

# Two Proposals for B&H Wind Turbines

[jim-adams@supanet.com](mailto:jim-adams@supanet.com)

This note is very much a *preliminary* discussion document on two schemes for large-scale wind turbines in Brighton and Hove. There is no reason why the proposals cannot be integrated or modified, in ways to be decided. The reason two schemes are selected is that different recommendations have been made by Graham Ennis arising from his conversations at the Renewable Energy conference in London, compared with the investigations by Prof. Alan Turner on wind turbine availability. It seemed reasonable to the author to incorporate *two* proposals, albeit a little artificially, so that a fuller range of views can be expressed, coming from many sources.

- Proposal 1. (Graham Ennis/David Russell). This is the larger of the two proposals.
  - Generating capacity – 50 MW.
  - 11 wind turbines around Shoreham Harbour (on/off shore), 3 off Brighton Pier.
  - The claim is that this bypasses local planning, in that it is a national scheme.
  - There would be an architectural ensemble around the turbines at Shoreham Harbour (architect David Russell?).
  - The turbines would be ½ price reconditioned Vestas cast-offs, with a life of about 20 years.
  - There would be a link between Brighton Pier and the 3 wind turbines.
  - Finance: Triodos Bank.
- Proposal 2. (Jim Adams/Robert Cohen/Alan Turner). This is a local Shoreham Harbour proposal.
  - One of several farms, the first turbines to be at Shoreham Harbour, and close offshore.
  - There would be an artistic competition for sculpted wind turbines, meeting certain conditions.
  - There would be a Transition B&H office and Renewable Energy Visitor Centre at Shoreham Harbour.
  - Prof. Turner has supplied a list of smaller turbine companies (see in-depth discussion at the end of this document).

- There would be a development (grant) scheme on adiabatic compressed air and/or electrolysis energy storage.
- Finance: Business Group to investigate.
- Ownership: Cooperative or standard energy company.
- Billing/customer base: outsourced.
- Maintenance of turbines: outsourced to a standard energy company.
- Local planning permission required: yes.
- Business plan: Via Brighton University students, as part of their course.
- Name for company: Renergy.

## Discussion.

Jim Adams, re: Robert Cohen's comments on 'The War on Bureaucracy'.

Robert Cohen maintains that the major problem in getting a project up and running is bureaucratic obstructionism, and that I should be prepared for a seven year struggle in getting wind turbine proposals through. I am.

On the question of how such a project could end in success, Robert came up with an interesting observation, which has become part of Proposal 2. This is that to get a proposal through, it is sometimes useful to create a diversion, so that objectors home in on that, rather than the content of the proposal, in this case to get wind turbines installed in and around Shoreham Harbour.

He suggests creating an architectural/sculptural ensemble round the wind turbines.

My own proposal is that we open this up to a competition from leading architects and sculptural artists in the UK.

Invite from Theresa at Shoreham Power Station to Chris Boocock: 17 October 2008.

ScottishPower is holding an event as the attached letter, and keeping in mind your recent projects I think that you may like to attend. I've attached the invitation letter that contains the event location and would be grateful if you could let me know if you and/or your colleagues would like to attend. If you are unable to make the day event there is an event in the evening for local councillors etc. from 17:30.

Regards

Theresa  
Shoreham Power Station

Invitation letter.

October 13 2008

Dear Chris

Stakeholder Event November 12 2008 - Thistle Hotel Brighton

As part of the development of our public safety and environmental strategy we're trying to discover what our key stakeholders think of us and how we can best focus our work to help them more.

We are organising an event to listen to what you have to say and we would very much like to involve you, hear your opinions rather than just telling you ours, so this won't be just another meeting – the majority of time is set aside for us to listen to you and build your ideas into our environmental strategy work in very practical ways.

We really do need to hear what you have to say about what we are doing now and what we might do in the future. We want to know how we can help by doing things that make best sense to you. To make sure we don't influence this process, and to make sure it is objective, we are working with independent facilitators with over 10 years of experience in this kind of work.

What's in it for you?

- A chance to make a significant difference to how we develop our environmental strategy over the next 10 years
- To pick up ideas and information by talking with others working in this area

With this in mind we would like to invite you, or a representative nominated by you, to attend a meeting on November 12 2008 at 12:30 in the Keats Room at the Thistle Hotel Brighton. We plan for the meeting to last no more than 3 hours and a buffet lunch will be provided. We look forward to meeting you and would be grateful if you would confirm your attendance on the attached form & return in the prepaid envelope. Thank you for your time.

Yours sincerely

Theresa E McCall  
Shoreham Power Station  
Email: [Theresa.McCall@scottishpower.com](mailto:Theresa.McCall@scottishpower.com)  
Office: 01273 427508 Fax: 01273 427544

Theresa thinks they can cater for about five of us so I suggest we coordinate amongst ourselves who would like to go and what we'd like to discuss.

Regards

Chris

Graham Ennis. Date: Wednesday, October 22, 2008, 12:39 PM

Hi All.

The article shows what a disaster the Government wind energy plans are. The local impact is not so bad however. The Shoreham power station is located on a main national grid intersection, already wired up to the national transmission system. It carries about 500 megawatt plus of power to distribute its local 400 Mw output plus balancing loads, and can probably carry a bit more. The site is under local control of the planning authority, so no problems there, except anti-wind loonies, who could cause lots of trouble, and delays.

The answer to that is to increase the project size to 11 turbines, so it's over 50Mw and the national planning authority steps in. This can be done by having three onshore on the beach, plus 8 more in the very shallow water just offshore, within 1km of the beach, strung along for a Km in two rows of 4, for example. This is, theoretically, nearly 90% of the load for B&H, but would have an average load factor of about 20%, annualised. Very useful. We are talking standard VESTUS 4.5 Mw turbines here, preferably second hand, recon jobs. We need to think about a couple of large turbines 1000/500 meters off Brighton beach, eventually, between the Piers, as a tourist feature as well.

Other sites in B&H, such as up on the ridges behind Woodingdean, smaller in size, 500Kw/1Mw second hand, in multiples, making another 5-10 Mw. These would need a small private wire cable to the nearest grid location, about three Km, which would be buried. There are similar possibilities in Hangleton The principle here is of infilling with small turbines wherever there is a possibility. Eventually, after a few years, we might have about one third or more of the sustained load in Brighton met from this. But the seed would be the first turbine project, on Hove beach. Three/four turbines.

Comments? Graham

Martin Grimshaw. Date: Wednesday, October 22, 2008, 16:33 PM

Graham - ermm, are you serious about wind turbines on the beach at Hove? There were people bandying the idea around of making the 'British Airways / London Eye tower' at the West pier into a turbine, not sure how serious. Make it into a tourist attraction, maybe. But I suspect just putting it on the beach will encounter serious flak. Why not further out?

Martin G

Graham Ennis. Date: Wednesday, October 22, 2008, 19:18 PM

Hi All, Hi Martin,

Yes, actually, I own up, (with Jim) to being the secret plotter that nearly brought Ecotricity to Brighton.

Quite a lot of work was done on sites. Hove beach actually extends nearly half way along Shoreham harbour, the bit where they have the lock gates, the canal. It's not overlooked by expensive housing, its an industrial zone and rust belt area. No problems.

The thing is, onshore is half the cost of offshore, and will get something up and running asap with a decent cashflow.

I'm not suggesting putting it in front of Regency terraces. It's almost behind the power station. Would lead to a sort of regeneration of the area.

I would love to put a large turbine between the two piers, 1000 meters out, (no noise at that distance) which would be a tourist attraction, as well. They do look spectacular.....

In the meantime, we should consider the huge underwater turbine potential offshore of Brighton, which is enough for the whole of Sussex, actually, in a rectangle between Rottingdean and the power station, to three miles out.

Totally invisible, and totally silent, but I'm sure the usual moaners will complain, or find something to argue about. (No, they do not harm fish, who spot them miles away.....)

Regards

Graham

Prof. Alan Turner. Date: Wednesday, October 10, 2008, 15:36 PM

Jim,

I attach something on wind power that may interest members of the Transition Town Group. It contains a recommendation to the City Council to go for several 5 MW wind farms.

I have also established that if the gas to Shoreham power station gets shut off then the rest of the country's gas fired stations would also be shut off and there would be widespread power shortages. We couldn't independently keep Brighton supplied.

Alan

Wind Power, current position, 10<sup>th</sup> October 2008

A B Turner, University of Sussex

The whole wind power picture is complex and there is a distinct difference between small and large power systems in grants and subsidies for initial costs and for selling the power. Small wind power, i.e. turbines <5kW, is uneconomic; large wind power (turbines >750kW) is very profitable.

The recommendation for Brighton would be to ignore small power systems for now and install several small wind farms of 5MW or so. The reason for limiting the power to <5MW is that the large power manufacturers (each turbine >2MW) have full order books for the next 4 years at least and they are not even looking at wind farms of <20MW. There are serious bottlenecks in the global supply chain for key components of large wind turbines such as generators, blades and copper and in the UK more than 200 wind farm projects are currently held up due to planning and assessment delays: large power applications at the moment can take 3 to 15 years. Small domestic wind turbines (0.24kW – 5kW) are totally uneconomic and at the moment they probably increase the carbon footprint. Although they qualify for an initial renewables grant of £2500 maximum, payback times are usually more than 17 years – the grants make little difference - and manufacturers of small wind power systems see themselves as “pre-commercial” and are awaiting bigger government support.

Medium sized wind power (10kW – 20kW) can make economic sense, but only with full use of the grants available as without these the payback times run from 15 to 12 years. The incentive for small businesses is a ‘capital allowance’ of 30% against tax but some larger scale business projects can get a 100% ‘enhanced capital allowance’. The Renewables Obligation Certificates, ROCs, make a tremendous difference and especially for some groups with the current ‘Low carbon buildings programme’, Lcbp, Phase 2 that gives 50% grants for new buildings and when the proposed “double ROCs” come in, this size of power could become as profitable as Large Wind power. In some cases ROCs as they stand can reduce the payback times by 70%.

Large wind power turbines on the order of 750kW and above are profitable with excellent ROIs; the cost per kW is currently £1000 to £1200 with paybacks often below 2 years.

The most knowledgeable group supplying wind power systems (with a clear understanding of the various grants and subsidies in the South of England) is an engineering company:

Industrial Maintenance Services, Portsmouth, (Manager Fergus Brown),  
[www.imsindustrial.co.uk](http://www.imsindustrial.co.uk)

They seem eminently sensible and their recommendation for Brighton City Council would be to go for several smaller wind farms, each less than 5MW, using Conergy Powerwind 56 turbines (900kW, £1.1 million each). Each farm would produce an annual revenue stream of about £2 million for a gross outlay of £5.5 million: these turbines are currently available with a 6 month lead time. The best sites in the Brighton area are in the grid square TQ3506 between Woodingdean and Bevendean and the local planning process need only take less than 18 months. Any wind farm greater than 5MW would have to be handled by the Home Office. There is no possibility that such wind farms could form a local strategic reserve should the gas supply to Shoreham power station be cut off for political reasons. Brighton is locked into the national grid and it is the regional suppliers that would buy the wind power (and the ROCs) from the generator Brighton City Council.

### Wind Power equation.

For those interested in doing their own calculations a simple wind power equation is:  
 $P = 0.2 \rho A v^3$  watts, where  $\rho = 1.2$  (kg/m<sup>3</sup>),  $A$  = blade swept area (m<sup>2</sup>) and  $v$  = wind speed (m/s). Most large turbines have a max power rating based on a wind speed of 12 m/s but smaller turbines use wind speeds from 9 to 15 m/s.

For the energy recovered an average/good site can have a power factor of 0.3 of the max power (this can vary between 0.17 and 0.45) so that:

$$E = 0.3 \times 24 \times 365 \times P_{\max} \text{ kWh per year, (P}_{\max} \text{ in kW).}$$

### Small turbine payback times

A quick survey of wind turbines available gives the following payback times. A 30% power factor has been used with no allowance made for capital grants or buy back subsidies such as ROCs. The capital cost includes the turbine-generator, mast, electronic controls and installation and a generous 10p per kWh has been assumed for the value of the electricity generated. No cost has been assumed for maintenance. It can be seen that the larger the power the quicker the payback time.

Stealthgen D400	0.24	2750	630	44
Proven Energy	2.5	17500	6570	27
	6.0	28,000	15770	18
	15	50000	39420	13
Segen Kestrel	0.6	4112	1577	26
	Kestrel	1.0	7000	2630
Skystream	1.8	10,000	4730	21
Iskra	5	25,000	13140	19
Westwind	10	35,000	26280	13
Westwind	20	65,000	52560	12
Vestas V17Recon	75	100,000	197100	5.1
Vestas V27Recon	225	275,000	591000	4.6
Fortis Wind Energy	1.4	11750	3679	32
	5	21550	13140	16
	6	25850	15768	16
	10	39450	26280	15
	20	64950	52560	12
	100	250,000	262800	9.5
Gaia Wind	11	39000	28908	14
Quiet Revolution (VA)	2.5	10,000	6570	15
	5-7	38,000	18396	21
Conergy Powerwind 56 900		1,100,000	2,370,000	4.6