He talked of the "wind integration challenge" because: "1) The wind blows, when it will. 2) The wind blows as it will – despite increasingly accurate forecasts, it is difficult to predict its actual strength. 3) The wind blows, where it will – and sadly, it does not blow where large quantities of power

are required.” Mr Fuchs also revealed that 2,700 km of new power lines would be needed in Germany by 2020 to transmit this variable amount of wind power within the grid system. He stated that the total cost of this (depending on how the lines were to be built) would be anything between 3 billion euro and 20 billion euro!

The cost of electricity generation from wind power has also been studied in Ireland by ESB National Grid (Document P). This document reports studies which simulated Ireland’s generation system. The model studied, for estimating electricity generation costs, was of a system with a peak output of 6,500 Mw. With no wind power in the generation portfolio, annual generating costs were estimated to be 1.28 billion euro. With a maximum installed capacity of 2,500 Mw from wind (and the actual amount of electricity generated would, of course, be much lower), the annual generating costs would rise to 1.58 billion euro (an increase of 24% in generating costs alone). This report did not look at the potential additional costs of investment into transmission infrastructure (which the German experience indicates would be necessary), but did comment that “the cost of CO<sub>2</sub> abatement using large levels of wind energy penetration appears high relative to other alternatives”.

### **Efficiency of wind turbines.**

Electricity can only be generated by a wind turbine when the wind is blowing! If the performance of the Nordex N80 turbine (a 2.5 Mw turbine) is studied, electricity generation starts when the wind speed reaches 4 metres/second (m/s), which is approximately 9 mph (Document Q). When the wind speed is between 4 m/s and 14 m/s (approx 32 mph) the electricity output varies with wind speed. When the wind speed is between 14 m/s and 25 m/s (approx 56 mph) electricity output is maximum and constant. At wind speeds over 25 m/s, the turbine must be shut down for safety reasons. Some older turbines do operate at a reduced power output at wind speeds over 45 mph, also for safety reasons. Wind speeds are highly variable within the UK, but average 5-6 m/s in lowland areas and rise to 8-10 m/s in exposed uplands in the north and west. When the need for maintenance is added in, it can easily be appreciated that there is considerable variability in the amount of electricity generated by wind power stations (as the German experience clearly shows – see previous section).

The concept of Capacity (Load) Factor allows an attempt to be made to analyse this variability. Capacity factor is defined as the actual power output of a wind turbine over a given period (typically one year) as a percentage of the theoretical maximum output of the turbine over the same period of time. In other words, if a wind turbine with a theoretical maximum output of 2 Mw had a capacity factor of 25%, it would have generated 0.5 Mw of electricity on average. Data has been collected for many years from Denmark and Germany, where there is considerably more experience with generating electricity from wind than in the UK. Over the last few years, the Danish capacity factor has averaged around 20% and the German capacity factor has averaged 15-17%.

In the March 2006 issue of *Energy Trends* (Document R), the DTI analysed UK onshore wind capacity factors between 1998 and 2004. The average capacity factor for the whole

of the UK over this period was 29%. There is considerable regional variability, from the lowest average capacity factor of 21% in North East England to the highest of 36% in Northern Ireland. The capacity factor for a modern gas fired conventional power station is of the order of 75%-90%. Electricity generation from wind power is, therefore, considerably less efficient when compared with conventional generators.

### **Wind power and CO2 emissions**

This was the subject of a detailed analysis by White in 2004 (Document S) and this paper merits thorough reading. Whilst it is true that electricity from a wind power station is free of CO2 emissions at the point of generation, the national emissions picture is considerably more complicated. It is necessary to consider the extent to which wind generated power can displace conventionally generated power from the total electricity supply system on a minute by minute basis. Wind generated power is inevitably variable and unpredictable. However UK consumers require guaranteed power on demand and, as stated earlier, 80 Gw of conventional generating capacity is currently in operation to guarantee electricity supplies.

Integrating wind-generated power into the UK system is not just about shutting down conventional power stations when the wind is blowing. Starting up and shutting down power plant can take minutes or hours, depending on the type of plant, while power may be needed in second or minutes. Any calculation of CO2 emission reduction must take into account the amount of conventional generating capacity that has to be kept in varying states of readiness to meet demand. In practice, significant capacity has to be kept operating and synchronised to be available for rapid response, which essentially means fossil-fired capacity operating in parallel with wind. This supporting capacity will be operating below its optimum efficiency and such operations will produce more CO2 per kWh than if plant operations were optimised. The more wind capacity that is introduced, the more of this lower efficiency plant will be required to operate on part-load, with increased CO2 emissions.

As White pointed out, data is available from some of the power generators and equipment manufacturers showing an increase in CO2 emissions as a result of any decline in generating efficiency with reduced load. Indeed, in an address (Document T) to the Institution of Mechanical Engineers in 2003, David Tolley (Commercial Manager of Innogy plc) described the experience of one UK generator (Innogy) in accommodating a modest amount of electricity generated from wind into its system and stated "...it has been estimated that the entire benefit of reduced emissions from the renewables programme has been negated by the increased emissions from part-loaded plant...."

In 2005, the Environmental Change Institute (ECI), of the University of Oxford, produced a report (Document Q) for the DTI on the characteristics of the UK wind resource and the implications of these for security of electricity supply. The ECI noted that the average capacity factor for wind in the UK at that time was 27%. Despite this, the authors then used a capacity factor of 35% in their subsequent calculations. The use of

this figure is somewhat dubious as even the most up to date data (see previous section) only gives an average capacity factor for the UK of 29%!

The authors used as a model an electricity network with a peak demand of 70Gw. They considered that 84Gw of conventional capacity would be required to guarantee meeting demand (the 2004 UK situation was peak demand of 61 Gw with generating capacity of 80 Gw). Using the inflated capacity factor of 35%, they stated that 13 Gw of wind power capacity would be needed to generate an average of 5.3 Gw of electricity (this would require 6500 wind turbines of 2 Mw maximum output). The ECI report stated that 13 Gw of installed wind capacity would allow 3 Gw of conventional generating capacity to be retired – meaning that 81 Gw of conventional generating capacity would need to be retained and kept in operation. In other words, even with this huge number of turbines in operation, 96.4% of conventional power stations would need to be kept in operation. This is the background to the section on page two of our Newsletter.

However, this report from the ECI seems overly optimistic when examined further. If the up to date UK average capacity factor of 29% is used, 20 Gw of installed wind power capacity would be needed to generate (on average) 5.8 Gw of electricity – just under 10% of current UK peak demand. This would mean that 10,000 wind turbines of 2 Mw output would be needed. As indicated above, the German experience suggests that the more wind power stations are brought into operation, the more ‘back-up’ conventional capacity is required. The figure of retaining 96.4% of conventional power stations is likely to be an underestimate and more conventional generating capacity would need to be retained in operation. Much of this conventional capacity would be operating at low output/efficiency for part of the time, with powering up and down to meet electricity demand. This will result in increased production of CO<sub>2</sub> per kWh.

The DTI reviewed CO<sub>2</sub> emissions by source in *Energy Trends* in March 2006 (Document U). In 2005, the UK produced a total of 157.4 million tonnes of carbon (MtC). Electricity generation from power stations accounted for 46.8 MtC (29.7%) of this. Using the model of 20 Gw of installed wind power producing 5.8 Gw of electricity, it is likely that approximately 97% of conventional power stations would need to be kept in operation. Using the 2005 data, if a 3% reduction in CO<sub>2</sub> emissions from power stations could be achieved with such a massive wind power station building programme, total UK CO<sub>2</sub> emissions would fall to 156 MtC (a reduction of 0.9%) with power generation accounting for 45.4 MtC (29.0% of total CO<sub>2</sub> emissions). If it were possible to achieve a 5% reduction in CO<sub>2</sub> emissions from power stations, total UK CO<sub>2</sub> emissions would fall to 155.1 MtC (a reduction of 1.5%) with power generation accounting for 44.5 MtC (28.7% of total CO<sub>2</sub> emissions). This is what we stated in the first paragraph of page two of our Newsletter – that wind power will not reduce our CO<sub>2</sub> emissions by more than 1-2%.

This figure is close to the DTI’s own estimate (see Document A) that attainment of the 2010 renewables target (of generating 10% of electricity from renewable sources) would achieve a reduction of carbon emissions in the UK of only 2.5 MtC (approximately 9.2 million tonnes of CO<sub>2</sub>). That is just 1.7% of UK emissions of CO<sub>2</sub> (550 million tonnes) and 0.0004% of global CO<sub>2</sub> emissions (24,000 million tonnes). Such a massive (and

expensive) wind power station programme in the UK could not, therefore, have any effect on global warming – which is often stated (by developers) as the rationale for building wind power stations in the UK.

### **Connection of wind power stations to the national grid.**

It is surely self-evident that any wind power station will require connection to the national grid, so that any electricity produced can be distributed. SOUL has not come across any suggestion that such connections from power station to grid system will be by underground cables and, therefore, new overhead transmission lines will clearly be required. This is recognised by Force 9 Energy in their application to build a wind power station at Barmoor (Document C).

The size of the overhead transmission line will obviously be determined by the amount of power it will have to carry – the more wind power stations that there are in a small area, the bigger the transmission line linking them with the main grid system. The length of any overhead transmission line will be determined by the distance from any wind power station(s) to the main grid system. It is already clear that in Scotland, where much of the UK wind power station development is currently taking place, there are already major problems with the grid infrastructure (Document V). Existing lines are having to be upgraded and new grid capacity built. Some developers have been told that it may be 2016 before they are connected to the grid system.

The need to improve and enlarge grid infrastructure has also been recognised in other countries. As indicated above E.ON Netz has commented on this very point in *Wind Report 2004* and *Wind Report 2005*. Their CEO has stated that 2,700 km of new transmission lines will be needed in Germany by 2020 to cope with the projected number of wind power stations. It seems inevitable that if more wind power stations are built in England and Wales, then there will also need to be upgrading of existing lines and the building of new grid capacity in both countries.

### **Surveys on effect of wind power stations on tourism.**

This has, I think, already been dealt with in the second section above (pp 2-4). The relevant documents in respect of the surveys carried out in Scotland, Cumbria and Wales are attached. There is remarkable consistency in all three surveys, in that a significant number of visitors to an area (approximately 20%-30%) say they would either not return or would visit less often if wind power stations were built.

### **Background picture across bottom of pages 2 and 3 of the newsletter.**

Clearly, this is a background image only and the important part of pages 2 and 3 is the text. The photograph was taken from the south-west boundary of Barmoor Castle Caravan Park, looking across the southern half of the proposed site of the Barmoor wind power station towards the Cheviot Hills. The Cheviot is the highest hill, on the right lower border of page 2. Barmoor Castle lies approximately 2 km to the north-east of the

site of the proposed Barmoor wind power station and is marked on the map in the top right hand corner of page 3 of the Newsletter. The images of the wind turbines that have been overlaid on this image are not supposed to represent the exact sites of the proposed wind turbines at Barmoor and, indeed, we made no claim to this effect in our Newsletter. This Newsletter was produced before the detailed site maps were available to us giving the exact locations of the proposed turbines. The objective of this background image was to give local residents an idea of the size of the turbines. Care was taken to ensure that the images of the wind turbines were as close to the correct scale as possible, so that a reasonable impression could be gained of the size of these turbines (over 360 feet high). The line drawing on page 1 is there for the same reason – to try to relate the size of a turbine to everyday objects. Given the huge cost of producing computer-generated photomontages, this is the best we could do.

### **Conclusion**

I hope that this letter and your review of all the attached documentation will convince you that there is material in the public domain which supports the opinions expressed in the SOUL Newsletter. As I stated above, SOUL recognises that there is a diversity of opinion about the value of wind power and that it is inevitable that developers will only use material favourable to their case. However, we believe that it is entirely reasonable for us to put forward the opposite point of view and to make local residents aware of the information which supports our position. It is obviously not possible to put all the detailed scientific and technical data in a Newsletter, but we did give details, on page 4 of the newsletter, of websites where the more detailed information could be found.

If there is any further clarification I can give you, particularly in respect of the attached documentation, please get back in touch with me.

Yours sincerely

Peter H Worlock  
Chairman, on behalf of the SOUL Steering Group.